DOE/EIS-0471

Environmental Impact Statement for the Proposed Areva Eagle Rock Enrichment Facility

Bonneville County, Idaho

Final Environmental Impact Statement

U.S. Nuclear Regulatory Commission NUREG-1945, Adopted as DOE/EIS-0471

U.S. Department of Energy

May 2011

Responsible Federal Agency: U.S. Department of Energy

Title: *Final Environmental Impact Statement for the Proposed Areva Eagle Rock Enrichment Facility – Bonneville County, Idaho (Adopted)(DOE/EIS-0471)*

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Proposed Action: The U.S. Department of Energy (DOE) is proposing to issue a loan guarantee to Areva Energy Services, LLC (AES), to provide funding for construction of the Eagle Rock Enrichment Facility (EREF) Project. The facility would be located in a rural area in western Bonneville County, Idaho. The EREF would be an advanced uranium enrichment facility utilizing centrifuge technology for the production of commercial nuclear fuel.

In December 2008, prior to DOE Loan Programs Office (LPO) involvement in the EREF project, AES submitted an application for the construction and operation of the EREF to the U.S. Nuclear Regulatory Commission (NRC). As required by Section 193 of the Atomic Energy Act (42 USC § 2243), the NRC prepared an environmental impact statement (EIS) which analyzes the impacts of the proposed plant. NRC issued a final EIS in February 2011 (see NUREG-1945, at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1945/). The Atomic Safety and Licensing Board has yet to issue its final decision on the issuance of a license to AES for the construction and operation of the EREF.

Public Involvement: DOE did not participate as a cooperating agency in the preparation of the February 2011 final EIS; therefore, DOE, in accordance with the National Environmental Policy Act (NEPA) regulations, is recirculating the 2011 final EIS for a period of 30 days and filing it with the U.S. Environmental Protection Agency (EPA). DOE's final EIS is available at the following locations:

- DOE LPO website: LPO Environmental Impact Statements - Areva EREF
- DOE NEPA website: DOE Final EISs

DOE will issue a Record of Decision no sooner than 30 days after EPA publishes a Notice of Availability of this final EIS in the *Federal Register*.

DOE conducted an independent review of the NRC final EIS for the purpose of determining whether DOE could adopt it pursuant to 40 CFR 1506.3. As part of DOE's independent review, DOE:

(1) Reviewed the action contained in the AES loan guarantee application and the proposed action analyzed in the NRC EIS;
(2) Performed a review under the Farmland Protection Policy Act (FPPA) to assess the effect of the project on prime farmlands;
(3) Consulted with the Advisory Council on Historic Preservation (ACHP) regarding DOE's compliance with Section 106 of the National Historic Preservation Act.

(1) Review of the Proposed Action - DOE reviewed the action encompassed in the AES loan guarantee application to ensure it is the same as the proposed action analyzed in the NRC final EIS. From DOE's review, it concluded that the action encompassed by the AES loan guarantee application is substantially the same as the proposed action analyzed in the NRC final EIS.

(2) FPPA Review – DOE assessed the EREF site using the criteria and guidance specified in 7 CFR Part 658 to determine the suitability of the site for protection as farmland. The rule specifies a two-part evaluation for this determination: 1) a site assessment by the Agency involved in the proposal using twelve separate criteria; and, 2) a determination of the relative value of the property as farmland provided by the Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture. DOE analyzed the site using the twelve criteria and received a value for the proposed site from the NRCS. After completing the evaluation, it was determined that the proposed site scored below the numeric threshold specified in the rule such that no further consideration for farmland protection of the proposed site is needed and that no alternative sites to avoid prime or unique farmland need to be evaluated.

(3) ACHP Consultation - DOE is consulting with ACHP regarding its Section 106 responsibilities under the National Historic Preservation Act. Although DOE would have a different federal action (providing a loan guarantee) than NRC had (issuing a license), DOE's action would not add to or alter the undertaking (per 36 CFR §800.16(y)) that has been subject to the Section 106 review process completed by NRC. Accordingly, DOE's Section 106 compliance requirements for the proposed loan guarantee for the AES EREF project have been satisfied.

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Final Report

Chapters 1 through 10

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Chapters 1 through 10

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ABSTRACT

On December 30, 2008, AREVA Enrichment Services LLC (AES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission the proposed Eagle Rock Enrichment Facility (EREF). The proposed EREF would be located in Bonneville County, Idaho, approximately 32 kilometers (20 miles) west of Idaho Falls. Revisions to the license application were submitted by AES on April 23, 2009, and April 30, 2010. If licensed, the proposed facility would enrich uranium for use in commercial nuclear fuel for power reactors. AES would employ a gas centrifuge enrichment process to enrich uranium to up to five percent uranium-235 by weight, with a planned maximum target production of 6.6 million separative work units (SWUs) per year. AES initiated preconstruction activities (e.g., site preparation) in late 2010 under an exemption approved by the NRC to conduct such activities prior to licensing. If its license application is approved, AES expects to begin facility construction in 2011and commence initial production in 2014, reaching peak production in 2022. AES's license would be for a term of 30 years. Prior to license expiration in 2041, AES would seek to renew its license to continue operating the proposed facility or plan for the decontamination and decommissioning of the proposed facility per the applicable licensing conditions and NRC regulations. The proposed EREF would be licensed in accordance with the provisions of the *Atomic Energy Act*. Specifically, an NRC license under Title 10, "Energy," of the U.S. *Code of Federal Regulations* (10 CFR) Parts 30, 40, and 70 would be required to authorize AES to possess and use special nuclear material, source material, and byproduct material at the proposed EREF site.

This Environmental Impact Statement (NUREG-1945) (EIS) was prepared in compliance with the *National Environmental Policy Act of 1969*, as amended (NEPA), and the NRC regulations for implementing NEPA (10 CFR Part 51). This EIS evaluates the potential environmental impacts of preconstruction activities and of the proposed action, which is to construct, operate, and decommission the proposed EREF near Idaho Falls in Bonneville County, Idaho. Also, this EIS describes the environment potentially affected by AES's proposal, evaluates reasonable alternatives to the proposed action, describes AES's environmental monitoring program and mitigation measures, and evaluates the costs and benefits of the proposed action.

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EXECUTIVE SUMMARY

BACKGROUND

Under the provisions of the *Atomic Energy Act* and pursuant to Title 10 of the U.S. *Code of Federal Regulations* (10 CFR) Parts 30, 40, and 70, the U.S. Nuclear Regulatory Commission (NRC) is considering whether to issue a license that would allow AREVA Enrichment Services, LLC (AES) to possess and use byproduct material, source material, and special nuclear material at a proposed gas centrifuge uranium enrichment facility near Idaho Falls in Bonneville County, Idaho, for a period of 30 years. The scope of activities to be conducted under the license would include the construction, operation, and decommissioning of the proposed Eagle Rock Enrichment Facility (EREF). The application for the license was filed with the NRC by AES by letter dated December 30, 2008. Revisions to the license application were submitted by AES on April 23, 2009 (Revision 1) and April 30, 2010 (Revision 2). To support its licensing decision on AES's proposed EREF, the NRC determined that the NRC's implementing regulations in 10 CFR Part 51 for the *National Environmental Policy Act* (NEPA) require the preparation of an Environmental Impact Statement (EIS). The development of this EIS is based on the NRC staff's review of information provided by AES, independent analyses, and consultations with the U.S. Fish and Wildlife Service and other Federal agencies, Native American tribes, the Idaho State Historic Preservation Office (SHPO) and other State agencies, and local government agencies.

The enriched uranium produced at the proposed EREF would be used to manufacture nuclear fuel for commercial nuclear power reactors. Enrichment is the process of increasing the concentration of the naturally occurring and fissionable uranium-235 isotope. Uranium ore usually contains approximately 0.72 weight percent uranium-235. To be useful in light-water nuclear power plants as fuel for electricity generation, the uranium must be enriched up to 5 weight percent uranium-235.

THE PROPOSED ACTION

The proposed action considered in this EIS is for AES to construct, operate, and decommission a uranium enrichment facility, the proposed EREF, at a site near Idaho Falls in Bonneville County, Idaho. To allow the proposed action to take place, the NRC would issue a license to AES as discussed above. The proposed EREF would be located on a 186-hectare (460-acre) section of a 1700-hectare (4200-acre) parcel of land that it intends to purchase from a single private landowner. Current land uses of the proposed EREF property include native rangeland, nonirrigated seeded pasture, and irrigated cropland. The proposed EREF, if approved, would be situated on the north side of US 20, about 113 kilometers (70 miles) west of the Idaho/Wyoming State line and approximately 32 kilometers (20 miles) west of Idaho Falls. The eastern boundary of the U.S. Department of Energy's (DOE) Idaho National Laboratory (INL) is 1.6 kilometers (1 mile) west of the proposed property. The lands north, east, and south of the proposed property are a mixture of private-, Federal-, and State-owned parcels, with the Federal lands managed by the Bureau of Land Management (BLM).

Using a gas centrifuge process, the proposed EREF would produce uranium enriched up to 5 percent by weight in the isotope uranium-235, with a planned maximum target production of 6.6 million separative work units (SWUs) per year. An SWU is a unit of measurement used in the nuclear industry, pertaining to the process of enriching uranium for use as fuel for nuclear power plants. If the license is approved, facility construction would begin in 2011 with heavy construction (construction of all major buildings and structures) continuing for 7 years into 2018. The proposed EREF would begin initial production in 2014 and reach peak production in 2022. Operations would continue at peak production until approximately 9 years before the license expires. Decommissioning activities would then begin and be completed by 2041. Decommissioning would involve the sequential shutdown of the 4 Separation Building Modules (SBMs) resulting in a gradual decrease in production. Each SBM would take approximately 4.5 years to decommission.

Supplemental information on a proposed 161-kilovolt (kV) electrical transmission line required to power the proposed EREF was submitted by AES on February 18, 2010. The NRC has no jurisdiction over transmission lines; therefore, the transmission line for the proposed EREF is not considered part of the proposed action. However, construction and operation of this transmission line are considered in this EIS under cumulative impacts.

NRC EXEMPTION FOR AES TO CONDUCT CERTAIN PRECONSTRUCTION ACTIVITIES

On June 17, 2009, AES submitted a request for an exemption from certain NRC regulations to allow commencement of certain preconstruction activities on the proposed EREF site prior to NRC's decision to issue a license for the construction, operation, and decommissioning of the proposed EREF. On March 17, 2010, the NRC granted an exemption authorizing AES to conduct the requested preconstruction activities. Under the exemption, these preconstruction activities are not considered by the NRC as part of the proposed action, although the environmental impacts of these activities are discussed in this EIS along with the impacts of facility construction.

Specifically, the exemption covers the following activities and facilities:

- clearing of approximately 240 hectares (592 acres) for the proposed EREF
- site grading and erosion control
- excavating the site including rock blasting and removal
- constructing a stormwater retention pond
- constructing main access and site roadways
- installing utilities
- erecting fences for investment protection
- constructing parking areas
- erecting construction buildings, offices (including construction trailers), warehouses, and guardhouses

This exemption authorizes AES to conduct the stated activities, provided that none of the facilities or activities subject to the exemption would be components of AES's Physical Security Plan or its Standard Practice Procedures Plan for the Protection of Classified Matter, or otherwise be subject to NRC review or approval. AES initiated preconstruction activities in late 2010.

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action would be to allow AES to construct, operate, and decommission a facility using gas centrifuge technology to enrich uranium up to 5 percent by weight of uranium-235, with a production capacity of 6.6 million SWU per year, at the proposed EREF near Idaho Falls in Bonneville County, Idaho. This facility would contribute to the attainment of national energy security policy objectives by providing an additional reliable and economical domestic source of low-enriched uranium to be used in commercial nuclear power plants.

Nuclear power currently supplies approximately 20 percent of the nation's electricity. The United States Enrichment Corporation Paducah Gaseous Diffusion Plant, Paducah, Kentucky, is currently the primary U.S. supplier of low-enriched uranium for nuclear fuel in the United States. However, the URENCO USA facility (formerly known as the National Enrichment Facility) in Lea County, New Mexico, which began initial operations in June 2010, may provide additional enrichment services in the future as construction continues on its remaining cascade halls. The American Centrifuge Plant (ACP) in Piketon, Ohio, which is currently under construction, and the proposed Global Laser Enrichment (GLE) Facility in Wilmington, North Carolina, for which the NRC is currently reviewing its license application, may also provide additional domestic enrichment services in the future. The existing operating Paducah, Kentucky, enrichment plant supplies approximately 15 percent of the current U.S. demand for low-enriched uranium. The United States Enrichment Corporation also imports downblended (diluted) weapons-grade uranium from Russia through the Megatons to Megawatts Program to supply an additional 38 percent of the U.S. demand. The remaining 47 percent of low-enriched uranium is imported from foreign suppliers. The current primary dependence on a single U.S. supplier and foreign sources for low-enriched uranium imposes reliability risks for the nuclear fuel supply to U.S. nuclear power plants. National energy policy emphasizes the importance of having a reliable domestic source of enriched uranium for national energy security. The production of enriched uranium at the proposed EREF would be equivalent to about 40 percent of the current and projected demand (15 to16 million SWUs) for enrichment services within the United States.

ALTERNATIVES TO THE PROPOSED ACTION

In this EIS, the NRC staff considered a reasonable range of alternatives to the proposed action, including alternative sites for an AES enrichment facility, alternative sources of low-enriched uranium, alternative technologies for uranium enrichment, and the no-action alternative. Two of the alternatives, the proposed action and the no-action alternative, were analyzed in detail. The approved preconstruction activities discussed earlier are assumed to occur prior to NRC's decision to grant a license to AES and, therefore, are assumed to occur under both the proposed action and the no-action alternative.

Under the no-action alternative, the proposed EREF would not be constructed, operated, and decommissioned in Bonneville County, Idaho. Uranium enrichment services would continue to be performed by existing domestic and foreign uranium enrichment suppliers. However, URENCO USA would provide and the ACP and potentially the proposed GLE Facility may provide enrichment services in the future.

AES considered 44 alternative sites throughout the United States. AES evaluated these sites based on various technical, safety, economic, and environmental selection criteria, and concluded that the Eagle Rock site in Bonneville County, Idaho, met all of the criteria. The NRC staff reviewed AES's site-selection process and results to determine if any site considered by AES was obviously superior to the proposed Eagle Rock site. The NRC staff determined that the process used by AES was rational and objective, and that its results were reasonable. Based on its review, the NRC staff concluded that none of the candidate sites were obviously superior to the AES preferred site in Bonneville County, Idaho.

The NRC staff examined three alternatives to satisfy domestic enrichment needs: (1) reactivate the Portsmouth Gaseous Diffusion Plant near Piketon, Ohio; (2) downblend highly enriched uranium instead of constructing a domestic uranium enrichment facility; and (3) purchase low-enriched uranium from foreign sources. These alternatives were eliminated from further consideration based on concerns related to reliability, excessive energy consumption, and national energy security, and did not meet national energy policy objectives involving the need for a reliable, economical source of domestic uranium enrichment.

The NRC staff also evaluated alternative technologies to the gas centrifuge process: electromagnetic isotope separation, liquid thermal diffusion, gaseous diffusion, Atomic Vapor Laser Isotope Separation, Molecular Laser Isotope Separation, and separation of isotopes by laser excitation. These technologies were eliminated from further consideration based on factors such as the technology immaturity, economic impracticality, or exclusive licensing.

In addition, the NRC staff considered conversion and disposition methods for depleted uranium hexafluoride (UF_6): (1) beneficial use of depleted $UF_{6,}$ and (2) conversion at facilities other than the new facilities that the U.S. Department of Energy (DOE) has built at Portsmouth and Paducah. For the purposes of this analysis, because the current available inventory of depleted uranium exceeds the current and projected future demand for the material, the depleted UF_6 generated by the proposed EREF was considered a waste product, and disposition alternatives involving its use as a resource were not further evaluated.

Existing fuel fabrication facilities have not expressed an interest in performing depleted UF_6 conversion services, and the cost for the services would be difficult to estimate; therefore, this alternative was eliminated from further consideration. However, International Isotopes, Inc. submitted a license application to the NRC on December 31, 2009, to construct and operate a depleted UF_6 conversion facility near Hobbs, New Mexico. On February 23, 2010, the NRC staff accepted the license application, and has initiated a formal safety and environmental review.

POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This EIS evaluates the potential environmental impacts of the proposed action. A standard of significance has been established for assessing environmental impacts. Following the Council on Environmental Quality's regulations in 40 CFR 1508.27, the NRC staff has assigned each impact one of the following three significance levels:

- SMALL. The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

- MODERATE. The environmental effects are sufficient to noticeably alter but not destabilize important attributes of the resource.

- LARGE. The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

As described in Chapter 4, the environmental impacts of preconstruction and the proposed action would mostly be SMALL. Some potential impacts would be SMALL to MODERATE or MODERATE in a few cases; and there would be LARGE, though intermittent, short-term impacts in one resource area during preconstruction. Methods for mitigating the potential impacts are identified in Chapters 4 and 5. Environmental measurement and monitoring methods are described in Chapter 6.

Summarized below are the potential environmental impacts of the proposed action on each of the resource areas considered in this EIS. Each summary is preceded by the impact significance level for the respective resource areas.

Land Use

SMALL. The construction of a uranium enrichment facility would alter the current land use, which consists primarily of agriculture and undeveloped rangeland. The 240-hectare (592-acre) proposed EREF site under consideration would be located entirely on a 1700-hectare (4200-acre) private parcel of land. Bonneville County has zoned the location as G-1, Grazing, which allows for industrial development, and is intended to allow certain activities that should be removed from population centers in the county. The operation of a uranium enrichment facility is consistent with the county's zoning. It is not anticipated that construction and operation of the proposed EREF would have any effect on the current land uses found on the surrounding public lands managed by the BLM.

Restrictions to land use would begin with the purchase of the proposed property by AES. The alteration of land use would begin during preconstruction and continue during construction. Preconstruction activities would result in the alteration of the land as a result of activities such as land clearing and grading, restricted access to the proposed EREF property, and cessation of agricultural uses (grazing and crop production). The majority of impacts to land use would occur during preconstruction. However, since large land areas in the county will continue to be used for grazing and crop production, including the BLM-managed lands surrounding the proposed EREF property, land use impacts resulting from preconstruction and construction would be SMALL.

Operation of the proposed EREF would restrict land use on the proposed property to the production of enriched uranium. The operation of the proposed EREF is not expected to alter land use on adjacent properties. Impacts on land use due to operations would be SMALL.

At the end of decommissioning, the buildings and structures would be available for unrestricted use. As a result, impacts on land use due to decommissioning would be SMALL.

Historic and Cultural Resources

SMALL TO MODERATE. Impacts to historic and cultural resources would occur primarily during preconstruction. Construction would take place on ground previously disturbed by preconstruction activities. There are 13 cultural resource sites (3 prehistoric, 6 historic, and 4 multi-component) in the surveyed areas of the proposed EREF property. One of these sites, the John Leopard Homestead (MW004), is located within the footprint of the proposed EREF, and has been recommended as eligible for the *National Register of Historic Places*. Site MW004 would be destroyed by preconstruction activities. However, AES mitigated impacts to site MW004 prior to land disturbance through professional excavation and data recovery, and other similar homestead site types exist in the region. Therefore, the impact to site MW004 would be limited to a MODERATE level.

Construction and operation of the proposed EREF would be unlikely to result in visual or noise impacts on the Wasden Complex, an important group of archaeological sites, because it is located approximately 1.6 kilometers (1.0 mile) from the proposed EREF site and sits behind a ridge that partially blocks the view. Other impacts during operations would be SMALL because no intact historic or cultural resources would remain.

Decommissioning would not likely affect historic and cultural resources because any areas disturbed during decommissioning would have been previously disturbed during preconstruction and construction. Therefore, impacts would be SMALL.

Visual and Scenic Resources

SMALL TO MODERATE. Impacts to visual and scenic resources result when contrasts are introduced into a visual landscape. The proposed project site and surrounding areas consist primarily of sagebrush semi-desert to the north, east, and west of the proposed site. The proposed facility would be located approximately 2.4 kilometers (1.5 miles) from areas of public view, including US 20 and the Hell's Half Acre Wilderness Study Area (WSA) to the south which contains the remains of a 4000-year-old lava flow. The BLM gave a Visual Resource Management (VRM) Class I designation to the WSA, which applies to areas of high scenic quality.

Visual impacts during preconstruction could result along US 20 from increased activity at the proposed site and fugitive dust, but these would be of a relatively short duration. The clearing of vegetation and installation of a perimeter fence would change the visual setting; however, they would not drastically alter the overall appearance of the area. Impacts on visual and scenic resources due to preconstruction would be SMALL.

Construction of the proposed EREF would introduce visual intrusions that are out of character with the surrounding area. While initial construction activities would commence on a cleared area, such a view is not very intrusive on the visual landscape. Similarly, fugitive dust generated during the construction period would be of a temporary nature and cause minimal disturbance to the viewshed. However, because of the extent of the proposed EREF project, the type and size of equipment involved in construction, and the industrial character of buildings to be built, construction of the proposed EREF would create significant contrast with the surrounding visual environment, which is predominantly rangeland and cropland. Thus, visual impact levels associated with construction would range from SMALL to MODERATE.

Construction and operation of the proposed EREF would be unlikely to result in visual impacts on the Wasden Complex due to its distance from the proposed EREF site and location behind a ridgeline that obscures views of the lower portions of the proposed facility. However, operations would have an impact on the surrounding visual landscape. The proposed facility is visually inconsistent with the current setting, and its operation is expected to alter the visual rating on surround public lands, which would be a MODERATE visual impact. Also, plant lighting at night could be perceivable at the trailhead of the Hell's Half Acre WSA, although probably not from the Craters of the Moon National Park located 72 kilometers (45 miles) to the west of the proposed EREF site.

At the end of decommissioning, the buildings and structures would be available for unrestricted use. As a result, impacts on visual and scenic resources would remain MODERATE.

Air Quality

<u>SMALL to LARGE</u>. Air emissions during preconstruction and construction would include fugitive dust from heavy equipment working on the proposed site, engine emissions from construction equipment onsite and vehicles transporting workers and materials to the proposed site, and emissions from diesel-fueled generators. The generators, although not intended to provide power for construction activities, would be operated weekly for preventative maintenance. During preconstruction, fugitive dust from land clearing and grading operations would result in large releases of particulate matter. Such impacts would be MODERATE to LARGE during certain preconstruction periods and activities that would be temporary and brief in duration. Otherwise, impacts on ambient air quality from preconstruction would be SMALL for all hazardous air pollutants (HAPs) and all criteria pollutants except particulates. Air quality impacts during construction would be SMALL for all HAPs and all criteria pollutants.

During operations, the proposed EREF would not be a major source of air emissions, although there is a potential for small gaseous releases associated with operation of the process that could contain UF_6, hydrogen fluoride (HF), and uranyl fluoride (UO_2F_2). Also, small amounts of nonradioactive air emissions consisting of carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM), volatile organic compounds (VOCs), and sulfur dioxide (SO_2) would be released:

- from the auxiliary diesel electric generators to supply electrical power when power from the utility grid is not available

- during building and equipment maintenance activities

- from trucks, automobiles, and other vehicles in use onsite

Air emissions are not expected to impact regional visibility. Ambient air modeling predicts that impacts on ambient air quality from the routine operation of the proposed EREF would be SMALL with respect to all criteria pollutants and all HAPs.

During decommissioning, impacts would result from emissions including fugitive dust (mitigated by dust suppression work practices) and CO, NO_x, PM, VOCs, and SO_2 from transportation equipment and would be SMALL.

Geology and Soils

<u>SMALL</u>. Impacts on about 240 hectares (592 acres) of land would occur primarily during preconstruction, as a result of soil-disturbing activities (blasting, excavating, grading, and other activities) that loosen soil and increase the potential for erosion. Because these impacts are short-term and can be mitigated, impacts on geology and soils would be SMALL. Construction activities could cause short-term impacts such as an increase in soil erosion at the proposed site. Soil erosion could result from wind action and rain, although rainfall in the vicinity of the proposed site is low. Compaction of soils due to heavy vehicle traffic would increase the potential for soil erosion via runoff. Impacts would be SMALL.

Impacts on soils during operations at the proposed facility would also be SMALL because activities would not increase the potential for soil erosion beyond that for the surrounding area. The impacts to soil quality from atmospheric deposition of pollutants during operations would be SMALL.

Land disturbance associated with decommissioning could temporarily increase the potential for soil erosion at the proposed EREF site, resulting in impacts similar to (but less than) those during the preconstruction/construction phase. As a result, impacts to soils due to decontamination and decommissioning activities would be SMALL.

Water Resources

<u>SMALL</u>. During preconstruction and construction, stormwater runoff would be diverted to a stormwater detention basin, thus the potential for contaminated stormwater discharging to water bodies on adjacent properties is low. No surface water sources would be used. Natural surface water bodies are absent within and near the proposed EREF site, and groundwater occurs at depths of 202 meters (661 feet) to 220 meters (722 feet). Annual maximum groundwater usage rates from the Eastern Snake River Plain (ESRP) aquifer in Bonneville County during preconstruction and construction comprise about 16 percent of the annual water right appropriation that has been transferred to the proposed property for use as industrial water. Therefore, impacts on surface water quality, the regional water supply, and groundwater quality during preconstruction and construction would be SMALL.

Water usage rates during operations would remain well within the water right appropriation. Both average and peak annual water use requirements would be less than 1 percent of the total groundwater usage from the ESRP aquifer. No process effluents would discharge to the retention or detention basins or into surface water. Therefore, liquid effluents would have a

SMALL impact on water resources. Because all the water discharged to the Cylinder Storage Pads Stormwater Retention Basins would evaporate, the basins would have a SMALL impact on the quality of water resources. The site Stormwater Detention Basin seepage would also have a SMALL impact on water resources of the area because no wastewater would be discharged to the basin.

Since the usage and discharge impacts to water resources during the decommissioning phase would be similar to those during construction, the impacts to water resources would remain SMALL.

Ecological Resources

SMALL TO MODERATE. Preconstruction activities such as land clearing could result in direct impacts due to habitat loss and wildlife mortality as well as indirect impacts to ecological resources in surrounding areas, primarily from fugitive dust and wildlife disturbance. Approximately 75 hectares (185 acres) of sagebrush steppe habitat and 55 hectares (136 acres) of nonirrigated pasture would be eliminated. Impacts on plant communities and wildlife from preconstruction would be MODERATE. Construction activities that could impact ecological resources include constructing the proposed UF_6 storage pads and EREF buildings. However, most construction activities would occur in areas that would have already been disturbed by preconstruction activities. Impacts on vegetation would occur primarily from any additional vegetation clearing. Impacts would include the generation of fugitive dust, spread of invasive species, changes in drainage patterns, soil compaction, erosion of disturbed areas, potential sedimentation of downgradient habitats, and accidental releases of hazardous or toxic materials (e.g., fuel spills). These activities could also result in some wildlife mortality and would cause other wildlife to relocate as a result of noise, lighting, traffic, and human presence. Collisions with construction equipment and other vehicles may cause some wildlife mortality. No rare or unique plant communities, or threatened or endangered species, have been found or are known to occur on the proposed site, although habitat on the proposed property is known to be used by greater sage-grouse (a Federal candidate species). Construction (and preconstruction) activities are not expected to result in population-level impacts on any Federally listed or State-listed species, which the U.S. Fish and Wildlife Service has stated are not present on the proposed EREF property. Impacts of construction of the proposed facility would be SMALL.

Operation of the proposed EREF could result in impacts on wildlife and plant communities as a result of noise, lighting, traffic, human presence, air emissions, and retention/detention ponds. However, these impacts would be SMALL.

Vegetation and wildlife that became established near the proposed facility could be affected by decommissioning activities. Impacts during decommissioning would be similar to those during construction and would be SMALL.

Noise

SMALL. Most of the major noise-producing activities (site clearing and grading, excavations [including the use of explosives], utility burials, construction of onsite roads [including the US 20 interchanges], and construction of the ancillary buildings and structures) would occur during preconstruction. Noise impacts from initial preconstruction activities may exceed established standards at some locations along the proposed EREF property boundary for relatively short periods of time. However, because of the distances involved, expected levels of attenuation, application of mitigation measures, and the expected limited presence of human receptors at these locations, the impacts of noise during preconstruction would be SMALL for human receptors. The nearest resident is located approximately 7.7 kilometers (4.8 miles) east of the proposed site. No residence is expected to experience unacceptable noise levels during construction. Noise impacts from construction may exceed established standards at some offsite locations for relatively short periods of time. However, because of the distances involved, expected levels of attenuation, and AES's commitment to appropriate mitigations, the impacts would be SMALL for human receptors. During the overlap period when partial operations begin while building construction continues, noise impacts from construction and operation are expected to be additive, but still substantially reduced from noise levels during initial construction.

Major noise sources associated with facility operation include the six diesel-fueled emergency generators, commuter traffic, the movement of delivery vehicles, and operation of various pumps, compressors, and cooling fans. Operational noise estimates at the proposed property boundary satisfy all relevant or potentially relevant U.S. noise standards and guidance. Residents in the vicinity of US 20, who would otherwise be unaffected by noise from the proposed EREF industrial footprint, would be impacted by slightly increased traffic noise. Noise impacts from proposed EREF operation would be SMALL.

Noise sources and levels during decommissioning would be similar to those during construction, and peaking noise levels would be expected to occur for short durations. As a result, noise impacts from decommissioning would be SMALL.

Transportation

<u>SMALL TO MODERATE</u>. Preconstruction activities for the proposed EREF would cause an impact on the local transportation network due to the construction of highway entrances, the daily commute of workers, daily construction deliveries, and waste shipments. Traffic slowdowns or delays would only be expected to occur at the entrance to the proposed EREF during access road construction and shift changes; the impacts on overall traffic patterns and volumes would be MODERATE on US 20 and SMALL on Interstate 15 (I-15). The primary impact would be increased traffic on nearby roads. Impacts during construction would occur from transportation of personnel, construction materials, and nonradiological waste. All traffic to and from the proposed EREF during preconstruction and construction would use US 20. Construction activities at the proposed EREF site could result in a 55 percent increase in traffic volume on US 20 (including the period when construction and operations overlap). Because traffic volume is expected to remain below the design capacity of I-15 and traffic slowdowns or delays would only be expected to occur at the entrance to the proposed EREF during shift changes, the impacts on overall traffic patterns and volumes during construction would be SMALL to MODERATE on US 20 and SMALL on I-15. For the most part, the impacts from the truck traffic to and from the proposed site during construction would be SMALL.

Operations impacts would occur from the transport of personnel, nonradiological materials, and radioactive material to and from the proposed EREF, especially during the period when construction and operation overlap. Increased traffic during facility operation would have a SMALL to MODERATE impact on the current traffic on US 20 (SMALL for any off-peak shift change). The impacts of truck traffic to and from the proposed site during operation would be SMALL. Annual transportation routine impacts and accident risks (radiological and chemical) would be SMALL.

Traffic during the initial portion of the decommissioning would be approximately the same as for the period when construction and operations overlap. Traffic after the cessation of operations would be less than during either construction or operation. Impacts on local traffic on US 20 would be SMALL to MODERATE.

Public and Occupational Health

SMALL. During preconstruction, impacts on occupational safety resulting from injuries, illnesses, and exposures to fugitive dust, pollutants, and vapors would be SMALL, based on estimates of the number of incidents. During construction, nonradiological impacts could include injuries and illnesses incurred by workers and impacts due to exposure to chemicals or other nonradiological substances. All such potential impacts would be SMALL because all activities would take place under typical construction workplace safety regulations. No radiological impacts are expected during facility construction.

Nonradiological impacts during facility operation include worker illnesses and injuries and impacts from worker or public exposure to hazardous chemicals used or present during operations, mainly uranium and HF. Due to low estimated concentrations of uranium and HF at public (proposed property boundary) and workplace receptor locations, nonradiological impacts due to exposures to hazardous chemicals (including uranium and HF) during operations would be SMALL.

Assessment of potential radiological impacts from facility operations considers both public and occupational exposures to radiation, and includes exposures to workers completing the facility construction during initial phases of operation. Exposure pathways include inhalation of airborne contaminants, ingestion of contaminated food crops, direct exposure from material deposited on the ground, and external exposure associated with the stored UF_6 cylinders. Impacts from exposure of members of the public would be SMALL. Worker exposures would vary by job type, but would be carefully monitored and maintained as low as reasonably achievable (ALARA) and impacts would be SMALL.

For a hypothetical individual member of the public at the proposed EREF property boundary and the nearest resident, the maximum annual total effective dose equivalents would be 0.014 millisievert per year (1.4 millirem per year) and 2.1×10^{-6} millisievert per year (2.1×10^{-4} millirem per year), respectively. Dose equivalents attributable to operation of the proposed EREF would be small compared to the normal background radiation range of 2.0 to 3.0 millisieverts (200 to 300 millirem) dose equivalent. This equates to radiological impacts during proposed EREF operation that would be SMALL.

The nature of decommissioning activities would be similar to that during construction and operation. Impacts from occupational injuries and illnesses and chemical exposures would be SMALL. Occupational radiological exposures would be bounded by the potential exposures during operation, because the quantities of uranium material handled would be less than or equal to that during operations. An active environmental monitoring and dosimetry (external and internal) program would be conducted to maintain ALARA doses to workers and to individual members of the public. Therefore, the impacts of decommissioning on public and occupational health would be SMALL.

Waste Management

SMALL. Solid nonhazardous wastes generated during preconstruction would be transported offsite to an approved local landfill. Hazardous wastes (e.g., waste oil, greases, excess paints, and other chemicals) generated during preconstruction would be packaged and shipped offsite to a licensed treatment, storage, and disposal facility (TSDF). Impacts from nonhazardous solid waste and hazardous waste generation during preconstruction would be SMALL due to the available current or future capacity at local and regional disposal facilities. Construction would generate about 6116 cubic meters (8000 cubic yards) of nonhazardous solid waste per year, not including recyclable materials such as scrap structural steel, sheet metal, and piping. About 23,000 liters (6200 gallons) and 1000 kilograms (2200 pounds) of hazardous waste would be generated annually. The impacts of nonhazardous and hazardous waste generation during construction would be SMALL due to the available current or future capacity at local and regional disposal facilities.

During operation, approximately 70,307 kilograms (154,675 pounds) of industrial, nonhazardous, nonradioactive solid waste and approximately 146,400 kilograms (322,080 pounds) of low-level radioactive waste (not including depleted UF_6) are expected to be generated annually. The proposed facility would also generate approximately 5062 kilograms (11,136 pounds) of hazardous wastes and 100 kilograms (220 pounds) of mixed waste annually. All wastes would be transferred to offsite licensed waste disposal facilities with suitable disposal capacity. The impacts of this waste generation would be SMALL.

During peak operation, the proposed EREF is expected to generate 1222 cylinders of depleted UF_6 annually, which would be temporarily stored on an outdoor cylinder storage pad in approved Type 48Y containers before being transported to a DOE-owned or private conversion facility. Storage of uranium byproduct cylinders at the proposed EREF would occur for the duration of, but not beyond, the proposed facility's 30-year operating lifetime. The impacts from temporary storage of depleted UF_6, from the conversion of depleted UF_6 to U_3O_8 at an offsite location, and from the transportation of the U_3O_8 conversion product to a potential disposal site would be SMALL.

During decommissioning, radioactive material from decontamination of contaminated equipment would be packaged and shipped offsite for disposal. Wastes to be disposed would include 7700 cubic meters (10,070 cubic yards) of low-level radioactive waste. Due to the availability of adequate disposal capacity, waste management impacts would be SMALL.

Socioeconomics

SMALL. Employment and income impacts were evaluated using an 11-county ROI in Idaho – including Bannock, Bingham, Blaine, Bonneville, Butte, Caribou, Clark, Fremont, Jefferson, Madison, and Power Counties. Wage and salary spending and expenditures associated with materials, equipment, and supplies would produce income and employment and local and State tax revenue, resulting in a beneficial impact. Preconstruction would create 308 jobs and $11.9 million in the first year, and 1687 jobs would be created during the peak year of construction with $65.0 million of income. Operations would produce 3289 jobs and $92.4 million in income in the first year of full operations. The jobs created include jobs at the proposed EREF and those indirectly created elsewhere in the 11-county ROI due to preconstruction, construction, and operation of the proposed EREF. Because preconstruction and construction activities would constitute less than 1 percent of total 11-county ROI employment, the economic impact of constructing the proposed EREF would, therefore, be SMALL.

As it is anticipated that a number of workers will move into the area during each phase of the proposed project, with the majority of the demographic and social impacts associated with population in-migration likely to occur in Bingham and Bonneville Counties, the impacts of the proposed EREF on population, housing, and community services are assessed for a two-county ROI, consisting of Bingham and Bonneville Counties. The migration of workers and their families into surrounding communities would affect housing availability, area community services such as healthcare, schools, and law enforcement, and the availability and cost of public utilities such as electricity, water, sanitary services, and roads resulting in an adverse impact. Because of the small number of in-migrating workers expected during preconstruction, construction, and operations, the impact on housing and community and educational services employment would be SMALL.

Decommissioning would provide continuing employment opportunities for some of the existing workforce and for other residents of the 11-county ROI. Additional, specialized decommissioning workers would also be required from outside the 11-county ROI. Expenditures on salaries and materials would contribute to the area economy, although less than during operations, and the State would continue to collect sales tax and income tax revenues. The socioeconomic impact of decommissioning activities would be SMALL.

Environmental Justice

<u>SMALL</u>. The potential impacts of the proposed EREF would mostly be SMALL for the resource areas evaluated. For these resources areas, the impacts on all human populations would be SMALL. Potential impacts would be SMALL to MODERATE or MODERATE in a few cases, which could potentially affect environmental justice populations; and there would be LARGE, though intermittent, short-term impacts from fugitive dist during preconstruction. However, as there are no low-income or minority populations within the 4-mile area around the proposed facility, these impacts would not be disproportionately high and adverse for these population groups.

Impacts of decommissioning would be SMALL. Because impacts on the general population would generally be SMALL to MODERATE in other resource areas, and because there are no low-income or minority populations defined according to Council on Environmental Quality (CEQ) guidelines within the 4-mile area around the proposed facility, decommissioning would not be expected to result in disproportionately high or adverse impacts on minority or low-income populations.

Accidents

SMALL TO MODERATE. Six accident scenarios were evaluated in this EIS as a representative selection of the types of accidents that are possible at the proposed EREF. The representative accident scenarios selected vary in severity from high- to intermediate-consequence events and include accidents initiated by natural phenomena (earthquake), operator error, and equipment failure. The consequence of a criticality accident would be high (fatality) for a worker in close proximity. Worker health consequences are low to high from the other five accidents that involve the release of UF_6. Radiological consequences to a maximally exposed individual (MEI) at the Controlled Area Boundary (proposed EREF property boundary) are low for all six accidents including the criticality accident. Uranium chemical exposure to the MEI is high for one accident and low for the remainder. For HF exposure to an MEI at the proposed property boundary, the consequence of three accidents is intermediate, with a low consequence estimated for the remainder. All accident scenarios predict consequences to the collective offsite public of less than one lifetime cancer fatality. Impacts from accidents would be SMALL to MODERATE. Plant design, passive and active engineered and administrative controls, and management of these controls would reduce the likelihood of accidents.

POTENTIAL ENVIRONMENTAL IMPACTS OF THE NO-ACTION ALTERNATIVE

This EIS also considers the potential environmental impacts of the no-action alternative, which are summarized below. It is assumed that preconstruction activities have taken place under the no-action alternative. The impact conclusions presented in this EIS for the no-action alternative address the impacts of denying the license, but do not include the impacts of the NRC-approved preconstruction activities. This is because a decision by the NRC not to issue the license does not cause the impacts of preconstruction under the no-action alternative. As described in Chapter 4, the anticipated environmental impacts from the no-action alternative would range from SMALL to MODERATE.

Should the nation's need for enriched uranium continue to increase and necessitate the construction and operation of another domestic enrichment facility at an alternate location, impacts could occur for each resource area and could range from SMALL to LARGE. The nature and scale of these impacts could be similar to those of the proposed action, but would depend on several facility- and site-specific factors.

Land Use

SMALL. Under the no-action alternative, AES would purchase the proposed property and restrictions on grazing and agriculture would occur. The zoning designation for the property would remain G-1 Grazing whether or not the proposed EREF is constructed. Current land uses of grazing and farming could potentially resume. Impacts to local land use would be SMALL.

Historic and Cultural Resources

SMALL TO MODERATE. Under the no-action alternative, the proposed EREF would not be constructed. Site MW004 would not be affected by NRC's licensing action, and Section 106 of the *National Historic Preservation Act* would not apply because no Federal action would be involved. However, the removal of site MW004, which has already occurred, resulted in a LARGE impact because the site no longer exists; but because AES removed this site through professional excavation and data recovery and there are other homestead sites of this type found in the region, the impact has been mitigated to a MODERATE level. No visual or noise effects would occur to the viewshed for the Wasden Complex.

Visual and Scenic Resources

SMALL. Under the no-action alternative, since the proposed EREF would not be constructed, no visual intrusions to the existing landscape would occur. The current land cover would be altered, but no large industrial structures would be constructed. The existing natural character of the area would largely remain intact. The lack of development would be consistent with BLM's VRM Class I designation for the Hell's Half Acre WSA, and no intrusions to the Wasden Complex viewshed would occur.

Air Quality

SMALL. Under the no-action alternative, the air quality impacts associated with construction and operation of the proposed EREF would not occur. The proposed site could revert to agricultural activities, which would impact ambient air quality through the release of criteria pollutants from the operation of agricultural vehicles and equipment and the release of fugitive dusts from the tilling of soils. Local air impacts associated with the no-action alternative would be SMALL.

Geology and Soils

SMALL. Under the no-action alternative, no additional land disturbance from construction would occur, and the proposed site could revert to crop production and grazing activities. Wind and water erosion would continue to be the most significant natural processes affecting the geology and soils at the proposed site. Impacts would be SMALL.

Water Resources

SMALL. Under the no-action alternative, additional water use may or may not occur, depending on future plans for the proposed property. Water resources would be unchanged. Water usage could continue at the current rate should agricultural activities resume at the proposed site. No changes to surface water quality would be expected, and the natural (intermittent) surface flow of stormwater on the proposed site would continue. No additional groundwater use or adverse changes to groundwater quality would be expected. Impacts would be SMALL.

Ecological Resources

SMALL. Most impacts on ecological resources would occur during preconstruction. The potential impacts associated with the construction, operation, and decommissioning of the proposed EREF would not occur. Revegetation of the proposed site could occur with renewal of some wildlife habitat. The land could revert to crop production and grazing activities. Impacts would be SMALL.

Noise

SMALL. Under the no-action alternative, none of the noise impacts associated with proposed EREF construction, operation, or decommissioning would occur. Land uses on the proposed EREF site could revert to previous applications, livestock grazing and/or crop production, with concomitant noise levels and SMALL impacts.

Transportation

SMALL. Under the no-action alternative, traffic volumes and patterns would remain unchanged from existing conditions. The current volume of radioactive material and chemical shipments from other sources in the area would not increase. Impacts would be SMALL.

Public and Occupational Health

SMALL. Under the no-action alternative, health impacts from construction, operation, and decommissioning would not occur. Worker and public impacts from chemical and radioactive hazards would also not occur. Should the land be returned to grazing and agriculture, current use impacts would be expected and would be SMALL.

Waste Management

SMALL. Under the no-action alternative, no proposed EREF construction, operational, or decommissioning wastes (including sanitary, hazardous, low-level radioactive wastes, or mixed wastes) would be generated or require disposition. Impacts from waste management would be SMALL.

Socioeconomics

SMALL. Under the no-action alternative, any beneficial or adverse consequences of the proposed action would not occur. All socioeconomic conditions in the 11-county ROI would remain unchanged. Impacts would be SMALL.

Population in the area surrounding the proposed EREF, in Bonneville and Bingham Counties, is expected to grow in accordance with current projections, with the total population in the region projected to be approximately 156,491 in 2013 and 168,331 in 2017. In association with population growth, the social characteristics of the region, including housing availability, school enrollment, and availability of law enforcement and firefighting resources, are expected to change over time. However, future changes in these characteristics are difficult to quantify, and no projections of their future growth are available.

Environmental Justice

SMALL. The no-action alternative would not be expected to cause any high and adverse impacts. It would not raise any environmental justice issues.

Accidents

SMALL. Under the no-action alternative, potential accidents and accident consequences from operation of the proposed EREF would not occur. Impacts would be SMALL.

COSTS AND BENEFITS OF THE PROPOSED ACTION

While there are national energy security and fiscal benefits associated with the proposed action, and local socioeconomic benefits in the 11-county ROI in which the proposed EREF would be located, there are also direct costs associated with the preconstruction, construction, and operation phases of the proposed project, as well as impacts on various environmental resources. These impacts would mostly be SMALL, and in a few cases SMALL to MODERATE, or MODERATE in magnitude and small in comparison to the local and national benefits of the proposed action. In addition, most of the impacts to environmental resources associated with the proposed action would result from preconstruction activities at the proposed site, and would also occur under the no-action alternative. The principal socioeconomic impact or benefit of the proposed EREF project would be an increase in employment and income in the 11-county ROI. Although the majority of the costs, and most of the socioeconomic impacts, of the various phases of proposed EREF development would occur in the 11-county ROI, there would be economic, fiscal and, in particular, energy security benefits, which would occur at the local, State, and national levels.

Average employment created in the 11-county ROI during the year of peak construction is estimated at 1687 full-time jobs, with $0.7 million in State income tax revenues and $5.1 million in State sales taxes. During the proposed EREF full operations phase beginning in 2022, 3289 annual jobs would be created. During this period, the State of Idaho would benefit from $1.3 million annually in income taxes, while Bonneville County would collect $3.5 million annually in property tax receipts. Although it can be assumed that some portion of paid State sales and income taxes would be returned to the 11-county ROI under revenue-sharing arrangements between each county and the State government, the exact amount that would be received by each county cannot be determined. Although there are economic and fiscal benefits associated with the proposed action in the 11-county ROI, these impacts would be SMALL.

The direct costs associated with the proposed action may be categorized by the following life-cycle stages: facility construction, operation, depleted uranium disposition, and decommissioning. In addition, costs would be incurred for preconstruction activities under both the proposed action and the no-action alternative. In addition to monetary costs, the proposed action would result in impacts on various resource areas, which are considered “costs” for the purpose of this analysis. The resource areas and corresponding impacts are described in detail in Chapter 4 of this EIS. As discussed earlier, the impacts of preconstruction and the proposed action would mostly be SMALL, and in a few cases SMALL to MODERATE, or MODERATE, for all resource areas.

The proposed action could result in the maximum annual production of 6.6 million SWUs of enriched uranium in peak years, which would represent an augmentation of the domestic supply of enriched uranium and, along with other planned new enrichment facilities, would meet the need for increased domestic supplies of enriched uranium for national energy security. Thus, the proposed action would generate national and regional benefits and costs. The national benefit would be an increase in domestic supplies of enriched uranium that would assist the national energy security need. The regional benefits would be increased employment, economic activity, and tax revenues in the 11-county ROI. Costs associated with the proposed project are, for the most part, limited to the resource areas in the 11-county ROI.

COMPARISON OF THE PROPOSED ACTION AND NO-ACTION ALTERNATIVE

The impacts of the proposed action and the no-action alternative are briefly summarized and compared below. A more detailed summary and comparison is provided in Chapter 2, Table 2-6. As discussed earlier, it is assumed that the previously discussed preconstruction activities take place under both alternatives and, therefore, the impacts associated with preconstruction activities take place regardless of which alternative is selected. As a result, the comparison of alternatives presented below and in Chapter 2 is intended to highlight the differences between the two alternatives after preconstruction activities have occurred.

Under the no-action alternative, the proposed EREF would not be constructed, operated, and decommissioned in Bonneville County, Idaho. The Paducah Gaseous Diffusion Plant in Paducah, Kentucky, the URENCO USA facility in Lea County, New Mexico, and the downblending of highly enriched uranium under the Megatons to Megawatts Program would remain the sole sources of domestically generated low-enriched uranium for U.S. commercial nuclear power plants. The URENCO USA facility is still under construction and with the ACP, which is currently under construction, may provide additional enrichment services in the future. The license application for an additional enrichment facility, the proposed GLE Facility, is currently under review by the NRC. Foreign enrichment sources would be expected to continue to supply approximately 85 percent of U.S. nuclear power plants' demand until new domestic enrichment facilities are constructed and operated.

The no-action alternative would have SMALL impacts on land use, visual and scenic resources, air quality, geology and soils, water resources, ecological resources, noise, transportation, public and occupational health, waste management, socioeconomics, environmental justice, and facility accidents, and SMALL to MODERATE impacts on historic and cultural resources. The costs and benefits of constructing, operating, and decommissioning the proposed EREF would not occur. Additional domestic enrichment facilities could be constructed in the future with impacts expected to be SMALL to LARGE, depending on facility- and site-specific conditions.

In comparison to the no-action alternative, the proposed action would also have SMALL impacts on land use, air quality, geology and soils, water resources, ecological resources, noise, public and occupational health, waste management, socioeconomics, and environmental justice, but would have SMALL to MODERATE impacts on historic and cultural resources, visual and scenic resources, transportation, and facility accidents. The proposed action would have positive impacts in the region on employment and income, and on State and Federal tax revenues.

CUMULATIVE IMPACTS

This EIS also considers cumulative impacts that could result from the proposed action when added to other past, present, and reasonably foreseeable future actions (Federal, non-Federal, or private). No ongoing or planned developments were identified within 16 kilometers (10 miles) of the proposed project location, which includes the ROI for all affected resource areas except socioeconomics, which extends to an 80.5-kilometer (50-mile) radius. Proposed developments within 80.5 kilometers (50 miles) that could contribute to a regional socioeconomic impact in combination with the proposed project include the proposed Mountain States Transmission Intertie, a proposed 500-kV electrical transmission line running between western Montana and southeastern Idaho. The preferred route lies approximately 40 kilometers (25 miles) to the west of the proposed EREF site, running north-south. Two other alternate routes lie closer, the nearest running adjacent to the western boundary of the proposed EREF property just outside of INL property, and the other route crossing US 20 about 10 miles east of the proposed EREF site. In addition, impacts from the construction of a proposed new 161-kV transmission line, a substation, and substation upgrades for the proposed EREF are addressed as cumulative impacts in this EIS, as this action is not under the NRC's jurisdiction and, therefore, not considered by the NRC to be part of the proposed action. In general, the anticipated cumulative impacts from the proposed action would be SMALL. Cumulative impacts associated with the no-action alternative would be generally less than those for the proposed action, except in terms of local job creation.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Preconstruction activities and the proposed action would result in unavoidable adverse impacts on the environment. These impacts would mostly be SMALL and SMALL to MODERATE or MODERATE in a few cases, with the potential for temporary and brief LARGE impacts on air quality from fugitive dust, and would, in most cases, be mitigated. The area needed for construction and operation of the proposed EREF would be cleared of vegetation, which would lead to the displacement of some local wildlife populations. There would be temporary impacts from preconstruction and the construction of new facilities, including increased fugitive dust, increased potential for soil erosion and stormwater pollution, and increased vehicle traffic and emissions. Water consumption from onsite wells would be relatively small, and the risk for significant adverse impacts on neighboring residential wells or public supply wells would be SMALL. During operations, workers and members of the public could be exposed to radiation and chemicals, although the impacts of these exposures would be SMALL.

Preconstruction and the proposed action would necessitate short-term commitments of resources and would permanently commit certain other resources (such as energy and water). This EIS defines short-term uses as generally affecting the present quality of life for the public (i.e., the 30-year license period for the proposed EREF) and long-term productivity as affecting the quality of life for future generations on the basis of environmental sustainability. The short-term use of resources would result in potential long-term socioeconomic benefits to the local area and the region.

Workers, the public, and the environment would be exposed to increased amounts of hazardous and radioactive materials over the short term from operations of the proposed EREF. Construction and operation would require a long-term commitment of terrestrial resources, such as land, water, and energy. Short-term impacts would be minimized by the application of appropriate mitigation measures. Upon the closure of the proposed EREF, AES would decontaminate and decommission the buildings and equipment and restore them for unrestricted use. Continued employment, expenditures, and tax revenues generated during the proposed action would directly benefit the local, regional, and State economies.

Irreversible commitment of resources refers to resources that are destroyed and cannot be restored, whereas an irretrievable commitment of resources refers to material resources that once used cannot be recycled or restored for other uses by practical means. The proposed action would include the commitment of land, water, energy, raw materials, and other natural and human-generated resources. Following decommissioning, the land occupied by the proposed facility would likely remain industrial beyond license termination. Water required during preconstruction and the proposed action would be obtained from new and existing wells at the proposed EREF property and would be replenished through natural mechanisms. Wastewaters would be treated to meet applicable standards and would evaporate. Energy used in the form of electricity and diesel fuel would be supplied through new infrastructure connecting to existing systems in the Idaho Falls area. The specific types of construction materials and the quantities of energy and materials used cannot be determined until final facility design is completed, but it is not expected that these quantities would strain the availability of these resources.

During operation of the proposed EREF, natural UF_6 would be used as feed material, requiring the mining of uranium (not licensed by the NRC) and other front end operational steps in the uranium fuel cycle (licensed by the NRC). This use of uranium would be an irretrievable resource commitment.

Even though the land used to construct the proposed EREF would be returned to other productive uses after the proposed facility is decommissioned, there would be some irreversible commitment of land at other offsite locations used to dispose of solid wastes generated by the proposed facility. In addition, wastes generated during the conversion of depleted UF_6 produced by the proposed facility and the depleted uranium oxide conversion product from the conversion of depleted UF_6 would be disposed at a licensed offsite LLRW disposal facility. Land used for disposal of these materials would represent an irreversible commitment of land. No solid wastes or depleted uranium oxide conversion product originating from the proposed EREF would be disposed of on the proposed EREF property. When the proposed facility is decommissioned, some building materials would be recycled and reused. Other materials would be disposed of in a licensed and approved offsite location, and the amount of land used to dispose of these materials would be an irretrievable land resource.

ACRONYMS AND ABBREVIATIONS

^{234}U	uranium-234 (U-234)
^{235}U	uranium-235 (U-235)
$^{235}UF_6$	uranium-235 hexafluoride
^{238}U	uranium-238 (U-238)
$^{238}UF_6$	uranium-238 hexafluoride
AAC	acceptable ambient concentration
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACP	American Centrifuge Plant
ADAMS	Agencywide Documents Access and Management System
AERMOD	AMS/EPA Regulatory Model
AES	AREVA Enrichment Services, LLC
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
APE	Area of Potential Effect
Argonne	Argonne National Laboratory
ASTM	American Society of Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
AVLIS	Atomic Vapor Laser Isotope Separation
BEA	U.S. Bureau for Economic Analysis
BLM	U.S. Bureau of Land Management
BLS	U.S. Bureau of Labor Statistics
BMP	best management practice
BSPB	Blending, Sampling, and Preparation Building
CAA	*Clean Air Act*
CAB	Centrifuge Assembly Building or Controlled Area Boundary
CaF_2	calcium fluoride
Cal/EPA	California Office of Environmental Health Hazard Assessment
CCS	Center for Climate Studies
CDC	Centers for Disease Control and Prevention
CEDE	committed effective dose equivalent
CEQ	Council on Environmental Quality
CFR	U.S. *Code of Federal Regulations*
CH_4	methane
CTF	Centrifuge Test Facility
CO	carbon monoxide
CO_2	carbon dioxide
CREP	Conservation Reserve Enhancement Program
CWA	*Clean Water Act*
CY	calendar year
D&D	decontamination and decommissioning
DDT	dichlorodiphenyltrichloroethane

DEM	Digital Elevation Model
DNFSB	Defense Nuclear Facilities Safety Board
DNL	day/night average noise level
DOC	U.S. Department of Commerce
DOE	U.S. Department of Energy
DOEQAP	DOE Quality Assurance Program
DOL	U.S. Department of Labor, U.S. Bureau of Labor Statistics
DOT	U.S. Department of Transportation
EA	Environmental Assessment
EDE	effective dose equivalent
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EMP	Effluent Monitoring Program
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ERDA	Energy Research and Development Administration
EREF	Eagle Rock Enrichment Facility
ESA	*Endangered Species Act*
ESRP	Eastern Snake River Plain
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FGR	Federal Guidance Report
FR	*Federal Register*
FTE	full-time equivalent
FWCA	*Fish and Wildlife Coordination Act*
FWS	U.S. Fish and Wildlife Service
GAO	U.S. General Accounting Office
GCRP	U.S. Global Climate Change Research Program
GDP	Gaseous Diffusion Plant
GE	General Electric
GEVS	Gaseous Effluent Ventilation System
GHG	greenhouse gas
GLE	Global Laser Enrichment
GWP	Global Warming Potential
HAP	hazardous air pollutant
HEPA	high-efficiency particulate air
HEU	high-enriched uranium
HF	hydrogen fluoride or hydrofluoric acid
HFC	hydrofluorocarbon
HPS	Health Physics Society
HRCQ	Highway Route Controlled Quantity
HVAC	heating, ventilating, and air conditioning
HUD	U.S. Department of Housing and Urban Development

I	Interstate
IAC	*Idaho Administrative Code*
ICRP	International Commission on Radiological Protection
IDAPA	*Idaho Administrative Procedures Act*
IDC	Idaho Department of Commerce
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDWR	Idaho Department of Water Resources
IGS	Idaho Geological Survey
INL	Idaho National Laboratory
IPCC	Intergovernmental Panel on Climate Change
IPCS	International Programme on Chemical Safety
IROFS	Items Relied on for Safety
IS	*Idaho Statutes*
ISA	Integrated Safety Analysis
ISAC	Idaho Sage-grouse Advisory Committee
ISACTAT	Idaho Sage-grouse Advisory Committee Technical Assistance Team
ISCORS	Interagency Steering Committee on Radiation Standards
ISTC	Idaho State Tax Commission
ITD	Idaho Transportation Department
IWRB	Idaho Water Resource Board
LCF	latent cancer fatality
L_{dn}	day/night maximum average sound level
L_{eq}	equivalent sound level
LES	Louisiana Energy Services
LEU	low-enriched uranium
LLRW	low-level radioactive waste
LOS	level of service
LTTS	Low Temperature Take-off Stations
LWR	light water reactor
MAPEP	Mixed Analyte Performance Evaluation Program
MCL	maximum contaminant level
MCNP	Monte Carlo N-Particle
MDC	minimum detectable concentration
MDEQ	Montana Department of Environmental Quality
MEI	maximally exposed individual
MFC	Materials and Fuels Complex
MLIS	molecular laser isotope separation
MOA	Memorandum of Agreement
MRI	Midwest Research Institute
MSL	mean sea level
MW(e)	Megawatt electric
NAAQS	National Ambient Air Quality Standards
NCDC	National Climatic Data Center
NCES	National Center for Education Statistics

NCRP	National Council on Radiation Protection and Measurements
NEF	National Enrichment Facility
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NEPA	*National Environmental Policy Act of 1966*
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	*National Historic Preservation Act of 1966*
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Technology
NLCD 1992	National Land Cover Data 1992
NMFS	National Marine Fisheries Service
NMVOC	nonmethane volatile organic compound
NNL	National Natural Landmark
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	nitrogen oxides
NPCR	National Program of Cancer Registries
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRCP	National Council on Radiation Protection
NRCS	U.S. Natural Resources Conservation Service
NRHP	*National Register of Historic Places*
NWS	National Weather Service
O_3	ozone
OECD	Organisation for Economic Co-operation and Development
OEL	occupational exposure levels
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PFC	perfluorocarbon
PGA	peak ground acceleration
PM	particulate matter
$PM_{2.5}$	particulate matter equal to or smaller than 2.5 micrometers in diameter
PM_{10}	particulate matter equal to or smaller than 10 micrometers in diameter
PNNL	Pacific Northwest National Laboratory
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
PWR	pressurized water reactor
RAB	Restricted Area Boundary
RAI	Request for Additional Information
RCRA	*Resource Conservation and Recovery Act*

REMP	Radiological Environmental Monitoring Program
RMP	Rocky Mountain Power or range management plan
ROI	region of influence
ROW	right-of-way
SAAQS	State Ambient Air Quality Standards
SARA	*Superfund Amendments and Reauthorization Act*
SBM	Separations Building Module
SDWA	*Safe Drinking Water Act*
SER	Safety Evaluation Report
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Office(r)
SILEX	separation of isotopes by laser excitation
SMCL	secondary maximum contaminant level
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SPL	sound pressure level
SUNSI	Sensitive Unclassified Non-Safeguards Information
SVOC	semivolatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
SWU	separative work unit
TEDE	Total Effective Dose Equivalent
TI	transportation index
TLD	thermoluminescent dosimeter
TRAGIS	Transportation Routing Analysis Geographic Information System
TSB	Technical Support Building
TSDF	treatment, storage, and disposal facility
U_3O_8	triuranium octaoxide
UO_2F_2	uranyl fluoride
UBC	uranium byproduct cylinder
UF_4	uranium tetrafluoride
UF_6	uranium hexafluoride
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
URENCO	URENCO Group
USACE	U.S. Army Corps of Engineers
U.S.C.	*United States Code*
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEC	U.S. Enrichment Corporation
USGS	U.S. Geological Survey
USSLWG	Upper Snake Sage-grouse Local Working Group
VOC	volatile organic compound
VRI	visual resource inventory

VRM	visual resource management
VTM	vehicle miles traveled
WSA	Wilderness Study Area

1 INTRODUCTION

1.1 Background

The U.S. Nuclear Regulatory Commission (NRC) prepared this Environmental Impact Statement (EIS) in response to an application submitted by AREVA Enrichment Services, LLC (AES) for a license that would allow the construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility near Idaho Falls in Bonneville County, Idaho (Figure 1-1). Revisions to the license application were submitted by AES on April 23, 2009 (Revision 1) and April 30, 2010 (Revision 2). The proposed facility is referred to as the Eagle Rock Enrichment Facility (EREF).

The NRC's Office of Federal and State Materials and Environmental Management Programs prepared this EIS as required by Title 10, "Energy," of the U.S. *Code of Federal Regulations* (10 CFR) 51.20(b)(10). In particular, 10 CFR 51.20 (b)(10) states that issuance of a license for a uranium enrichment facility requires the NRC to prepare an EIS or a supplement to an EIS. The NRC's regulations under 10 CFR Part 51 implement the requirements of the *National Environmental Policy Act of 1969*, as amended (NEPA) (Public Law 91-190). The Act requires Federal agencies to assess the potential impacts of their actions affecting the quality of the human environment.

1.2 The Proposed Action

The proposed action is for AES to construct, operate, and decommission a gas centrifuge uranium enrichment facility near Idaho Falls, in Bonneville County, Idaho. If the NRC issues a license to AES under the provisions of the *Atomic Energy Act of 1954*, the license would authorize AES to possess and use special nuclear material, source material, and byproduct material at the proposed EREF for a period of 30 years, in accordance with the NRC's regulations in 10 CFR Parts 70, 40, and 30, respectively. The scope of activities to be conducted under the license would include the construction, operation, and decommissioning of the proposed EREF.

AES has proposed that the EREF be located on a 186-hectare (460-acre) section of a 1700-hectare (4200-acre) parcel of land that it intends to purchase from a single private landowner. The only structure presently on the property is a potato storage facility at the south end of the site. Current land uses of the property include native rangeland, nonirrigated seeded pasture, and irrigated cropland.

AES plans to conduct preconstruction and construction of the proposed EREF from 2010 to 2022.[1] Partial facility operations will commence in 2014, with an 8-year startup period that would run concurrently with construction activities. The facility is expected to reach full production capacity in 2022. Decommissioning or potential license renewal activities would begin in advance of scheduled license expiration (anticipated to be 2041).

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[1] As discussed in Section 1.4.1, certain site preparation activities, referred to as "preconstruction" activities in this EIS, are explicitly excluded from the definition of construction in 10 CFR 51.4. Preconstruction activities are not considered part of the proposed action.

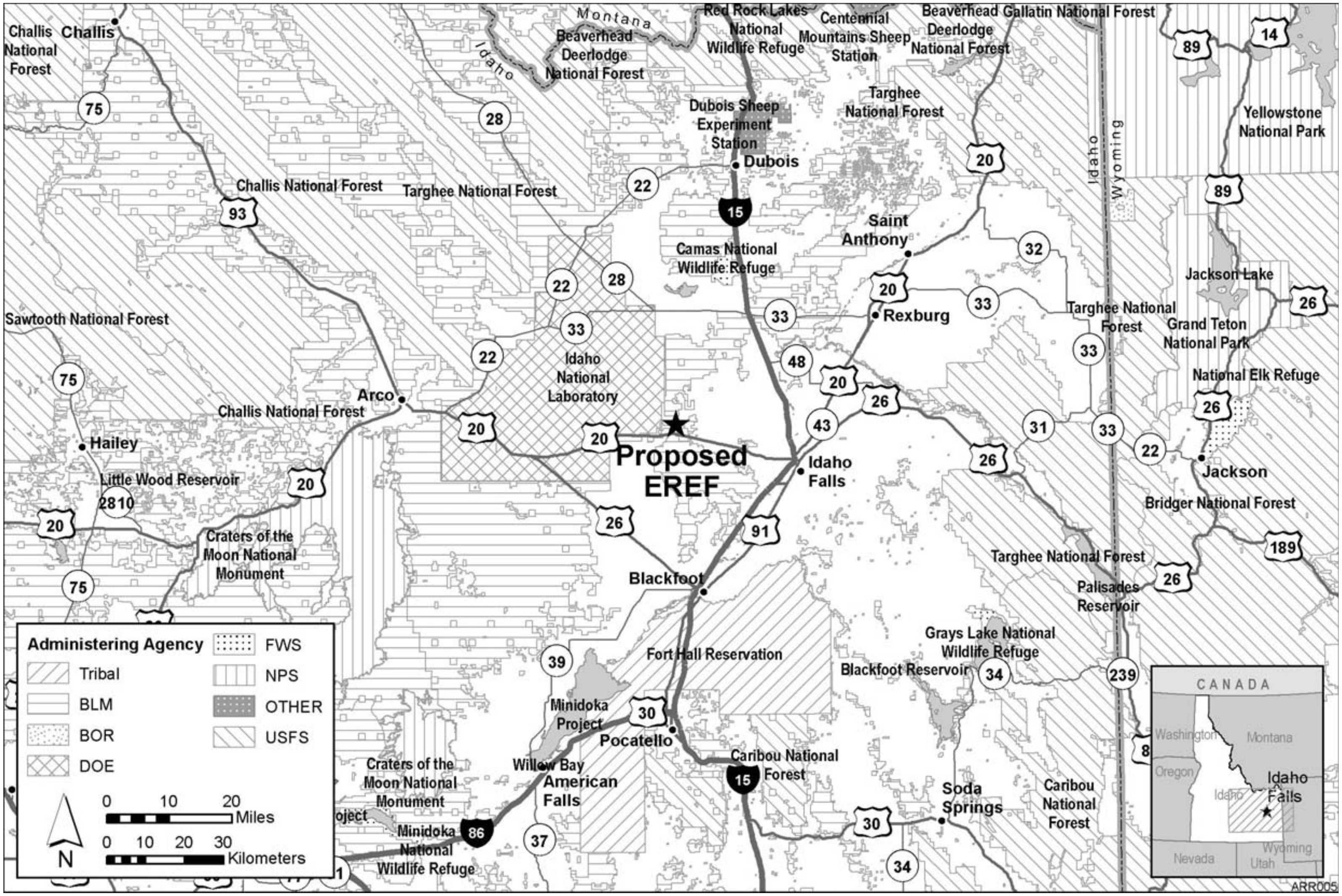

Figure 1-1 Location of the Proposed Eagle Rock Enrichment Facility (EREF)

AES intends that the proposed EREF would help fulfill needs for domestic enriched uranium capacity for nuclear electrical generation and contribute to national energy security (i.e., provide additional reliable and economical uranium enrichment capacity in the United States) (AES, 2010b). This purpose and need are discussed in detail in Section 1.3.

Natural uranium ore usually contains approximately 0.72 weight percent uranium-235, and this percentage is significantly less than the 3 to 5 weight percent uranium-235 required by the nuclear power plants currently employed or proposed in the United States and in most other countries as fuel for electricity generation. Therefore, uranium must be enriched in one of the steps of the nuclear fuel cycle (Figure 1-2) so it can be used in commercial light-water nuclear power plants. Enrichment is the process of increasing the percentage of the naturally occurring and fissile uranium-235 isotope and decreasing the percentage of uranium-238.

AES's license application seeks authorization to produce enriched uranium up to a nominal 5 percent by weight of uranium-235, which meets the needs of most U.S. power plants. Enriched uranium from the proposed EREF would be used in commercial light-water nuclear power plants and is called low-enriched uranium (LEU). Uranium used in military reactors and nuclear weapons has a much higher percentage of uranium-235 by weight and is called highly enriched uranium (HEU).

AES has requested a license for a nominal annual production capacity of 6 million separative work units (SWUs) per year and a maximum production capacity of 6.6 million SWUs[2] per year. An SWU represents the level of effort or energy required to raise the concentration of uranium-235 to a specified level.

1.3 Purpose and Need for the Proposed Action

As discussed in Section 1.2, the proposed action is for AES to construct, operate, and decommission a facility to enrich uranium up to 5 percent by weight of uranium-235, with a nominal annual production capacity of 6 million SWUs and a maximum annual production capacity of 6.6 million SWUs. The proposed facility would use the gas centrifuge uranium enrichment process and would be constructed on an undeveloped site in Bonneville County, Idaho. The proposed action is intended to satisfy the need for an additional economical domestic source of enriched uranium.

The purpose of the proposed action is to fulfill the following needs:

- the need for enriched uranium to fulfill electricity generation requirements

- the need for domestic supplies of enriched uranium for national energy security

[2] An SWU is a unit of measurement used in the nuclear industry pertaining to the process of enriching uranium for use as fuel for nuclear power plants. It describes the effort needed to separate uranium-235 and uranium-238 atoms in natural uranium to create a final product that is richer in uranium-235 atoms. For 114 kilograms (251 pounds) of natural uranium, it takes about 70 SWUs to produce 10 kilograms (22 pounds) of uranium enriched to 5 percent uranium-235. It takes on the order of 100,000 SWUs of enriched uranium to fuel a typical 1000-megawatt commercial nuclear reactor for a year (USEC, 2009).

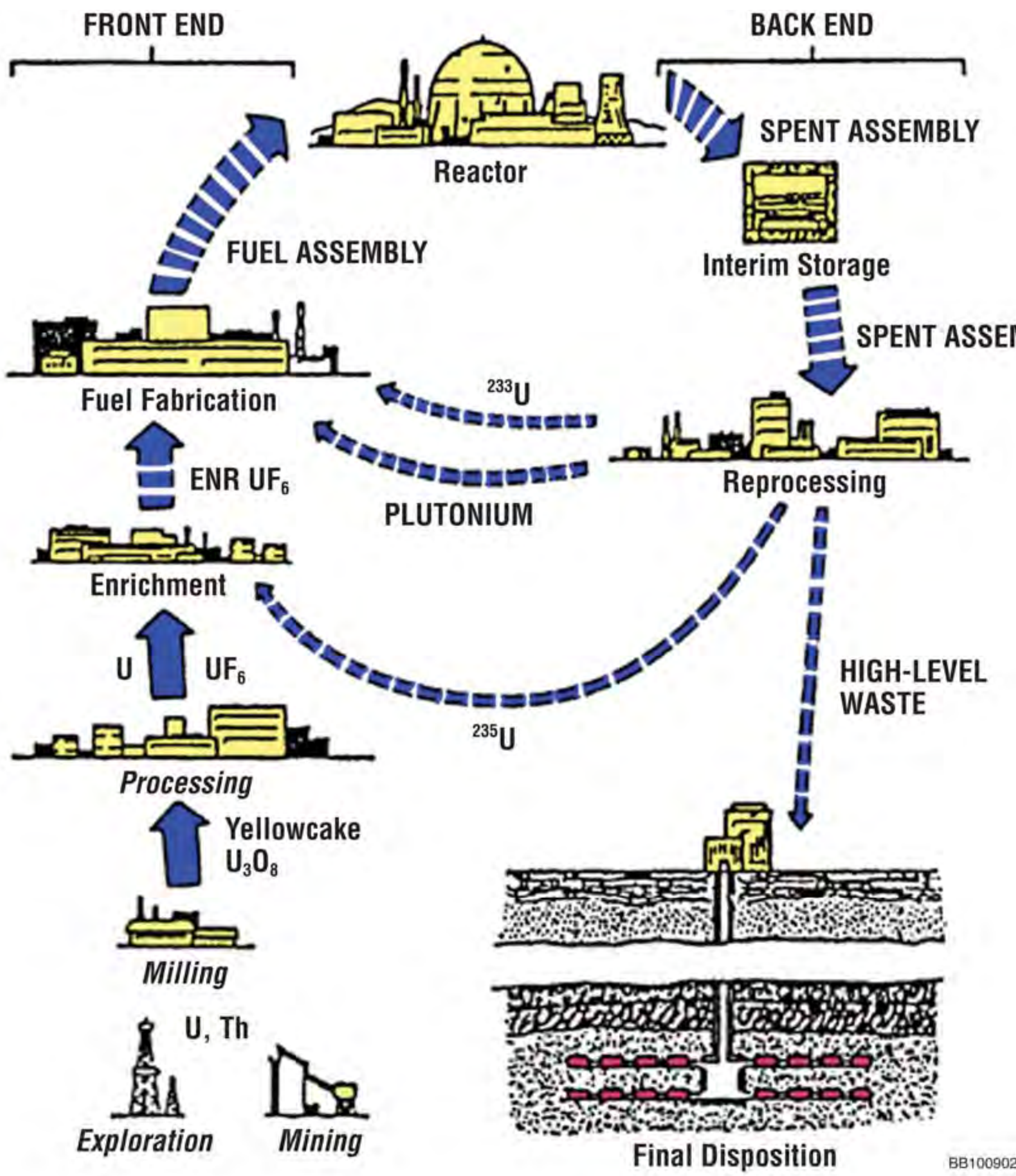

Figure 1-2 Nuclear Fuel Cycle (NRC, 2008)

The following sections discuss each of these needs and how each is addressed by the proposed action.

1.3.1 The Need for Enriched Uranium to Fulfill Electricity Requirements

Enriched uranium from the proposed EREF would be used in U.S. commercial nuclear power plants. According to the Energy Information Administration (EIA) in its *Annual Energy Outlook 2010 with Projections to 2035* (EIA, 2010a), these plants currently supply approximately 20 percent of the nation's electricity requirements. As future demand for electricity increases, the need for LEU to fuel nuclear power plants is also expected to increase (EIA, 2010a).

For the case based on established policies and current trends (the reference case), the EIA estimates that nuclear capacity grows from 100,600 megawatts in 2008 to 112,900 megawatts in 2035, including 4000 megawatts of expansion at existing plants and 8400 megawatts of new capacity (EIA, 2010a). Also, the EIA estimates that nuclear generation will grow from 806 billion kilowatt hours in 2008 to between 882 and 951 billion kilowatt hours in 2035, depending on the low- or high-growth scenarios.

The NRC expects to license the next generation of nuclear power plants using 10 CFR Part 52. Part 52 governs the issuance of standard design certifications (DCs), early site permits (ESPs), and combined licenses (COLs) for nuclear power plants. The NRC staff is engaged in numerous ongoing interactions with vendors and utilities regarding prospective new reactor applications and licensing activities. Based on these interactions, the NRC staff has received a significant number of new reactor COL applications (COLAs) since 2007. As of December 2010, the NRC is actively reviewing 12 COLAs for a total of 20 nuclear reactor units. The NRC has suspended 6 COLA reviews due to changes in applicants' business strategies or the timing of their construction plans. One of the suspended COLAs was converted by the applicant to an ESP application. Assuming licensing requirements are met, the NRC is poised to issue two COLs by the end of 2011.

The NRC has three DC applications and two DC amendment applications currently under review. As of December 2010, one DC application and one DC amendment are in rulemaking. The NRC received two Advanced Boiling Water Reactor (ABWR) DC renewal requests in calendar year 2010 and expects to receive one new DC application by FY2012.

The EIA forecasts of nuclear generating capacity combined with applications from the nuclear power industry for construction and operation of new plants suggest a continuing, if not increasing, demand for LEU. In addition, the EIA forecasts that the annual demand for enrichment services may vary between 12.9 million and 15.7 million SWUs from 2006 through 2025 (EIA, 2003).

The demand for enriched uranium in the United States is currently being fulfilled by three main categories of supply:

- *Domestic production of enriched uranium provides about 15 percent of U.S. demand* (EIA, 2010b). The primary uranium enrichment facility currently operating in the United States is the Paducah Gaseous Diffusion Plant (PGDP) in Paducah, Kentucky, run by USEC Inc.'s subsidiary, the United States Enrichment Corporation. A similar existing enrichment facility in the United States is the Portsmouth Gaseous Diffusion Plant in Piketon, Ohio, but it ceased production in May 2001 and will no longer produce enriched uranium, as the plant has been placed in cold shutdown (a condition whereby the plant is undergoing preparation for decommissioning and decontamination) (DOE, 2010a). The URENCO USA facility (formerly known as the National Enrichment Facility [NEF]) in Lea County, New Mexico, operated by Louisiana Energy Services LLC (LES), began initial operations in June 2010. This facility, which is still under construction and will continue to increase production as its remaining cascade halls are completed, is expected to reach a capacity of about 1.6 million SWUs per year in August 2011 (about half of its full capacity of approximately 3 million SWUs per year, as currently licensed by the NRC). Full licensed capacity would not be reached until sometime later. An expansion to 5.9 million SWUs per year is being considered by LES, but an application for the expansion has not yet been submitted to the NRC.

- *The Megatons to Megawatts Program provides about 38 percent of U.S. demand* (EIA, 2010b). Under this program, the United States Enrichment Corporation implements the 1993 government-to-government agreement between the United States and Russia that calls for Russia to convert 500 metric tons (550 tons) of HEU from dismantled nuclear warheads into LEU (DOE, 2010b). This is equivalent to about 20,000 nuclear warheads. The United States Enrichment Corporation purchases the enriched portion of the "downblended" material, tests it to make sure it meets specifications, adjusts the enrichment level if needed, and then sells it to its electric power generation customers for fuel in commercial nuclear power plants. All program activities in the United States now take place at the Paducah plant (NRC, 2006). This program is scheduled to expire in 2013 (DOE, 2010b).

- *Other foreign sources provide about 47 percent of U.S. demand*. Other countries that produce and export enriched uranium to the United States include China, France, Germany, the Netherlands, and the United Kingdom (EIA, 2010b).

The current 5-year average U.S. demand for enriched uranium is approximately 14 million SWUs per year (EIA, 2010b). As noted, recent forecasts indicate that this demand could reach 15 to 16 million SWUs by 2025, depending on the rate of nuclear generation growth in the United States (EIA, 2003). From 2005 through 2009, the United States Enrichment Corporation delivered approximately 10 to 13 million SWUs to customers annually, of which 5.5 million SWUs per year were from the Megatons to Megawatts Program. Of the remaining 4.5 to 7.5 million SWUs, an average of approximately 2 million SWUs were sold for use in the United States and the balance exported (USEC, 2010). Therefore, of the amount sold for use in the United States from 2005 to 2009, approximately 2 million SWUs (about15 percent of U.S. demand) came from enrichment at the PGDP and 5.5 million SWUs (about 38 percent of U.S. demand) came from downblending at the Megatons to Megawatts Program, which depends on deliveries from Russia (EIA, 2010b; USEC, 2010). Accordingly, about 85 percent (38 percent from the Megatons to Megawatts Program plus 47 percent from other foreign sources) of U.S. demand is currently supplied by foreign sources.

It is anticipated that all gaseous diffusion enrichment operations in the United States will cease to exist in the near future due to the higher cost of aging facilities (DOE, 2007). The Megatons to Megawatts Program is scheduled to expire in 2013 (DOE, 2010b). As noted, these two sources meet about half (53 percent) of the current U.S. demand for LEU.

To help fill the anticipated supply deficit, other potential future domestic sources of supply have emerged in recent years. In addition to the URENCO USA facility mentioned above, the USEC American Centrifuge Plant (ACP) in Piketon, Ohio, has received a license from the NRC (NRC, 2005, 2006) and is currently under construction. The NRC is currently reviewing a license application submitted by GE-Hitachi Global Laser Enrichment, LLC (GE-Hitachi) to construct and operate the proposed Global Laser Enrichment (GLE) Facility in Wilmington, North Carolina (GE-Hitachi, 2009). The URENCO USA facility and ACP are based on the gaseous centrifuge technology, while the GLE Facility is based on a newer, laser enrichment process under development. LES has announced a potential plan to expand the annual capacity of its URENCO USA facility in New Mexico from 3 million to 5.9 million SWUs per year in response to customer expressions of the need for additional enrichment services (URENCO, 2008). However, as noted above, the URENCO USA facility, although currently operating, is still under construction and is not expected to reach half of its currently licensed annual capacity of 3 million SWUs per year until August 2011. ACP is licensed to produce 3.5 million SWUs annually. The GE-Hitachi application is for a 6-million-SWU-per-year plant. Based on the projected need for LEU by existing reactors and proposed new reactors, with the target capacity of 6.6 million SWUs per year for the proposed EREF (this EIS), the total projected enrichment capacity in the United States would exceed the projected demand (approximately 16 million SWUs per year) by about 6 million SWUs per year if all of the enrichment facilities were constructed and operated at their rated capacities (and assuming the URENCO USA facility is authorized to operate at 5.9 million SWUs and the Paducah Gaseous Diffusion Plant is shut down). However, given the uncertainties in future development and/or potential expansion of the proposed projects, this projected level of extra capacity would not provide the needed assurance that the enriched uranium would be reliably available when needed for domestic nuclear power production.

1.3.2 The Need for Domestic Supplies of Enriched Uranium for National Energy Security

All of the current domestic production of enriched uranium currently originates primarily from the aging gaseous diffusion plant in Paducah, Kentucky, and to a lesser extent from the URENCO USA facility in Lea County, New Mexico, that began initial operations in June 2010 and is still under construction. This situation creates a severe reliability risk in U.S. domestic enrichment capacity. Any disruption in the supply of enriched uranium for domestic commercial nuclear reactors could have a detrimental impact on national energy security because nuclear reactors supply approximately 20 percent of the nation's electricity requirements. The proposed EREF could play an important role in assuring the nation's ability to maintain a reliable and economical domestic source of enriched uranium by providing such additional enrichment capacity. Further, this additional capacity would lessen U.S. dependence on foreign sources of enriched uranium.

In a letter to the NRC regarding general policy issues raised by the LES license application, the U.S. Department of Energy (DOE) stated that uranium enrichment is a critical step in the production of nuclear fuel and noted the decline in domestic enrichment capacity (DOE, 2002). In its 2002 letter, DOE also referenced comments made by the U.S. Department of State indicating that "maintaining a reliable and economical U.S. uranium enrichment industry is an important U.S. energy security objective" (DOE, 2002). The proposed EREF could contribute to the attainment of national energy security policy objectives by providing an additional domestic source of enriched uranium. This additional capacity would lessen U.S. dependence on foreign sources of enriched uranium.

At present, gaseous diffusion is the primary technology currently in commercial use in the United States. Gaseous diffusion technology has relatively large resource requirements that make it less attractive than gas centrifuge technology, from both an economic and an environmental perspective (NRC, 2006). Gas centrifuge technology, used at the URENCO USA facility, proposed for the EREF, and to be used at the ACP, is known to be more efficient and substantially less energy-intensive than gaseous diffusion technology. The new laser enrichment technology proposed for the GLE Facility is still under development.

1.4 Scope of the Environmental Analysis

To fulfill its responsibilities under NEPA, the NRC has prepared this EIS to analyze the environmental impacts (i.e., direct, indirect, and cumulative impacts) of the proposed EREF as well as reasonable alternatives to the proposed action. The scope of this EIS includes consideration of both radiological and nonradiological impacts associated with the proposed action and the reasonable alternatives.

In addition, this EIS identifies resource uses, monitoring programs, potential mitigation measures, unavoidable adverse environmental impacts, the relationship between short-term uses of the environment and long-term productivity, and irreversible and irretrievable commitments of resources.

The development of this EIS was based on (1) the NRC staff's review of the AES license application (AES, 2010a), which includes a supporting Environmental Report, AES's responses to Requests for Additional Information (RAIs) (AES, 2009b), and subsequent sage-grouse survey (North Wind, 2010a) and supplemental wildlife survey report submittals (North Wind, 2010b); (2) the NRC staff's review of additional information provided by AES and its consultants in recent letters to and from State agencies (AES, 2010c; Idaho SHPO, 2010; WCRM, 2010); (3) the NRC staff's independent verification and analyses; (4) public and agency comments received during the scoping period and the Draft EIS public comment period; and (5) the NRC staff's consultations with other Federal agencies and with Native American tribes and State and local government agencies. In addition, the development of this EIS was closely coordinated with the development of the NRC's Safety Evaluation Report (SER) (*Safety Evaluation Report for the Eagle Rock Enrichment Facility in Bonneville County, Idaho*, NUREG-1951, September 2010 [NRC, 2010a]), which is the outcome of the NRC safety review of the AES license application for the proposed EREF.

1.4.1 Scope of the Proposed Action

The scope of the proposed action consists of the construction, operation, and decommissioning of the proposed EREF. Therefore, all activities associated with these actions must be considered. Construction activities consist of site preparation (e.g., clearing the land and construction of access roads) and facility construction (erection of the buildings and structures concerned with uranium enrichment). A distinction between site preparation and facility construction is made because of an exemption request submitted by AES as discussed below. Operation activities include those involved in the enrichment of uranium (shipment, receipt, storage, and processing of natural uranium and storage and shipment of enriched and depleted uranium). Decommissioning activities include those involved in facility shutdown such as equipment and building decontamination for disposal or reuse.

On June 17, 2009, AES submitted a request for exemption (AES, 2009a) from specific NRC requirements governing "Commencement of Construction" as specified under 10 CFR 70.4, 70.23(a)(7), 30.4, 30.33(a)(5), 40.4, and 40.32(e). This exemption was approved by the NRC on March 17, 2010 (NRC, 2010b). The exemption allows AES to proceed with certain activities that are considered outside of NRC regulatory purview (they are not related to radiological health and safety or the common defense and security) before obtaining an NRC license to construct and operate the proposed EREF (the proposed action). These activities, discussed further in Section 2.1.4.1, are referred to as “preconstruction” activities, because they are not considered construction activities as defined in NRC regulations. See 10 CFR 51.4 (defining “construction”) and 10 CFR 70.4 (defining “commencement of construction”); also compare 10 CFR 50.2 (defining “construction” and “constructing”) and the NRC’s *Final Interim Staff Guidance COL/ESP-ISG-004 on the Definition of Construction and on Limited Work Authorizations* (NRC, 2009). Specifically, 10 CFR 51.4 states, in relevant part, that “construction” does not include the following activities:

i. Changes for temporary use of the land for public recreational purposes;

ii. Site exploration, including necessary borings to determine foundation conditions or other preconstruction monitoring to establish background information related to the suitability of the site, the environmental impacts of construction or operation, or the protection of environmental values;

iii. Preparation of a site for construction of a facility, including clearing of the site, grading, installation of drainage, erosion and other environmental mitigation measures, and construction of temporary roads and borrow areas;

iv. Erection of fences and other access control measures;

v. Excavation;

vi. Erection of support buildings (such as, construction equipment storage sheds, warehouse and shop facilities, utilities, concrete mixing plants, docking and unloading facilities, and office buildings) for use in connection with the construction of the facility;

vii. Building of service facilities, such as paved roads, parking lots, railroad spurs, exterior utility and lighting systems, potable water systems, sanitary sewerage treatment facilities, and transmission lines;

viii. Procurement or fabrication of components or portions of the proposed facility occurring at other than the final, in-place location at the facility;

ix. Manufacture of a nuclear power reactor under a manufacturing license under subpart F of part 52 of this chapter to be installed at the proposed site and to be part of the proposed facility; or

x. With respect to production or utilization facilities, other than testing facilities and nuclear power plants, required to be licensed under Section 104.a or Section 104.c of the Act, the erection of buildings which will be used for activities other than operation of a facility and which may also be used to house a facility (e.g., the construction of a college laboratory building with space for installation of a training reactor).

As indicated in (iii) of the list above, site preparation is one component of preconstruction. As used in this document, the term “site preparation” includes the items specifically listed in (iii) above (i.e., clearing of the site, grading, installation of drainage, erosion and other environmental mitigation measures, and construction of temporary roads and borrow areas).

The NRC's decision to grant the exemption request to AES was based on the NRC staff finding that the request to perform certain preconstruction activities is authorized by law, will not endanger life or property or common defense and security, and is in the public interest. The exemption covered the following activities and facilities:

- clearing of approximately 240 hectares (592 acres)
- site grading and erosion control
- excavating the site including rock blasting and removal
- constructing a stormwater retention pond
- constructing main access and site roadways
- installing utilities
- erecting fences for investment protection
- constructing parking areas
- erecting construction buildings, offices (including construction trailers), warehouses, and guardhouses

The authorization to conduct these listed activities or construct the listed facilities prior to the NRC licensing decision was based on the condition that none of the facilities or activities subject to the exemption will be, at a later date, a component of AES's Physical Security Plan or its Standard Practice Procedures Plan for the Protection of Classified Matter or otherwise subject to NRC review or approval. Approval of the exemption request does not indicate that a licensing decision has been made by the NRC. Preconstruction activities would be completed by AES with the risk that a license may not be issued. Although the activities covered by the NRC's March 17, 2010, exemption (NRC, 2010b) are referred to in this document as "preconstruction" activities, some of these activities may continue after the commencement of construction, if a license is issued.

These activities authorized under the exemption approval are expected to occur whether or not the license is granted. As a result, the NRC does not consider these activities as part of the proposed action or the no-action alternative. However, because they are related to the construction of the proposed EREF, NRC staff analyzed their impacts in Chapter 4 as part of the impacts considered under "Preconstruction and Construction." However, the staff also attempted, to the extent possible, to separate the impacts from preconstruction and construction activities into those that would occur as a result of preconstruction activities and those that would occur as a result of construction activities as defined in 10 CFR 50.2 and 10 CFR 51.4. The staff also considered all of these impacts in evaluating the cumulative impacts of the EREF project.

Further, the NRC has no regulatory jurisdiction over the 161-kilovolt (kV) electrical transmission line that is required to power the EREF (its installation and operation are not related to radiological health and safety or the common defense and security). Therefore, the installation and operation of this transmission line is not considered by the NRC to be part of the proposed action. The installation and operation of this transmission line is considered under cumulative impacts in Chapter 4 of this EIS.

1.4.2 Scoping Process and Public Participation Activities

The NRC regulations in 10 CFR Part 51 contain requirements for conducting a scoping process prior to the preparation of an EIS. Scoping was used to help identify the relevant issues to be discussed in detail in this EIS. Scoping was also used to help determine issues that are beyond the scope of this EIS, which do not warrant a detailed discussion, or that are not directly relevant to the assessment of potential impacts from the proposed action.

On May 4, 2009, the NRC published in the *Federal Register* (74 FR 20508) a Notice of Intent (NOI) to prepare an EIS for the construction, operation, and decommissioning of the proposed EREF and to conduct the scoping process for the EIS. The NOI summarized the NRC's plans to prepare the EIS and presented background information on the proposed EREF. For the scoping process, the NOI initiated the public scoping period and invited comments on the proposed action, and announced a public scoping meeting to be held concerning the project.

On June 4, 2009, the NRC staff held the public scoping meeting in Idaho Falls, Idaho. During this meeting, a number of individuals offered oral and written comments and suggestions to the NRC concerning the proposed EREF and the development of the EIS. In addition, the NRC received written comments from various individuals during the public scoping period that ended on June 19, 2009. The NRC carefully reviewed the scoping comments (both oral and written) and then consolidated and categorized these comments by topical areas.

After the scoping period, the NRC issued the *Environmental Scoping Summary Report: Proposed AREVA Enrichment Services Eagle Rock Enrichment Facility in Bonneville County, Idaho* in September 2009. This report is provided in Appendix A. The report identifies categories of issues to be analyzed in detail in the EIS and issues determined to be beyond the scope of the EIS.

1.4.3 Issues Studied in Detail

As stated in the NOI, the NRC identified issues to be studied in detail as they relate to implementation of the proposed action. The public identified additional issues during the subsequent public scoping process. Issues identified by the NRC and the public that could have short- or long-term impacts from the potential construction and operation of the proposed EREF include:

- accidents
- alternatives
- air quality
- compliance with applicable regulations
- costs and benefits
- cumulative impacts
- decommissioning
- historic and cultural resources
- land use
- need for the facility
- noise
- public and occupational health
- resource commitments
- socioeconomic impacts

- depleted uranium disposition
- ecological resources
- environmental justice
- geology and soils
- transportation
- visual and scenic resources
- waste management
- water resources

1.4.4 Issues Eliminated from Detailed Study

The NRC has determined that detailed analysis associated with mineral resources was not necessary because there are no known nonpetroleum mineral resources at the proposed site that would be affected by any of the alternatives being considered.

The NRC also determined that detailed analysis of the impact of the proposed EREF on associated actions that include the overall nuclear fuel cycle activities was not necessary. This is because the proposed project would not measurably affect uranium mining and milling operations and the demand for enriched uranium. The amount of mining and milling depends upon the stability of market prices for uranium balanced with the concern of environmental impacts associated with such operations (NRC, 1980). The demand for enriched uranium in the United States is primarily driven by the number of commercial nuclear power plants and their operation. The proposed EREF would only result in the creation of new transportation routes within the fuel cycle to and from the enrichment facility. The existing transportation routes between the other facilities are not expected to be altered. Because the environmental impacts of all of the transportation routes other than those to and from the proposed EREF have been previously analyzed, they are eliminated from further study (NRC, 1977, 1980).

1.4.5 Issues Outside the Scope of the EIS

The following issues raised during the scoping process have been determined to be outside the scope of this EIS:

- safety and security

- credibility of the applicant

- nonproliferation

As noted in Section 1.4, some of these issues are analyzed in detail in the NRC's SER (NRC, 2010a) and are only summarized in the EIS. For example, within the area of safety and security, the SER analyzes the probabilities and consequences of various accidents at the proposed EREF, as well as measures to prevent those accidents and mitigate their effects. This EIS does not go into the same level of detail, but provides, in Section 4.2.15, an accident analysis for the purpose of assessing the potential environmental impacts of accidents.

NRC regulations require that information submitted as part of a license application be complete and accurate in all material respects. See, e.g., 10 CFR 70.9. At the same time, the general credibility of an applicant is not an issue the NRC addresses in an EIS. Rather, the NRC evaluates the submitted application based on its merits and performs an independent verification of the proposal put forth in the applicant's application.

The issue of nonproliferation was most recently addressed by the NRC in an August 25, 2010, letter from NRC Chairman Gregory B. Jaczko to the Honorable John M. Spratt, Jr., Congressman, U.S. House of Representatives (NRC, 2010c). This letter was in response to Congressman Spratt's June 30, 2010, letter (Spratt et al., 2010) in which he requested that the NRC conduct a nuclear nonproliferation assessment as part of the review of license applications for new nuclear technologies. The relevant statements from Chairman Jaczko's letter are as follows:

> *"The NRC has adopted a comprehensive regulatory infrastructure and implements an integrated set of activities directed against the unauthorized disclosure of information and technology considered important to common defense and security and the diversion of nuclear materials inimical to public health and safety and the common defense and security. The NRC's key regulations in this area (10 CFR Parts 73, 74, and 95) provide comprehensive requirements governing the control of, and access to, information, physical security of materials and facilities, and material control and accounting. Other NRC regulatory requirements are directed at preventing unauthorized disclosure of classified information, safeguards information (SGI), and sensitive unclassified nonsafeguards information. As appropriate, the NRC may supplement these requirements by order consistent with its statutory obligation to protect the common defense and security and public health and safety.*
>
> *"Beyond the NRC's regulations, uranium enrichment facility licensees have voluntarily committed to implement additional measures to protect information associated with classified enrichment technologies. The Nuclear Energy Institute developed a guidance document for the enrichment facility licensees and certificate holders which the NRC staff has endorsed. Licensees are now implementing these additional measures and incorporating their commitments in their site security plans. These additional measures and commitments become part of their licensing basis. In addition, the staff is working with other agencies to provide additional Federal involvement in protecting uranium enrichment technologies and establishing information protection measures.*
>
> *"Given the NRC's comprehensive regulatory framework, ongoing oversight, and active interagency cooperation, it is the NRC's current view that a formal nuclear nonproliferation assessment would not provide any additional benefit to protection of the common defense and security....*
>
> *"I want to assure you that the NRC takes your concerns very seriously and that we will continue to regulate nuclear materials and sensitive technology to ensure protection of public health and safety and the environment, promotion of the common defense and security, and fulfillment of U.S. obligations for nonproliferation and international agreements."*

Nonproliferation is therefore outside the scope of the EIS.

1.4.6 Draft EIS Public Comment Period and Public Participation Activities

The NRC staff issued the Draft EIS for public review and comment on July 21, 2010, and announced its availability on that date in the *Federal Register* (75 FR 4266) in accordance with 10 CFR 51.73, 51.74, and 51.117. The official public comment period on the Draft EIS began with publication in the *Federal Register* on July 23, 2010, of a Notice of Availability of the Draft EIS (75 FR 43160). The 45-day public comment period ended on September 13, 2010.

During the public comment period, the NRC staff held two public comment meetings – in Boise, Idaho, on August 9, 2010, and in Idaho Falls, Idaho, on August 12, 2010. The NRC staff posted meeting notices for both meetings in the NRC's public involvement website. Oral comments on the Draft EIS were presented by about 50 people at the Boise meeting and about 46 people at the Idaho Falls meeting. A court reporter recorded the oral comments and other meeting proceedings and prepared a written transcript for each meeting. In addition to oral comments received at the public meetings, the NRC staff received written comments on the Draft EIS during the public meetings, and written comments by postal mail and emails during the public comment period. The public meeting transcripts and written comments are part of the public record for the proposed EREF project.

All the comments received by the NRC on the Draft EIS were reviewed and considered by the NRC staff in developing the Final EIS. In Appendix I of this EIS, these comments are presented in groups by topic and summarized, and the NRC's responses to the comments are provided. The NRC staff made the public comment meeting transcripts part of the public record, contained in the NRC's Agencywide Documents Access and Management System (ADAMS). The meeting transcripts are also available in the NRC's public website for the proposed EREF project, at http://www.nrc.gov/materials/fuel-cycle-fac/arevanc.html#3. Other comment documents were added to ADAMS as they were received by the NRC.

Members of the public can access ADAMS at http://www.nrc.gov/reading-rm/adams.html. From this website, the transcripts and other comment documents can be accessed by entering their ADAMS Accession Numbers (or ML numbers). The ADAMS Accession Numbers for the comment documents are identified in Table I-1 in Appendix I.

In general, the issues identified in the comments were similar to those brought up during the EIS scoping process (see Section 1.4.2 and Appendix A). The comments received during the Draft EIS public comment period were on topics in all the major issues and resource areas addressed in the EIS except for noise and environmental justice. As discussed in Section 1.4.5, issues that are related to safety and security, nonproliferation, and the credibility of the applicant are not part of the scope of the EIS. Other safety issues are addressed in the NRC's SER (NRC, 2010a).

1.4.7 Changes from the Draft EIS

The majority of changes to the Draft EIS that the NRC staff made in preparing the Final EIS were minor corrections and a number of updates and clarifications. Among these changes, based on recent project developments or certain comments on the Draft EIS (see Appendix I, Section I.5), updated or additional information has been included in the EIS in some of the resource area sections and other sections and appendices, to provide more current or complete information and/or analyses. The impacts assessed and the NRC staff's findings and conclusions remain unchanged for all resource areas.

The most noteworthy of the changes from the Draft EIS are identified below:

Chapter 1 Introduction

- Information in Sections 1.3.1 and 1.3.2 relating to purpose and need for the proposed action has been updated.

- Additional information explaining why nonproliferation is not within the scope of the EIS has been added to Section 1.4.5.

- Information on the Draft EIS public comment period and associated public participation activities, and on comments received on the Draft EIS, has been added (see Section 1.4.6).

- Information in Sections 1.5.4.1 and 1.5.4.2 regarding *Endangered Species Act* and *National Historic Preservation Act* (NHPA) consultations, respectively, conducted by the NRC staff has been updated.

Chapter 2 Alternatives

- Information in the introduction to Section 2.1 has been updated to indicate that AES initiated preconstruction activities in late 2010.

- Information in Section 2.1.5.1 regarding the status of conversion facilities for depleted uranium hexafluoride has been updated.

- Information in Section 2.2 regarding the no-action alternative has been updated.

- Information on mitigation of impacts to historic and cultural resources due to preconstruction activities, and on the NHPA Section 106 consultation, has been updated in Table 2-6, Section 2.4, under both the proposed action and no-action alternative.

Chapter 3 Affected Environment

- Information in Section 3.2.1 regarding the applicability of the *Farmland Protection Policy Act* to the proposed EREF project has been updated.

- Additional information on seismicity/earthquakes has been added to Section 3.6.1.1.

Chapter 4 Environmental Impacts and Chapter 5 Mitigation

- Information on mitigation of impacts to historic and cultural resources due to preconstruction activities, and on the NHPA Section 106 consultation, has been updated in Sections 4.2.2.1 and 4.2.2.3.

- Information on potential visual impacts from construction and operation of the proposed EREF on the quality of the recreational experience at Hell's Half Acre Wilderness Study Area (WSA) has been added to Section 4.2.3.1.

- Information on water appropriation and usage during construction and operation was updated in Sections 4.2.6.1 and 4.2.6.2, respectively.

- Additional NRC-recommended mitigation measures for potential impacts to water quality during preconstruction and construction have been added to Sections 4.2.6.3 and 5.2 (Table 5-3).

- Expanded discussions of impacts on sage–grouse during operation of the proposed EREF have been provided in Sections 4.2.7.2 and 4.3.7.

- Additional AES mitigation measures for potential impacts to ecological resources have been added to Sections 4.2.7.3 and 5.1 (Table 5-1), and additional NRC-recommended mitigation measures have been added to Sections 4.2.7.2 and 5.2 (Tables 5-3 and 5-4).

- For comparison with the original ground-level release calculations, impacts on public health from elevated releases of radionuclides from the proposed EREF during normal operation were added in Section 4.2.10.2 (details added in Appendix E, Section E.3.1).

- Expanded coverage on solid, liquid, and mixed wastes has been provided in Section 4.2.11.2.

- Section 4.2.12.4 has been added to provide a discussion of the potential effect of a facility such as the proposed EREF on surrounding property values.

- Information has been added to Section 4.2.17 regarding the estimated amount of CO_2 emissions avoided from coal-burning power plants through use by nuclear power plants of fuel fabricated from UF_6 enriched at the proposed EREF

- Clarification on the region of influence (ROI) used in the cumulative impact analysis has been added to the introduction to Section 4.3

- Information on water usage during construction and operation of the proposed EREF was updated in Section 4.3.6. Also provided in Section 4.3.6 is additional information on prior contamination of the Eastern Snake River Plain (ESRP) aquifer originating from Idaho National Laboratory (INL).

<u>Chapter 6 Environmental Measurement and Monitoring Programs</u>

- Clarifications regarding the groundwater monitoring program have been added to Section 6.1.5.

- Additional information has been added to Section 6.2.2.1 regarding ecological monitoring along the proposed 161-kV transmission line to provide power for the proposed EREF.

Appendix B Consultation Letters

- Appendix B has been updated to reflect additional consultations conducted since the Draft EIS was issued.

Appendix E Dose Methodology and Impacts

- Impacts on public health from elevated releases of radionuclides from the proposed EREF during normal operation were estimated in Section E.3.1 for comparison with the previously estimated impacts from ground-level releases.

1.4.8 Related Relevant Documents

The following documents were reviewed as part of the development of this EIS.

- *Environmental Impact Statement for the Proposed American Centrifuge Plant in Piketon, Ohio, Final Report. NUREG-1834, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, April 2006.* This EIS analyzes the potential environmental impacts of the proposed siting, construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility at the existing DOE reservation in Piketon, Ohio. Its description of the purpose and need of the proposed action, as well as its review of alternatives to the proposed action, are highly relevant to the alternatives analysis for the proposed ERE project. The environmental impacts discussed for the proposed ACP are also relevant to the impact analysis for the proposed EREF, especially the analysis of cumulative impacts associated with the management of depleted uranium and low-level wastes from the proposed EREF, the ACP, the NEF, and the proposed GLE Facility, as well as the existing DOE inventory of depleted uranium hexafluoride (UF_6).

- *Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico, Final Report. NUREG-1790, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, June 2005.* This EIS analyzes the potential environmental impacts of the proposed siting, construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility near Eunice, New Mexico. Its description of the purpose and need of the proposed action, as well as its review of alternatives to the proposed action, are highly relevant to the alternatives analysis for the proposed EREF project. The environmental impacts discussed for the proposed NEF are also relevant to the impact analysis for the proposed EREF, especially the analysis of cumulative impacts associated with the management of depleted uranium and low-level wastes from the proposed EREF, the ACP, the NEF, and the proposed GLE Facility, as well as the existing DOE inventory of depleted UF_6.

- *Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio, Site. DOE/EIS-0360, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June 2004.* This site-specific EIS analyzes the impacts associated with the construction, operation, and decommissioning of a depleted UF_6 conversion facility at the Portsmouth, Ohio, site. The EIS also evaluates the impacts of transporting cylinders (depleted UF_6, enriched uranium, and empty) to Portsmouth that used to be stored at the East Tennessee

Technology Park near Oak Ridge, Tennessee. Also evaluated are transportation of depleted UF_6 conversion products and waste materials to a disposal facility; transportation and sale of the hydrogen fluoride produced as a conversion co-product; and neutralization of hydrogen fluoride to calcium fluoride and the sale or disposal of the calcium fluoride in the event that the hydrogen fluoride product is not sold. The results presented in the EIS are relevant to the management, use, and potential impacts associated with the depleted UF_6 that would be generated at the proposed EREF and the cumulative impacts of depleted UF_6 from the ACP, the NEF, the proposed EFEF, and the proposed GLE Facility, as well as the existing DOE inventory of depleted UF_6.

- *Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Paducah, Kentucky, Site*. *DOE/EIS-0359, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June 2004*. This site-specific EIS is very similar to the EIS for the Portsmouth, Ohio, site, except that the conversion facility is at the Paducah, Kentucky, site.

- *Environmental Assessment: Disposition of Russian Federation Titled Natural Uranium. DOE/EA-1290, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, June 1999.* This Environmental Assessment (EA) analyzed the environmental impacts of transporting natural UF_6 from the gaseous diffusion plants to the Russian Federation. Transportation by rail and truck were considered. The EA addresses both incident-free transportation and transportation accidents. The results presented in this EA are relevant to the transportation of UF_6 for the proposed EREF.

- *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride. DOE/EIS-0269, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, April 1999*. This EIS analyzes strategies for the long-term management of the depleted UF_6 inventory that was stored at three DOE sites near Paducah, Kentucky; Portsmouth, Ohio; and Oak Ridge, Tennessee, at the time this EIS was prepared. This EIS also analyzes the potential environmental consequences of implementing each alternative strategy for the period 1999 through 2039. The results presented in this EIS are relevant to the management, use, and potential impacts associated with the depleted UF_6 that would be generated at the proposed EREF and the cumulative impacts of depleted UF_6 from the ACP, the NEF, the proposed EREF, and the proposed GLE Facility, as well as the existing DOE inventory of depleted UF_6.

- *Advanced Mixed Waste Treatment Project (AMWTP) Final Environmental Impact Statement. DOE/EIS-0290, Idaho Operations Office, U.S. Department of Energy, January 1999*. This site-specific EIS evaluates the alternatives associated with the treatment and packaging of stored onsite radioactive waste at the Idaho National Laboratory (INL) site for offsite disposal. Treatment of offsite radioactive waste is also considered. As the INL is located within approximately 1 mile of the proposed EREF property located in Bonneville County, Idaho, the characterization of the affected environment in this EIS is relevant to existing conditions (e.g., air quality, ecology, geology, and hydrology) at and near the proposed EREF site.

- *Idaho High-Level Waste & Facilities Disposition, Final Environmental Impact Statement. DOE/EIS-0287, Idaho Operations Office, U.S. Department of Energy, September 2002*. This site-specific EIS evaluates the alternatives associated with the treatment and disposal of certain mixed wastes (waste with both hazardous and radioactive components) generated by past spent nuclear fuel reprocessing operations at the INL. As the INL is located within approximately 1 mile of the proposed EREF property located in Bonneville County, Idaho, the characterization of the affected environment in this EIS is relevant to existing conditions (e.g., air quality, ecology, geology, and hydrology) at and near the proposed EREF site.

- *Draft Environmental Impact Statement for the Proposed Consolidation of Nuclear Operations Related to Production of Radioisotope Power. DOE/EIS-0373D, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, June 2005*. This EIS analyzes the impacts from the consolidation of facilities necessary for the production of radioisotope power systems. One site considered is the INL in southeastern Idaho. As the INL is located within approximately 1 mile of the proposed EREF property located in Bonneville County, Idaho, the characterization of the affected environment in this EIS for the INL is relevant to existing conditions (e.g., air quality, ecology, geology, and hydrology) at and near the proposed EREF site.

1.5 Applicable Statutory and Regulatory Requirements

1.5.1 Applicable State of Idaho Requirements

Certain environmental requirements, including some discussed earlier, have been delegated to State authorities for implementation, enforcement, or oversight. Table 1-1 provides a list of State of Idaho environmental requirements.

1.5.2 Permit and Approval Status

Several construction and operating permit applications must be prepared and submitted by AES or its agents, and regulatory approval and/or permits must be received prior to EREF project construction or facility operation. Decommissioning of the EREF would be addressed in the decommissioning plan required pursuant to 10 CFR Parts 30 and 40. Table 1-2 lists the potentially required Federal, State, and local permits and their present status.

1.5.3 Cooperating Agencies

No Federal, State, or local agencies or tribes have come forward as cooperating agencies in the preparation of this EIS.

1.5.4 Consultations

The consultation requirements of the *Endangered Species Act of 1973* and the *National Historic Preservation Act* apply to the NRC regarding the licensing of the proposed EREF. The consultation correspondence discussed below is provided in Appendix B of this EIS.

Table 1-1 State of Idaho Environmental Requirements

Law/Regulation	Citation	Requirements
Air Pollution Control	*Idaho Administrative Procedures Act* (IDAPA) 58.01.01 authorized by *Idaho Statutes* (IS), Title 39, Chapter 1, Environmental Quality – Health	Requires a permit before an owner or operator may begin the construction or modification of any stationary source, facility, major facility, or major modification; stationary source permit applicants must demonstrate compliance with all applicable Federal, State, and local emission standards, and that the source will not cause or significantly contribute to a violation of any ambient air quality standard.
Water Quality Standards	IDAPA 58.01.02, authorized by IS, Title 39, Chapter 1, Environmental Quality – Health, and Chapter 36, Water Quality	Designates uses for waters in the State and establishes water quality standards to protect those uses; places restrictions on the discharge of wastewaters and on human activities which may adversely affect public health and water quality in State waters.
Public Water Drinking Systems	IDAPA 58.01.08 authorized by IS, Title 39, Chapter 1, Environmental Quality – Health	Controls and regulates the design, construction, operation, maintenance, and quality control of public drinking water systems; adopts 40 CFR Parts 141 and 143 national primary and secondary drinking water regulations by reference. Requires a plan that demonstrates that the water system has adequate technical and managerial capacity and written approval of the site by the Idaho Department of Environmental Quality prior to drilling a public water system well.
Hazardous Waste	IDAPA 58.01.05 as authorized by IS, Title 39, Chapter 44, Hazardous Waste Management	Requires hazardous waste permits for treating, storing, or disposing of hazardous wastes; permit provisions are dependent on volumes and types of wastes generated and management level (i.e., storage, treatment, and/or disposal).

Table 1-1 State of Idaho Environmental Requirements (Cont.)

Law/Regulation	Citation	Requirements
Protection of Graves	IS, Title 27, Chapter 5, Protection of Graves	Prohibits willful removal, mutilation, defacing, injuring, or destroying any cairn or grave; allows excavation by a professional archaeologist if action is necessary to protect the burial site from foreseeable destruction and upon prior notification to affected parties.
Disposal of Radioactive Materials	IDAPA 58.01.10 as authorized by IS, Title 39, Chapter 44, Hazardous Waste Management	Regulates the disposal of radioactive materials not regulated under the *Atomic Energy Act of 1954*, as amended, at State-permitted facilities; places restrictions on disposal of certain radioactive materials at municipal solid waste landfills and identifies other approved disposal options for radioactive materials. Adopts the radiation protection standards contained in 10 CFR Part 20.
Preservation of Historic Sites	IS, Title 67, Chapter 46, Preservation of Historic Sites	Authorizes the governing body of any county or city to establish a historic preservation commission that can conduct surveys of local historic properties, acquire interests in them, and participate in land use planning.
Wastewater Rules	IDAPA 58.01.16 as authorized by IS, Title 39, Chapter 1, Environmental Quality – Health, and Chapter 36, Water Quality	Requires the State to certify that the NPDES permit issued by the EPA complies with the State's water quality standards.
Well Construction Standards Rules	IDAPA 37.03.09 as authorized by IS, Title 42, Chapter 2, Appropriation of Water – Permits, Certificates, and Licenses – Survey	Establishes minimum standards for the construction of all new wells and the modification and decommissioning (abandonment) of existing wells; applies to all water wells, monitoring wells, and other artificial openings and excavations in the ground that are more than 18 feet in vertical depth below land surface.
Rules Governing Classification and Protection of Wildlife	IDAPA 13.01.06, as authorized by IS, Title 36, Chapter 2, Classifications and Definitions	Defines and lists State threatened and endangered species and bans taking or possessing them.
Individual/Subsurface Sewage Disposal Rules	IDAPA 58.01.03 as authorized by IS, Title 39, Chapter 1, Environmental Quality – Health	Requires a permit to construct, modify, or repair individual or subsurface sewage disposal systems.

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Table 1-2 Potentially Applicable Permitting and Approval Requirements and Their Status for the Construction, Operation, and Decommissioning of the Proposed Eagle Rock Enrichment Facility

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Federal			
Domestic Licensing of Special Nuclear Material, Domestic Licensing of Source Material, Rules of General Applicability to Domestic Licensing of Byproduct Material	NRC	10 CFR Part 70, 10 CFR Part 40, 10 CFR Part 30 as authorized by the *Atomic Energy Act*	Submitted
NPDES Industrial Stormwater Permit	EPA Region 10	40 CFR Part 122 as authorized by the CWA	Application to be submitted[a]
NPDES Construction General Permit	EPA Region 10	40 CFR Part 122 as authorized by the CWA	Applications to be submitted by AES and Rocky Mountain Power[a]
Section 404 Permit	U.S. Army Corps of Engineers (USACE)	40 CFR Part 230 authorized by the CWA	Not required per letter issued by the USACE
Endangered Species Act Consultation	FWS	50 CFR Part 402 authorized by the *Endangered Species Act*	Not required per letter issued by the FWS
State			
Air: Permit to Construct	Idaho Department of Environmental Quality/Air Quality Division (IDEQ/AQD)	*Idaho Administrative Procedures Act* (IDAPA) 58.01.01 authorized by the *Idaho Environmental Protection and Health Act*	Not required; proposed EREF satisfies IDAPA Permit to Construct exemptions
Air: Operating Permit (under Title V)	IDEQ/AQD	IDAPA 58.01.01 authorized by the *Idaho Environmental Protection and Health Act*	Not required; proposed EREF emissions do not meet thresholds

Table 1-2 Potentially Applicable Permitting and Approval Requirements and Their Status for the Construction, Operation, and Decommissioning of the Proposed Eagle Rock Enrichment Facility (Cont.)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
State (Cont.)			
National Emission Standards for Hazardous Air Pollutants Permit	IDEQ/AQD	IDAPA 58.01.01 authorized by the *Idaho Environmental Protection and Health Act*	Not required; proposed EREF would not be a major source of criteria air pollutants or source of hazardous air pollutants
Hazardous Waste Permit	IDEQ/Waste Management and Remediation Division	IDAPA 58.01.05 authorized by the *Hazardous Waste Management Act*	Not required; the proposed EREF qualifies as a small quantity generator – a generator identification number will be requested
NPDES Section 401 Permit Certification	IDEQ/Water Quality Division (WQD)	IDAPA 58.01.16 authorized by the *Idaho Environmental Protection and Health Act*	Certification decisions will be made when EPA issues the proposed final NPDES permits
Well Drilling Permit	Idaho Department of Water Resources	IDAPA 37.03.09 as authorized by Title 42 of the *Idaho Statutes*	Application to be submitted
Easement on State Owned Land	Department of Lands	IDAPA 20.03.08 authorized by the *Public Depository Law*	Not required; access nor easement is needed over the endowment trust lands proximate to the proposed EREF
Safe Drinking Water Act Drinking Water System	IDEQ/WQD	IDAPA 58.01.08 authorized by the *Idaho Environmental Protection and Health Act*	Comprehensive treatment plan will be prepared; operations will be placed under a licensed operator
Sanitary System Permit	IDEQ/WQD	IDAPA 58.01.03 authorized by the *Idaho Environmental Protection and Health Act*	Not required for the proposed EREF (zero-discharge system), but may be required for the Visitor Center.

Table 1-2 Potentially Applicable Permitting and Approval Requirements and Their Status for the Construction, Operation, and Decommissioning of the Proposed Eagle Rock Enrichment Facility (Cont.)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
State (Cont.)			
Access Permit	Idaho Transportation Department	IDAPA 39.03.42 authorized by Titles 40, 49, and 67 of the *Idaho Statutes*	Application to be submitted
Construction Permits: Electrical, Plumbing, HVAC	Idaho Division of Building Safety	IDAPA 07.01.01, 07.02.04, 07.07.01 authorized by Title 54 of the *Idaho Statutes*	Application to be submitted
Machine-produced Radiation Registration	Idaho Department of Health and Welfare/Radiation Control Agency	IDAPA 16.02.27 authorized by Title 56 of the *Idaho Statutes*	Application to be submitted
County			
Construction Permits: Structural, Mechanical	Bonneville County	*Bonneville County Ordinance 218-07*	Application to be submitted

[a] Updates on the NPDES permitting process can be viewed on the EPA website at: http://cfpub.epa.gov/npdes/stormwater/noi/noidetail_new.cfm?ApplId=IDR10CI01.

1.5.4.1 *Endangered Species Act of 1973* Consultation

NRC staff consulted with the FWS to comply with the requirements of Section 7 of the *Endangered Species Act*. On June 17, 2009, the NRC staff sent a letter to the FWS Eastern Idaho Field Office describing the proposed action and requesting a list of threatened and endangered species and critical habitats that could potentially be affected by the proposed action. By letter dated July 15, 2009, the FWS Eastern Idaho Field Office indicated that no listed species are present at the project location. On February 18, 2010, the NRC sent a letter to the FWS Eastern Idaho Field Office reporting the installation of a proposed electrical transmission line to power the proposed EREF project and requesting a list of threatened and endangered species and critical habitats that could potentially be affected by the proposed transmission line and associated facilities. By letter dated March 9, 2010, the FWS Eastern Idaho Field Office pointed out that the protections provided to bald eagles under the *Bald and Golden Eagle Protection Act* and the *Migratory Bird Treaty Act* remain in place even though the bald eagle is no longer included on the list of threatened and endangered species in the lower 48 States. The March letter also referenced the potential of transmission lines to affect migratory birds. A letter dated July 14, 2010, from the NRC to the FWS Eastern Idaho Field Office, transmitted a copy of the Draft EIS, summarized the contents of the above correspondence, and also summarized an April 15, 2010, telephone conversation between the NRC and Mr. Ty Matthews of the FWS Eastern Idaho Field Office. During that conversation, Mr. Matthews indicated that the list of endangered, threatened, proposed, and candidate species provided by the FWS with its March 9, 2010, letter was for Bonneville County in general; he did not believe that these species are in the vicinity of, or potentially impacted by, the proposed transmission line project; and consultation by the NRC with the FWS under Section 7 of the *Endangered Species Act* would not be needed for these species for the proposed project.

In addition, the NRC has reviewed the results of field surveys (see Section 4.2.7) and determined that no threatened or endangered species would be affected by the proposed EREF.

Additionally, by letters dated June 22, 2009, and June 24, 2009, the NRC communicated with the Idaho Department of Fish and Game and the Idaho Office of Energy Resources, respectively, regarding the proposed action. The NRC again corresponded with the Idaho Department of Fish and Game and the Idaho Office of Energy Resources on February 10, 2010, and February 18, 2010, respectively, reporting the installation of a transmission line to power the proposed EREF project. The Idaho Department of Fish and Game (IDFG) corresponded with the NRC on August 4, 2009, and April 14, 2010. On June 8, 2010, the NRC provided IDFG with additional information on sage grouse surveys conducted for the project.

1.5.4.2 *National Historic Preservation Act of 1966* Section 106 Consultation

Pursuant to Section 106 of the NHPA, in a letter dated June 17, 2009, the NRC initiated consultation with the Idaho State Historical Society, State Historic Preservation Office (SHPO). In this letter, the NRC identified the Area of Potential Effect (APE) for the proposed project and informed the SHPO that archaeological surveys of the APE had been undertaken by a contractor to AES. Also in the letter, the NRC stated its intent to use the NEPA process to comply with Section 106 of the NHPA as allowed in 36 CFR Part 800.8. In a letter dated September 16, 2009, the NRC discussed the AES request to commence preconstruction activities prior to NRC's completion of its environmental review. In a letter dated February 17, 2010, the NRC relayed that a 161-kV transmission line would be constructed and operated to power the proposed EREF and that the APE for the proposed EREF had changed. On April 16, 2010, Argonne National Laboratory (Argonne), on behalf of the NRC, provided the SHPO with copies of the following AES documents: a report providing information on the proposed 161-kV transmission line project to provide power to the proposed EREF; a Treatment Plan describing the process for mitigating the adverse effect from the proposed EREF project to site MW004 (the *National Register of Historic Places* (NRHP)-eligible John Leopard Homestead) by professional excavation and data recovery (see Sections 3.3.4 and 4.2.2); a report presenting the findings of X-ray fluorescence (XRF) analysis conducted on obsidian artifacts found in the proposed EREF project's APE; and an archaeological survey report conducted for the unsurveyed portions of the expanded APE identified in the NRC's February 17, 2010 letter. In a letter dated May 3, 2010, the SHPO acknowledged the expanded EREF project footprint and proposed transmission line project described in the NRC's February 17, 2010, letter; requested additional copies and/or clarifications of certain AES cultural resource survey reports; expressed support for the proposed treatment of (i.e., mitigation of an adverse effect to) site MW004, and appreciation for receiving a letter report on the XRF analysis of obsidian artifacts; and outlined the next steps in the consultation process including development of a Memorandum of Agreement (MOA) between the NRC and the SHPO to define the mitigation of the adverse effect resulting from the removal of site MW004 as a result of the proposed EREF project.

A letter from the NRC dated July 14, 2010, continued the Section 106 consultation process, notified the SHPO of the issuance of the Draft EIS, and transmitted copies of the Draft EIS for the SHPO's review and comment. In addition, this letter discussed the NRC staff's determination of the APE for the proposed EREF and transmission line projects and the staff's preliminary determination in the Draft EIS of the impacts on historic and cultural resources that would result from the preconstruction, construction, operation, and decommissioning of the proposed project, including the adverse effect on site MW004 and the proposed mitigation of the adverse effect by professional excavation. In a letter dated July 22, 2010, the SHPO stated that they had reviewed the Draft EIS and found that the historic and cultural resource sections accurately reflected the identification efforts conducted to date under Section 106 of the NHPA. Additionally, the letter recommended that a statement be added in the Final EIS that effects on site MW004 will be resolved through an MOA.

By letter dated August 31, 2010, the NRC informed the Advisory Council on Historic Preservation (ACHP) of the adverse effect to site MW004 as a result of the proposed EREF project and that the NRC is drafting an MOA regarding the mitigation of this adverse effect. Also, this letter presented the NRC's invitation to the ACHP to participate in the NHPA Section 106 consultation for the proposed EREF project; provided relevant background information on the proposed project and on the MOA; and transmitted copies of project consultation letters, cultural resource survey reports, and related documents. By letter dated September 20, 2010, the ACHP responded that they do not believe their participation in the consultation to resolve the adverse effect is needed at this time, but may reconsider this decision if they receive a request for participation from a consulting party or other party. The ACHP also stated that once the MOA is signed, it must be filed with the ACHP to complete the requirements of Section 106 of the NHPA.

On June 4, 2009, the NRC met with the Shoshone-Bannock Tribal Council to inform them of the project. By letter dated July 29, 2009, the NRC formally initiated the Section 106 consultation process with the Shoshone-Bannock Tribes. By letters dated September 16, 2009, and February 19, 2010, the NRC continued the consultation process with the Shoshone-Bannock Tribes regarding the AES request to commence certain activities prior to NRC's completion of its environmental review and the installation of the transmission line and associated structures, respectively. On August 11, 2010, the NRC again met with the Shoshone-Bannock Tribal Council to discuss, and answer questions about, the proposed project. In a letter dated October 8, 2010, the NRC described the adverse effect to site MW004, informed the Tribes about the development of an MOA for the proposed EREF project, and invited the Shoshone-Bannock Tribes to participate in the development of the MOA as a concurring party. In a December 22, 2010, telephone conversation with a tribal representative, the NRC was informed that the Shoshone-Bannock Tribes want to be a party to the MOA.

Follow-ups on correspondence with the SHPO and the Shoshone-Bannock Tribes were conducted through subsequent telephone conversations and emails (see Appendix B, Section B.2). On October 13, 2010, the NRC informed the SHPO, by email, that AES had begun work on the mitigation of site MW004, in the manner identified in the Treatment Plan provided to the SHPO with Argonne's letter dated April 16, 2010. On January 26, 2011, the NRC informed the SHPO that the Shoshone-Bannock Tribes had accepted the NRC's invitation to be a concurring party on the MOA, and about the NRC's progress on developing a draft of the

MOA for review by the parties. Additional information regarding development of the MOA is presented in Section 4.2.2.1 of this EIS.

1.6 Organizations Involved in the Proposed Action

Two organizations have specific roles in the implementation of the proposed action:

- AES is the NRC license applicant. If the license is granted, AES would be the holder of an NRC license to construct, operate, and decommission the proposed EREF and for the possession and use of special nuclear material, source material, and byproduct material at the proposed EREF. AES would be responsible for constructing, operating, and decommissioning the proposed facility in compliance with that license and applicable NRC regulations.

  AES is a Delaware limited liability corporation that was formed solely to provide uranium enrichment services for commercial nuclear power plants. AES is a wholly owned subsidiary of AREVA NC Inc. AREVA NC Inc. is a wholly owned subsidiary of the AREVA NC SA, which is part of AREVA SA (AES, 2010b). AES has indicated that its principal business location is in Bethesda, Maryland. The NRC intends to examine any foreign relationship to determine whether it is inimical to the common defense and security of the United States. The foreign ownership, control, and influence issue is beyond the scope of this EIS and is addressed as part of the NRC's SER (NRC, 2010a).

- The NRC is the licensing agency. The NRC has the responsibility to evaluate the license application for compliance with the NRC regulations associated with uranium enrichment facilities. These include standards for protection against radiation in 10 CFR Part 20 and requirements in 10 CFR Parts 30, 40, and 70 that would authorize AES to possess and use byproduct material, source material, and special nuclear material, respectively, at the proposed EREF. The NRC is responsible for regulating activities, as applicable, performed within the proposed EREF through its licensing review process and subsequent inspection program. To fulfill the NRC responsibilities under NEPA, the environmental impacts of the proposed project are evaluated in accordance with the requirements of 10 CFR Part 51 and documented in this EIS.

1.7 References

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(WCRM, 2010) Western Cultural Resources Management, Inc. Letter from J. Sigler (WCRM) to K. Reid (Idaho Deputy SHPO) dated November 17, 2010. "Re: To Summarize Western Cultural Resource Management's Data Recovery Activities for the Eagle Rock Enrichment Facility Project Located in Bonneville County, Idaho." ADAMS Accession No. ML103280087.

2 ALTERNATIVES

This chapter describes and compares the proposed action and alternatives to the proposed action. As discussed in Chapter 1, the proposed action is for AREVA Enrichment Services, LLC (AES) to construct, operate, and decommission a gas centrifuge uranium enrichment facility, known as the Eagle Rock Enrichment Facility (EREF), near Idaho Falls, in Bonneville County, Idaho. In this Environmental Impact Statement (EIS), the U.S. Nuclear Regulatory Commission (NRC) staff evaluated a reasonable range of alternatives to the proposed action, including alternative sites for the AES facility, alternative sources of low-enriched uranium, alternative technologies for uranium enrichment, and the no-action alternative. Under the no-action alternative, AES would not construct, operate, or decommission the proposed EREF. Therefore, the no-action alternative provides a basis against which the potential environmental impacts of the proposed action are evaluated and compared. The EIS also discusses alternatives for the disposition of depleted uranium hexafluoride (UF_6) resulting from enrichment operations over the lifetime of the proposed EREF.

Section 2.1 presents detailed technical descriptions of the proposed action and related actions, including descriptions of the proposed site, gas centrifuge enrichment technology, and activities at the proposed EREF. The activities at the proposed EREF are grouped under preconstruction and construction, operation, and decontamination and decommissioning. Disposition of depleted UF_6 is also discussed in Section 2.1. Section 2.2 describes the no-action alternative. Section 2.3 discusses alternatives to the proposed action that were considered but not analyzed in detail, including alternative sites, enrichment technologies other than the proposed gas centrifuge technology, and use of alternate sources of enriched uranium. The chapter concludes with a comparison of predicted environmental impacts of the proposed action and no-action alternatives (Section 2.4) and a preliminary recommendation from the NRC staff regarding the proposed action (Section 2.5).

2.1 Proposed Action

The proposed action is for AES to construct, operate, and decommission a gas centrifuge uranium enrichment facility near Idaho Falls, in Bonneville County, Idaho. To allow the proposed action, the NRC would need to grant AES a license to possess and use special nuclear material, source material, and byproduct material at the proposed EREF. The NRC license, if granted, would be for a period of 30 years (i.e., through 2041), after which AES would request renewal of the license or begin decommissioning of the proposed facility. AES initiated preconstruction activities for the proposed EREF in late 2010, under an exemption granted by NRC (see Section 1.4.1). If NRC grants the license, AES plans to start construction of the proposed EREF in 2011, begin commercial enrichment operations in 2014, and increase to the maximum target production capacity by 2022, as shown in Table 2-1.

The location of the proposed site is described in Section 2.1.1. The gas centrifuge enrichment process and the proposed facility are described in Sections 2.1.2 and 2.1.3, respectively. Section 2.1.4 describes the phases of the proposed action. The options for management of the depleted UF_6 tails generated at the proposed facility are reviewed in Section 2.1.5.

Table 2-1 Proposed Eagle Rock Enrichment Facility Schedule

Milestone	Estimated Date
Initiate Preconstruction Work	October 2010
Requested License Approval	February 2011
Initiate Facility Construction	February 2011
Start First Cascade	February 2014
Complete Heavy Construction	February 2018
Achieve Production Output of 3.3 million SWUs	March 2018
Complete Construction	February 2022
Achieve Full Nominal Production Output	March 2022
Submit Decommissioning Plan to NRC	February 2030
Complete Construction of Decontamination and Decommissioning Facility	February 2032
Decontamination and Decommissioning Completed	February 2041

Source: AES, 2010a.

Much of the information presented below on the description of the proposed site, the proposed EREF, and the proposed action and related activities is taken from information provided by AES in its Environmental Report (AES, 2010a).

2.1.1 Location and Description of the Proposed Site and Vicinity

As shown in Figures 1-1 and 2-1, the proposed EREF, if approved, would be situated on the north side of US 20, about 113 kilometers (70 miles) west of the Idaho/Wyoming State line. The proposed EREF would be located approximately 32 kilometers (20 miles) west of Idaho Falls (the nearest major city), approximately 32 kilometers (20 miles) east of Atomic City, and approximately 40 kilometers (25 miles), 60 kilometers (37 miles), and 76 kilometers (47 miles) north of Blackfoot, Fort Hall, and Pocatello, respectively. The Fort Hall Indian Reservation, which encompasses about 220,150 hectares (544,000 acres), lies to the south. The nearest boundary of the reservation is about 44 kilometers (27 miles) from the proposed site. The nearest residence is 7.7 kilometers (4.8 miles) east of the proposed site. The nearest counties are Bonneville, Jefferson, and Bingham Counties, parts of which are within 8 kilometers (5 miles) of the proposed site.

The proposed EREF would be located on a 186-hectare (460-acre) site (the “proposed site”) within a privately owned, approximately 1700-hectare (4200-acre) property (the “property” or “proposed property”) that would be purchased by AES from a single landowner (AES, 2010a). Within the 1700-hectare (4200-acre) proposed property are a 16-hectare (40-acre) parcel administered by the U.S. Bureau of Land Management (BLM) and two additional 16-hectare (40-acre) parcels for which the Federal Government had reserved rights under the *Atomic Energy Act of 1946*, as amended, to certain radioactive materials that might be present (e.g., uranium, thorium), along with the right to enter the land to prospect for, mine, and remove

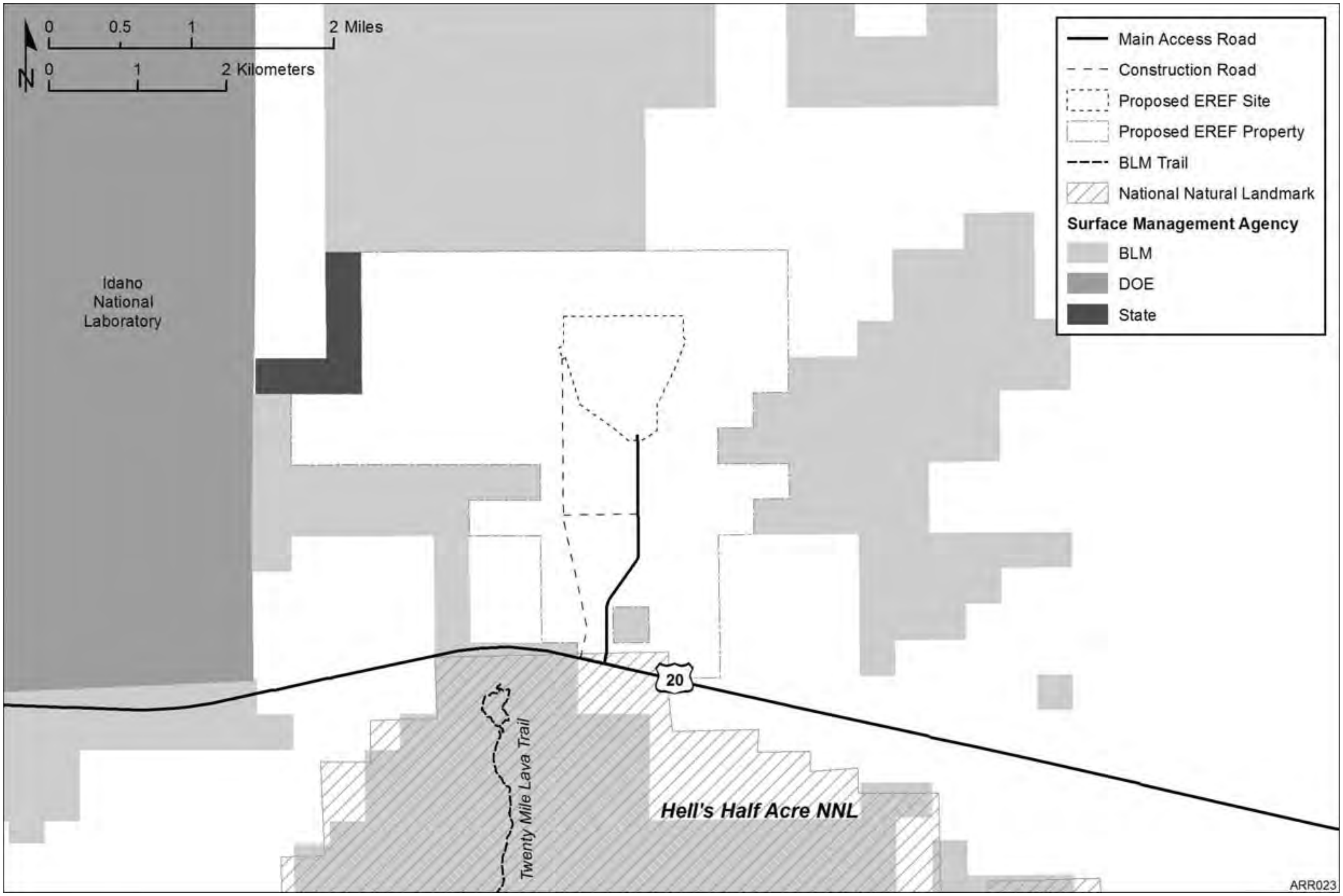

Figure 2-1 Location of the Proposed EREF Site in Bonneville County, Idaho

those materials. However, these reservations were subsequently relinquished pursuant to Section 68.b of the *Atomic Energy Act of 1954*, as amended, 42 U.S.C. 2098(b), and no longer have any legal effect on the property (AES, 2010a). The only right-of-way (ROW) on the proposed property is the ROW for US 20, which forms part of the southern property boundary.

The proposed EREF property consists primarily of relatively flat and gently sloping surfaces with small ridges and areas of rock outcrop; and is semiarid steppe covered by eolian soils of variable thickness that incompletely cover broad areas of volcanic lava flows. Uses of this property, including the proposed EREF site within it, include native rangeland, nonirrigated seeded pasture, and irrigated cropland. Wheat, barley, and potatoes are grown on 389 hectares (962 acres) of the proposed property. A potato storage facility is located at the south end. The property is seasonally grazed.

The main land uses within 8 kilometers (5 miles) of the proposed site are grazing and agriculture. Grazing occurs on State-owned land immediately to the west of the proposed property and on BLM land immediately to the east. The nearest offsite croplands are located within about 0.8 kilometer (0.5 mile) of the southeast corner of the proposed property; and the nearest feedlot and dairy operations are about 16 kilometers (10 miles) to the east.

The eastern boundary of the U.S. Department of Energy's (DOE) Idaho National Laboratory (INL) is 1.6 kilometers (1 mile) west of the proposed property. The INL land closest to the proposed site is undeveloped rangeland. The closest facility on the INL property to the proposed EREF property is the Materials and Fuels Complex (MFC), located approximately 16 kilometers (10 miles) west of the proposed property boundary. The lands north, east, and south of the proposed property are a mixture of private-, Federal-, and State-owned parcels.

Structures located within an 8-kilometer (5-mile) radius of the proposed EREF site include a transformer station (Kettle Substation) adjacent to the proposed site to the east and potato cellars, one 3.2 kilometers (2 miles) to the west of the proposed site and one 7.7 kilometers (4.8 miles) to the east. Public use areas in the immediate vicinity of the proposed AES property include a hiking trail in Hell's Half Acre Lava Field National Natural Landmark (NNL) on the south side of US 20 (see Figure 2-1). Hell's Half Acre is also a Wilderness Study Area (WSA) and is on Federal land managed by the BLM. There is also a small lava tube cave located approximately 8 kilometers (5 miles) east and south of the proposed property. The Wasden Complex, consisting of caves formed by collapsed lava tubes, is located approximately 3.2 kilometers (2 miles) northeast of the footprint of the proposed EREF.

2.1.2 Gas Centrifuge Enrichment Process

The proposed EREF would employ a proven gas centrifuge technology for enriching natural uranium (NRC, 2005b). Figure 2-2 shows the basic construction of a gas centrifuge. The technology uses a rotating cylinder (rotor) spinning at a high circumferential rate of speed inside a protective casing. The casing maintains a vacuum around the rotor and provides physical containment of the rotor in the event of a catastrophic rotor failure.

Uranium hexafluoride (UF_6) gas is fed through a fixed pipe into the middle of the rotor, where it is accelerated and spins at almost the same speed as the rotor. The centrifugal force produced by the spinning rotor causes the heavier uranium-238 hexafluoride ($^{238}UF_6$) molecules to concentrate close to the rotor wall and the lighter uranium-235 hexafluoride ($^{235}UF_6$) molecules to collect closer to the axis of the rotor. This separation effect initially occurs only in a radial direction, which increases when the rotation is supplemented by a convection current produced by a temperature difference along the rotor axis (thermoconvection). A centrifuge with this kind of gas circulation (i.e., from top to bottom near the rotor axis and from bottom to top by the rotor wall) is called a counter-current centrifuge.

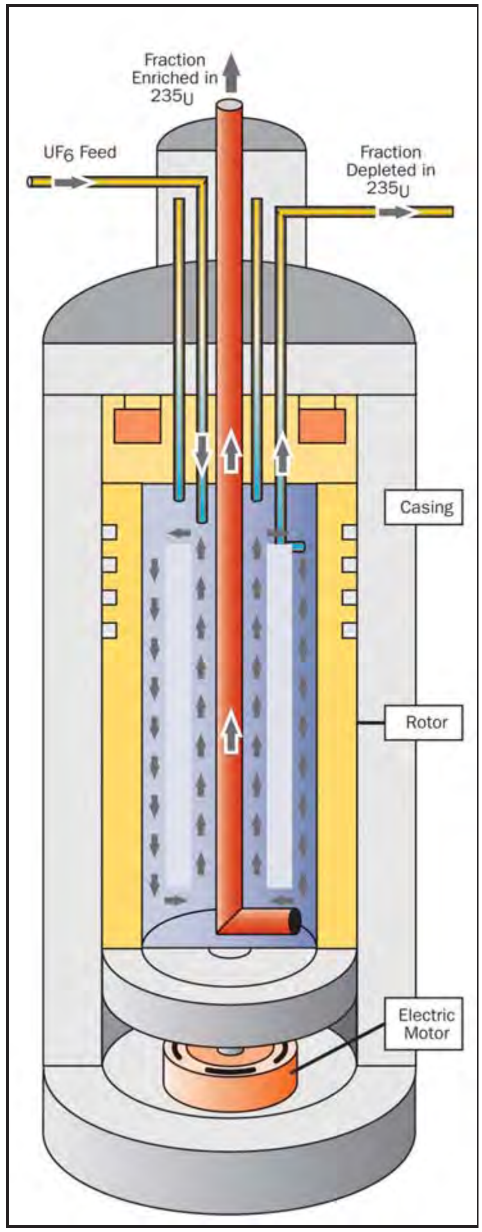

Figure 2-2 Schematic of a Gas Centrifuge (NRC, 2009a)

The inner and outer streams become more enriched/depleted in uranium-235 in their respective directions of movement. The biggest difference in concentration in a counter-current centrifuge does not occur between the axis and the wall of the rotor, but rather between the two ends of the centrifuge rotor. In the flow pattern shown in Figure 2-2, the enriched UF_6 is removed from the lower end of the rotor and the depleted UF_6 is removed at the upper end through take-off pipes that run from the axis close to the wall of the rotor.

The enrichment level achieved by a single centrifuge is not sufficient to obtain the desired concentration of 3 to 5 percent by weight of uranium-235 in a single step; therefore, a number of centrifuges are connected in series to increase the concentration of the uranium-235 isotope. Additionally, a single centrifuge cannot process a sufficient volume for commercial production, which makes it necessary to connect multiple centrifuges in parallel to increase the volume flow rate. The arrangement of centrifuges connected in series to achieve higher enrichment and in parallel for increased volume is called a “cascade.” A full cascade contains hundreds of centrifuges connected in series and parallel. Figure 2-3 is a diagram of a segment of a uranium enrichment cascade showing the flow path of the UF_6 feed, enriched UF_6 product, and depleted UF_6 gas. In the proposed EREF, 12 cascades would be grouped in a Cascade Hall, and each Separations Building Module (SBM) would house two Cascade Halls. There would be four identical SBMs in the full-capacity plant.

2.1.3 Description of the Proposed Eagle Rock Enrichment Facility

The major facility buildings and structures in the proposed EREF are described in Section 2.1.3.1. Section 2.1.3.2 describes the supporting utilities. Site access would be via the local road network, as discussed in Section 2.1.3.3.

What Is Enriched Uranium?

Uranium is a naturally occurring radioactive element. In its natural state, uranium contains approximately 0.72 percent by weight of the uranium-235 isotope, which is the fissile isotope of uranium. There is a very small (0.0055 percent) quantity of the uranium-234 isotope, and most of the remaining mass (99.27 percent) is the uranium-238 isotope. All three isotopes are chemically identical and only differ slightly in their physical properties. The most important difference between the isotopes is their mass. This small mass difference allows the isotopes to be separated and makes it possible to increase (i.e., "enrich") the percentage of uranium-235 in the uranium to levels suitable for nuclear power plants or, at very high enrichment, nuclear weapons.

Most civilian nuclear power reactors use low-enriched uranium fuel containing 3 to 5 percent by weight of uranium-235. Uranium for most nuclear weapons is enriched to greater than 90 percent.

Uranium would arrive at the proposed EREF as natural UF_6 in solid form in a Type 48X or 48Y transport cylinder from existing conversion facilities in Port Hope, Ontario, Canada; Metropolis, Illinois; or overseas sources. To start the enrichment process, the cylinder of UF_6 is heated, which causes the material to sublime (change directly from a solid to a gas). The UF_6 gas is fed into the enrichment cascade where it is processed to increase the concentration of the uranium-235 isotope. The UF_6 gas with an increased concentration of uranium-235 is known as "enriched" or "product." Gas with a reduced concentration of uranium-235 is referred to as "depleted" UF_6 or "tails."

Source: NRC, 2005b.

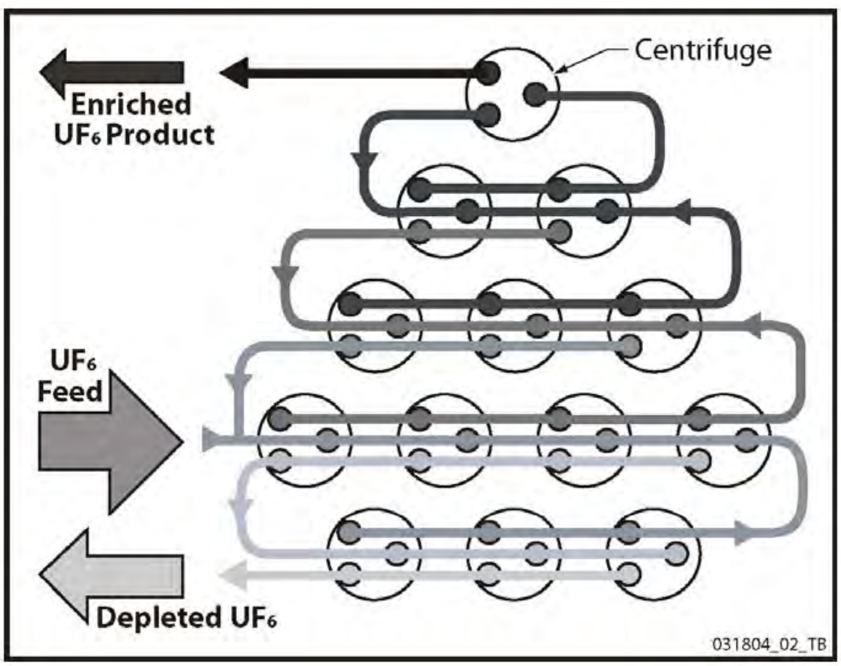

Figure 2-3 Diagram of Enrichment Cascade (NRC, 2005b)

2.1.3.1 Major Facility Buildings and Structures

Buildings/structures within the proposed EREF will include the following:

- Cylinder Storage Pads
- Centrifuge Assembly Building
- Separations Building Modules
- Cylinder Receipt and Shipping Building
- Blending, Sampling, and Preparation Building
- Technical Support Building
- Operations Support Building
- Electrical and Mechanical Services Buildings
- Administration Building
- Visitor Center
- Security and Secure Administration Building

The main process facilities at the proposed EREF are the four SBMs, with each identical unit capable of handling approximately one-quarter of plant capacity (AES, 2010a). Each SBM consists of two Cascade Halls. Each Cascade Hall is able to produce enriched UF_6 with a specific assay (weight percent uranium-235), giving the proposed EREF the capability of producing up to eight different assays at one time.

Cylinder Storage Pads

Concrete storage pads would be constructed for storing full feed cylinders (Type 48Y) containing natural UF_6 prior to use in the enrichment process, full tails cylinders (Type 48Y) containing depleted UF_6 after the enrichment process, full product cylinders (Type 30B) containing enriched UF_6 after the enrichment process, and empty feed, tails, and product cylinders. There will be a total of four pads (one pad for each of the above uses), although the empty tails pad will bisect the full tails cylinder pad.

The pads for storage of the full feed cylinders, full tails cylinders, and empty cylinders would be located next to each other on the north side of the proposed facility. The pad capacities would be 712 full feed cylinders, 25,718 full tails cylinders, and 1840 empty cylinders. The feed cylinders would be single-stacked, while the tails and empty cylinders would be double-stacked. The pad for empty cylinders would be sized to temporarily store these cylinders for up to six months. The full tails cylinders would be stacked two high in concrete saddles that would elevate them approximately 20 centimeters (8 inches) above ground level. The pad for full tails cylinders would be expanded as additional storage is required up to the maximum expected facility lifetime generation of 25,718 cylinders, if necessary (AES, 2010a). Figure 2-4 shows a cylinder stacking operation using a specialized carrier.

Full product cylinders would be single-stacked on a single pad adjacent to the Cylinder Receipt and Shipping Building. The pad would be sized to accommodate approximately 1032 cylinders.

Figure 2-4 Stacking Depleted UF_6 Cylinders in a Storage Yard (DOE, undated a)

Centrifuge Assembly Building

The Centrifuge Assembly Building would be used for the assembly, inspection, and mechanical testing of the centrifuges prior to installation in the Cascade Halls. The building would be separated into areas for centrifuge component storage, centrifuge assembly, and assembled centrifuge storage. This building would also contain the Centrifuge Test and Postmortem Facilities that would be used to test the functional performance and operational problems of production centrifuges and ensure compliance with design parameters in addition to providing an area for the dismantlement of potentially contaminated centrifuges and also to prepare for their disposal.

Separations Building Modules

The eight proposed Cascade Halls would be contained in four identical Separations Building Modules near the center of the proposed EREF. Figure 2-5 is a photograph of centrifuges inside a Cascade Hall at URENCO. Each of the eight proposed Cascade Halls would house 12 cascades, and each cascade would consist of hundreds of centrifuges connected in series and parallel to produce enriched UF_6. Each Cascade Hall would be capable of producing a maximum of 825,000 separative work units (SWUs) per year.

The centrifuges would be mounted on precast concrete floor-mounted stands (flomels). Each Cascade Hall would be enclosed by a structural steel frame supporting insulated sandwich panels (metal skins with a core of insulation) to maintain a constant temperature within the cascade enclosure.

In addition to the Cascade Halls, each SBM would house a UF_6 Handling Area and a Process Service Corridor. The UF_6 Handling Area would contain the UF_6 feed input system as well as the enriched UF_6 product and depleted UF_6 take-off systems. The Process Service Corridor would contain the gas transport piping and equipment, which would connect the cascades with each other and with the product and depleted materials take-off systems. The Process Service Corridor would also contain key electrical and cooling water systems.

Figure 2-5 Centrifuges inside a Cascade Hall (NRC, 2005b)

Cylinder Receipt and Shipping Building

All UF_6 cylinders (feed, product, and tails) would enter and leave the proposed EREF through the Cylinder Receipt and Shipping Building. Full feed and empty product and tails cylinders delivered to the proposed EREF would be inspected, unloaded off the transport trucks, and sent to their appropriate locations. Outgoing cylinders (empty feed and full product and tails) would be prepared for shipment, including overpack protection as necessary, and loaded on the transport trucks.

Blending, Sampling, and Preparation Building

The primary function of the Blending, Sampling, and Preparation Building would be filling and sampling the Type 30B product cylinders with UF_6 enriched to customer specifications. Other activities within the building would include cylinder preparation, inspection, testing, and maintenance. The Ventilation Room, which is also located in this building, would provide a set-aside area for testing and inspecting Type 30B, 48X, and 48Y cylinders for use in the proposed EREF. The Ventilation Room would be maintained under negative pressure and would require entry and exit through an airlock.

Technical Support Building

The Technical Support Building would contain radiological support areas for the proposed facility and would act as the secure point of entry to the SBMs and the Blending, Sampling, and Preparation Building. This building would contain the following functional areas:

- The Radiation Monitoring Room would separate the uncontaminated areas from the potentially contaminated areas of the proposed plant. It would include personnel radiation monitoring equipment, hand-washing facilities, and safety showers.

- The Laundry Sorting Room would be used to sort potentially contaminated and soiled clothing and similar articles according to their level of contamination for either disposal or laundering onsite or offsite.

- The Solid Waste Collection Room would be used for processing wet and dry low-level solid waste.

- The Liquid Effluent Collection and Treatment Room would be used to collect, monitor, and treat potentially contaminated liquid effluents produced onsite.

- The Truck Bay/Shipping and Receiving Area would be used to load and ship low-level radioactive and hazardous wastes to licensed treatment and disposal facilities.

- The Gaseous Effluent Ventilation System would be used to remove uranium and other radioactive particles and hydrogen fluoride from the potentially contaminated process gas streams.

- The Decontamination Workshop would provide a facility for removing radioactive contamination from contaminated materials and equipment.

- Other workshops would provide space for maintenance of chemical traps, mobile vacuum pump skids, valves, and pumps.

- The Maintenance Facility would provide space for the normal maintenance of contaminated equipment used at the proposed EREF, as well as all instrument and control equipment, lighting, power, and associated processes and pipe work.

- The Laboratory Areas contain rooms for the receipt, preparation, analysis, and storage of various samples. A number of chemical analysis methods used for uranium isotope measurement and UF_6 quality assurance are available including mass spectrometry, atomic emission spectroscopy, alpha/beta/gamma counting, and gas Fourier transform infrared spectrometry.

Operation Support Building

The Operation Support Building would be located next to the Technical Support Building and would provide nonradiological support functions for the proposed EREF. This building would contain the following functional areas:

- The Control Room would be the main monitoring point for the entire plant and provide all of the facilities for the control of the plant.

- The Security Alarm Center would be the primary security monitoring station for the proposed facility. All electronic security systems would be controlled and monitored from this center.

- Workshops for the maintenance and repair of uncontaminated plant equipment would be provided. The Vacuum Pump Rebuild Workshop would service pumps and other miscellaneous equipment. The Mechanical, Electrical, and Instrumentation Workshop would service pump motors, all instrument and control equipment, lighting, power, and associated process and services pipe work.

- The Medical Room would provide space for a nurse's station and room for medical examinations.

- The Environmental Laboratory Area would provide rooms and space for various laboratory areas that receive, prepare, and store various samples.

Electrical and Mechanical Services Buildings

The Electrical Services Building would be adjacent to the north side of the SBMs, housing four standby diesel generators. Building heating, ventilation, and air-conditioning equipment as well as switchgears and control panels would be housed in the building.

The Mechanical Services Building would be located south of the SBMs, housing air compressors, demineralized water systems, and the centrifuge cooling water system pumps, heat exchangers, and expansion tanks.

Administration Building

The Administration Building would contain general office areas. All personnel access to the proposed EREF would occur through the Administration Building.

Visitor Center

The Visitor Center would be located outside the security fence close to US 20.

Security and Secure Administration Building

The Security and Secure Administration Building would be near the Administration Building. The building would contain secure office areas and would provide the only access (the Entry Exit Control Point) to the inside areas of the proposed EREF. Personnel must first pass through the Administration Building to gain access to the Security and Secure Administration Building.

2.1.3.2 Utilities

The proposed EREF would require the installation of water and electrical utility lines. Natural gas will not be used. Sanitary waste would be treated in a packaged domestic Sanitary Sewage Treatment Plant.

Water for the proposed facility would be provided from onsite groundwater wells. The proposed EREF's water requirement is expected to be approximately 24,900 cubic meters per year (6,570,000 gallons per year) in support of plant operations. Of this, approximately 2100 cubic meters per year (554,800 gallons per year) would be consumed by plant processes and 22,800 cubic meters per year (6,023,000 gallons per year) would be used for potable water (AES, 2010a).

The proposed EREF is anticipated to require approximately 64 megavolt-amperes (MVA) of power when all cascades are in operation (AES, 2010a). A new 161-kV electrical transmission line would be run from the existing Bonneville Substation approximately 16 kilometers (10 miles) east of the proposed EREF site (AES, 2010a). The new transmission line and associated structures would be located entirely on private land within Bonneville County. Rocky Mountain Power, a division of PacifiCorp, will be the builder, owner, and operator. The line would extend west from the Bonneville Substation 14.5 kilometers (9 miles) to the Kettle Substation, continuing an additional 1.2 kilometers (0.75 mile) to the west to the proposed EREF property. Once on the property, the transmission line would go to the north and then circle to the west and south around the proposed EREF site to the proposed new Twin-Buttes Substation, which would be adjacent to the proposed EREF site. The entire length of the transmission line would be approximately 22.1 kilometers (13.8 miles) (AES, 2010a).

A packaged sanitary sewage treatment system (Domestic Sanitary Sewage Treatment Plant) would be installed onsite for the collection and treatment of sanitary and uncontaminated liquid wastes. Residual treated effluent from the system would be discharged to the two single-lined Cylinder Storage Pads Stormwater Retention Basins where it would evaporate. The total annual discharge from the system is expected to be approximately 18,700 cubic meters per year (4,927,500 gallons per year) (AES, 2010a). This sanitary discharge source is not expected to contain any uranic material. Solid sanitary wastes from the treatment system would be temporarily stored in a holding tank and disposed of at an approved offsite location.

2.1.3.3 Local Road Network

The proposed EREF property lies immediately north of US 20, approximately 32 kilometers (20 miles) west of Idaho Falls and the junction of US 20 and Interstate 15 (I-15). US 20 extends from Idaho Falls in the east to the junction with US 26 northwest of Atomic City. The proposed EREF property lies along this route where US 20 is a two-lane highway. Access to the proposed EREF site would be from two planned access roads to US 20 (see Figure 2-6). All traffic to and from the proposed EREF (for construction, employees, and shipments) would use one of these access roads (AES, 2010a). Controlled and public access to these roads has yet to be determined by AES.

The primary shipping route for all of the proposed EREF's incoming and outgoing truck shipments would be eastbound US 20 to its intersection with I-15, which is the major

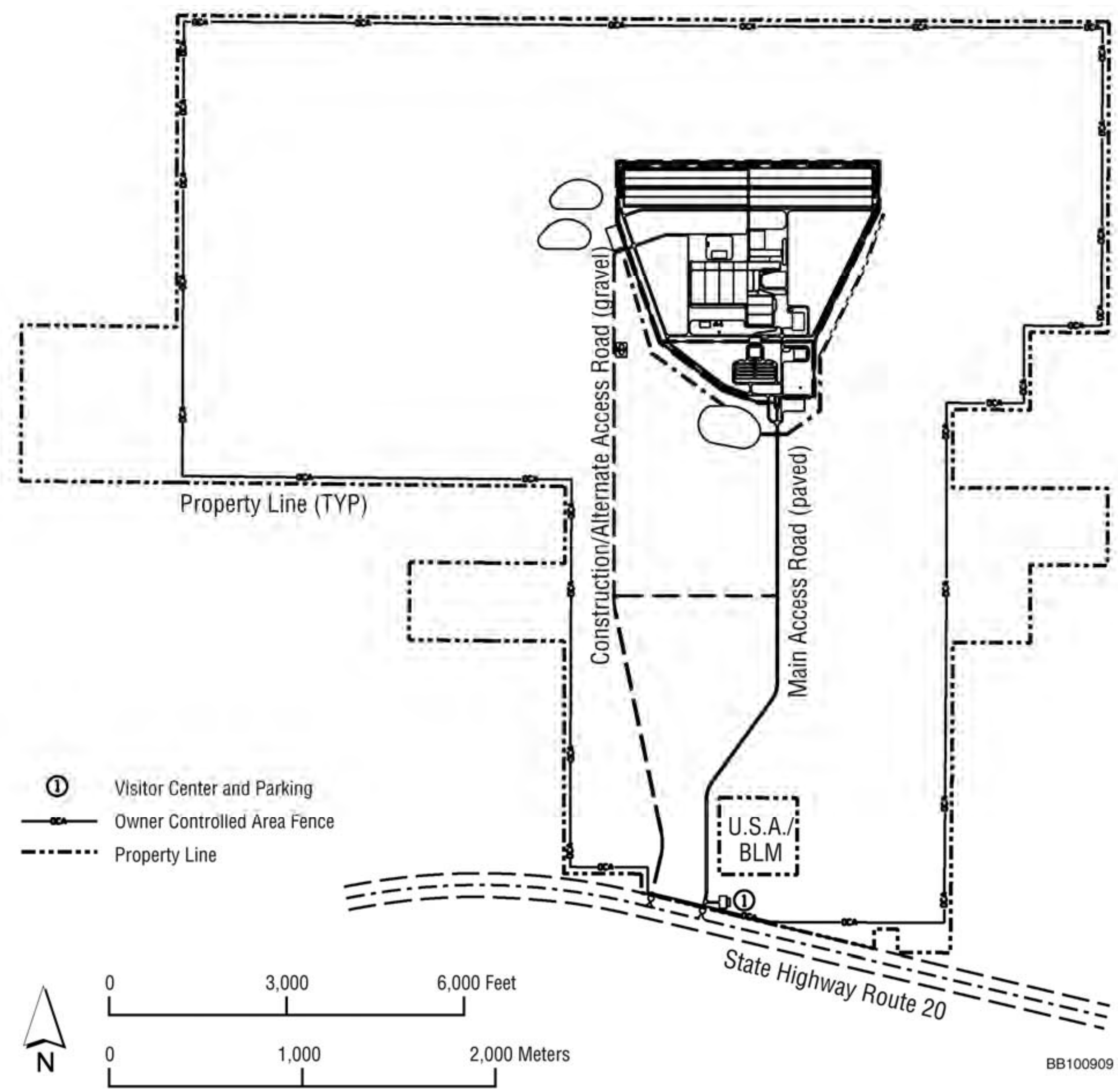

Figure 2-6 Site Plan for the Proposed Eagle Rock Enrichment Facility (AES, 2010a)

north-south access to the region. The nearest interstate highway access to the west would be I-84, which intersects US 20 approximately 296 kilometers (184 miles) away from the proposed site. Idaho Falls is also served by US 26 and US 91.

2.1.4 Description of the Phases of the Proposed Action

As discussed previously, the proposed action would be conducted in three phases: (1) preconstruction and construction, (2) facility operation, and (3) decontamination and decommissioning. Each of these phases is described in the following sections. The general site plan is shown in Figure 2-6.

2.1.4.1 Preconstruction and Construction Activities

Preconstruction

As discussed in Section 1.4.1, the NRC has approved an exemption request from AES (AES, 2009) to conduct certain preconstruction activities prior to the NRC issuing a license to AES for the construction, operation, and decommissioning of the proposed EREF. The exemption (NRC, 2010a) covers the following activities and facilities:

- clearing the site (e.g., removal of vegetation and debris)
- site grading and erosion control
- excavating the site including rock blasting and removal
- installing parking areas
- constructing the stormwater detention pond
- constructing two highway access roadways and site roads
- installing utilities (e.g., temporary and permanent power) and storage tanks
- installing fences for investment protection (not used to implement the Physical Security Plan)
- installing construction buildings, offices (including construction trailers), warehouses, and guardhouses

Conventional earthmoving and grading equipment would be used to clear and grade the site. In some areas, blasting and rock excavation may be required. Preconstruction for the proposed EREF would affect approximately 240 hectares (592 acres) on the 1700-hectare (4200-acre) proposed property. The disturbed area would consist of 186 hectares (460 acres) for construction activities (see below), including future permanent plant structures, and an additional 53.6 hectares (132.5 acres) for temporary construction facilities, parking areas, material storage, and excavated areas for underground utilities. The total disturbed area would be cleared of vegetation, and approximately 164.9 hectares (407.5 acres) would be graded. Grading would include cutting and filling approximately 778,700 cubic meters (27,500,000 cubic feet) of soil (AES, 2010a).

Facility Construction

Facility construction would encompass the erection of the SBMs and facility support structures described in Section 2.1.3. All major facility support structures would be constructed in the first 3 years (2011–2013). The first SBM would be completed in 2014, and heavy construction would continue into 2018 when the second SBM would become operational. During this period of heavy construction (2011–2018), typical building construction activities would take place involving the construction trades and associated truck deliveries of concrete, steel and steel reinforcement, wiring, piping, and other building materials. Scrap pieces of construction debris would be trucked offsite to local landfills. Hazardous waste would be sent to an appropriately licensed facility for treatment and disposal.

By early 2018, SBMs 1 and 2 would be fully operational and the building shells for SBMs 3 and 4 would have been erected. After 2018, truck delivery of centrifuge components would occur during the latter phase of construction as centrifuges are installed in the remaining SBMs with completion of the last SBM in 2022.

Temporary construction buildings and warehouses would be removed after facility construction is complete. Also, temporary construction areas, such as laydown areas, would be restored at this time.

2.1.4.2 Facility Operation

The proposed EREF would be constructed in stages to allow enrichment operations to begin while additional Cascade Halls are still under construction. Facility operation would commence with limited production after the completion of the first cascade. This ramped production schedule would allow the proposed facility to begin operation only 3 years after the license is issued. Production of enriched UF_6 product would increase from approximately 825,000 SWUs in the third year to a maximum of 6.6 million SWUs by the 10th year and start to ramp down again in the 24th year (AES, 2010a).

At full production, the proposed EREF would employ an estimated 550 full-time workers and receive up to 17,518 metric tons (19,310 tons) per year, in up to 1424 Type 48Y cylinders, of UF_6 feed material containing a concentration of 0.72 percent by weight of the uranium-235 isotope (AES, 2010a). The natural UF_6 feed material would be processed by the cascades to generate up to 2252 metric tons (2482 tons) of low-enriched UF_6 product and 15,270 metric tons (16,832 tons) of depleted UF_6 material each year.

The subsections below discuss operations in detail, including receipt of UF_6 feed material, generation of UF_6 product, shipping UF_6 product, generation rate of depleted UF_6 tails, and supporting production process systems.

Receiving UF_6 Feed Material

The natural feed material would be shipped to the proposed EREF in standard Type 48Y cylinders. This cylinder is a U.S. Department of Transportation-approved container for transporting Type A material (DOE, 1999a). The radioactive materials transported in this container are subject to 10 CFR Part 71 and 49 CFR Parts 171 to 173 shipping regulations. These regulations include requirements for an internal pressure test without leakage, free drop test without loss or dispersal of UF_6, and thermal test requirements without rupture of the containment system. In addition, shipments would be required to have fissile controls. A fully loaded Type 48Y cylinder contains approximately 12 metric tons (14 tons) of material and is shipped one per truck (DOE, 1999b). After receipt and inspection, the cylinder could be stored until needed or connected to the gas centrifuge cascade at one of several feed stations discussed in the next section. Once installed in the feed station, the transport cylinders would be heated to sublime the solid UF_6 into a gas that would be fed to the gas centrifuge enrichment cascade.

AES anticipates receiving feed cylinders at the proposed EREF from U.S. and foreign origins. In the United States, the UF_6 production facility is located in Metropolis, Illinois. The proposed EREF would receive feed cylinders from foreign UF_6 production facilities through ports in Baltimore, Maryland; and Portsmouth, Virginia; as well as from Port Hope, Ontario, Canada.

After each feed cylinder has been emptied, it would be inspected and processed for reuse. The proposed EREF would have the capability to provide for internal cleaning or decontamination of the cylinders in the Blending, Sampling, and Preparation Building. This capability is intended for preparation of the 30B enriched product cylinders, but could be used for empty feed cylinders if necessary (AES, 2010a). The empty Type 48Y feed cylinders would be used as tails cylinders to store depleted UF_6 material on the Cylinder Storage Pads or would be returned to the supplier (empty feed cylinder with a "heel").

Producing Enriched UF_6 Product

The enrichment process would begin with sublimation of the solid UF_6 into the gas phase and purification of the gaseous UF_6. The UF_6 would then be routed through the centrifuge cascades where enriched and depleted streams would be created, as discussed in Section 2.1.2. The enriched product stream and the depleted waste stream would exit the cascades separately and would be desublimed (solidified) in their respective systems. These four major elements of the enrichment process would occur in the following systems contained in the SBMs (AES, 2010b):

- UF_6 Feed System
- Cascade System
- Product Take-off System
- Tails Take-off System

In the UF_6 Feed System, feed cylinders would be loaded into Solid Feed Stations, vented for removal of light gases, primarily air and hydrogen fluoride (HF), and heated to sublime the UF_6. The light gases and UF_6 gas generated during feed purification would be routed to the Feed Purification Subsystem where the UF_6 would be desublimed in cold traps and the HF would be captured in chemical traps. The UF_6 would be then sublimed again and routed into the cascade system.

After sublimation and purification, the UF_6 would be routed through the centrifuge cascades in the Cascade System. As discussed in Section 2.1.2, each centrifuge has a thin-walled, vertical, cylindrically shaped rotor that spins around a central post within an outer casing. Feed, product, and tails streams would enter and leave the centrifuge through the central post. Control valves, restrictor orifices, and controllers would provide uniform flow of product and tails.

Depleted UF_6 exiting the cascades would be transported from the high vacuum of the centrifuge for desublimation into Type 48Y tails cylinders at subatmospheric pressure. This process would occur in the Tails Take-off System. The primary equipment in this system includes vacuum pumps and the Tails Low Temperature Take-off Stations (LTTS). Chilled air would flow over cylinders in the Tails LTTS to effect the desublimation. Filling of the Type 48Y cylinders would be monitored with a load cell system, and filled cylinders would be transferred outdoors to the Full Tails Cylinder Storage Pad.

In the Product Take-off System, enriched UF_6 from the cascades – low-enriched product between 3 and 5 percent by weight of the uranium-235 isotope – would be desublimed into Type 30B product cylinders. The Product Take-off System consists of vacuum pumps, product LTTS, UF_6 cold traps, and vacuum pump/chemical trap sets. The pumps would transport the UF_6 from the cascades to the Product LTTS at subatmospheric pressure. The heat of desublimation of the UF_6 would be removed by cooling air routed through the LTTS. The product stream normally would contain small amounts of light gases that may have passed through the centrifuges. Therefore, a UF_6 cold trap and vacuum pump/trap set would be provided to vent these gases from the Type 30B product cylinder. Any UF_6 captured in the cold trap is periodically transferred to another product cylinder for use as product or blending stock. Filling of the product cylinders would be monitored with a load cell system, and filled cylinders would be transferred to the Product Liquid Sampling System for sampling.

Blending stock would be used in the Product Blending System, which would be used to produce enrichment levels other than those produced in any given Cascade Hall. The system would contain donor stations for two donor cylinders of different assays and a receiver station. Operation of the donor and receiver stations would be similar to that for the Solid Feed Stations and the LTTS, respectively. The Product Liquid Sampling System would use autoclaves to liquefy the UF_6 in Type 30B product cylinders. Samples would be extracted from each cylinder to verify the product assay level (weight percent uranium-235).

Supporting functions of the enrichment process would include sample analysis, equipment decontamination and rebuild, liquid effluent treatment, and solid waste management. All gas-phase processes would be conducted at subatmospheric pressures to mitigate hazards, should a break in the process lines or equipment occur.

Shipping Enriched Product

Enriched UF_6 product would be shipped in a Type 30B cylinder, which is 76 centimeters (30 inches) in diameter and 206 centimeters (81 inches) long and holds a maximum of 2.3 metric tons (2.5 tons) of 5-percent enriched $^{235}UF_6$. Figure 2-7 shows Type 30B enriched product cylinders and overpacks loaded for transport. At full production, the proposed EREF would produce approximately 1032 enriched product cylinders annually for shipment to customers. Potential customers are fuel fabrication facilities in Richland, Washington; Columbia, South Carolina; Wilmington, North Carolina; and overseas through ports at Portsmouth, Virginia, and Baltimore, Maryland.

Depleted UF_6 Generation

During operation of the proposed EREF, the production of depleted UF_6 material would increase from 1909 metric tons (2105 tons) per year during initial production to 15,267 metric tons (16,830 tons) per year during peak production. This material would fill between 153 and

Figure 2-7 Truck Loaded with Five 30B Enriched Product Cylinders Loaded for Transport in Their Protective Overpacks (DOE, undated b)

1222 Type 48Y cylinders per year. Table 2-2 shows the potential maximum expected quantity of cylinders that would be filled with depleted UF_6 material each year during the anticipated life of the proposed EREF. The values presented reflect the sequential startup and shutdown of the cascades.

Production Process Support Systems

Enriched UF_6 would be the primary product of the proposed EREF. Production of enriched UF_6 would require the safe operation of multiple plant support systems to ensure the safe operation of the proposed facility. The supporting process systems required for the safe and efficient production of enriched UF_6 product would include the following (AES, 2010b):

- Gaseous Effluent Ventilation Systems (GEVSs)
- Liquid Effluent Collection and Treatment System
- Centrifuge Test and Postmortem Facilities Exhaust Filtration System
- Solid Waste Collection System
- Decontamination System

Gaseous Effluent Ventilation Systems

Gaseous effluent ventilation systems for each SBM and for the Technical Services Building would be designed to collect the potentially contaminated gaseous effluent streams in the plant and treat them before discharge to the atmosphere. Each system would route these streams through a filter system prior to exhausting out a vent stack, which would contain a continuous

Table 2-2 Depleted UF_6 Tails Generation[a]

Years (number after license is issued)	Annual Number of 48Y Tails Cylinders	Cumulative Number of 48Y Tails Cylinders
1	0	0
2	0	0
3	153	153
4	306	459
5	459	918
6	611	1529
7	764	2293
8	917	3210
9	1069	4279
10 to 23	1222	5501 to 21,387
24	1069	22,456
25	917	23,373
26	764	24,137
27	611	24,748
28	459	25,207
29	306	25,513
30	166	25,679
31	26	25,705
32	13	25,718

[a] Note that the tails generation provided by AES is conservative in that it provides a maximum number of tails cylinders that could be produced over the lifetime of the proposed EREF. It is based on a 30-year production life with appropriate ramp-up/ramp-down in capacity rather than an actual 30-year license period which includes the time necessary to first construct the proposed facility. In reality, AES would not be producing additional tails cylinders beyond 30 years after a license is issued and may start the ramp-down sooner than 24 years after the license is issued.
Source: AES, 2010b.

monitor to measure radioactivity level (alpha) and HF levels. The GEVS for SBM 1 would also serve the Blending, Sampling, and Preparation Building.

Each gaseous effluent vent system would transport potentially contaminated gases through a subatmospheric duct network to a set of redundant filters (a pre-filter, a high-efficiency particulate air [HEPA] filter, an activated carbon filter impregnated with potassium carbonate, and another HEPA filter) and fans. The cleaned gases would be discharged to the atmosphere via rooftop stacks. The fan would maintain an almost constant subatmospheric pressure in front of the filter section by means of a differential pressure controller.

Liquid Effluent Systems

The Liquid Effluent Collection and Treatment System would collect potentially contaminated liquid effluents generated in a variety of plant operations and processes. These liquid effluents would be collected and stored in tanks prior to processing. The effluent input streams would include hydrolyzed UF_6, degreaser water, citric acid, floor wash water, and miscellaneous effluent. The contaminated liquids would be processed for uranium removal through several precipitation units, filtration units, microfiltration units, and evaporation units. The final step would use an evaporation process that discharges clean steam to the atmosphere. Any resulting solid waste would be shipped offsite for disposal at an approved facility.

Centrifuge Test and Postmortem Facilities Exhaust Filtration System

The Centrifuge Test and Postmortem Facilities Exhaust Filtration System would exhaust potentially hazardous contaminants from the Centrifuge Test and Postmortem Facilities. The system would also ensure the Centrifuge Postmortem Facility is maintained at a negative pressure with respect to adjacent areas.

The ductwork would be connected to a one-filter station and would exhaust through a fan. The filter station and fan would be able to handle 100 percent of the effluent exhaust. Activities that require the Centrifuge Test and Postmortem Facilities Exhaust Filtration System to be operational would be manually stopped if the system fails or shuts down. After filtration, the clean gases would be discharged through the monitored exhaust stack on the Centrifuge Assembly Building. The Centrifuge Assembly Building exhaust stack would be monitored for hydrogen fluoride and alpha radiation.

Solid Waste Collection System

In addition to the depleted UF_6, operation of the proposed EREF would generate other radioactive and nonradioactive solid wastes. Solid waste would be segregated and processed based on its classification as wet-solid or dry-solid wastes and segregated into radioactive, hazardous, or mixed-waste categories. Wet solid waste would include wet trash (waste paper, packing material, rags, wipes, etc.), oil-recovery sludge, oil filters, miscellaneous oils (such as cutting machine oils), solvent recovery sludge, and uranic waste precipitate. Dry solid waste would include trash (combustible and nonmetallic items), activated carbon, activated alumina, activated sodium fluoride, HEPA filters, scrap metal, laboratory waste, and dryer concentrate.

Radioactive solid waste would be sent to a licensed low-level radioactive waste disposal facility. AES is considering options that include shipping its low-level radioactive waste to a treatment facility in Oak Ridge, Tennessee, and disposal sites near Richland, Washington, and Clive, Utah. Material that would be classified as mixed waste may also be handled at the Oak Ridge, Tennessee, and Clive, Utah, facilities. Nonradioactive and nonhazardous wastes – including office and warehouse trash such as wood, paper, and packing materials; scrap metal and cutting oil containers; and building ventilation filters – would be sent to a commercial landfill for disposal. Hazardous wastes would be sent to an appropriately licensed facility for treatment and disposal.

<u>Decontamination System</u>

The Decontamination System would be designed to remove radioactive contamination from centrifuges, pipes, instruments, and other potentially contaminated equipment. The system would contain equipment and processes to disassemble, clean and degrease, decontaminate, and inspect plant equipment. Scrap and waste material from the decontamination process would be sent to the Solid Waste Collection System or the Liquid Effluent Collection and Treatment System for segregation and treatment prior to offsite disposal at a licensed facility. Exhaust air from the decontamination system area would pass through the gaseous effluent ventilation systems before discharge to the atmosphere.

2.1.4.3 Decontamination and Decommissioning

The proposed EREF would be licensed to operate for 30 years. At the end of this period, unless AES files a timely application for license renewal, the proposed EREF would be decontaminated and decommissioned in accordance with applicable NRC license termination requirements. The intent of decommissioning is to return the entire proposed EREF site to levels suitable for unrestricted use in accordance with 10 CFR 20.1402 requirements (AES, 2010a). Decontamination and decommissioning is projected to take 9 years, beginning in 2032 with completion expected in 2041. The SBMs would be decommissioned in the first 8 years, and there would be one additional year for final site surveys and activities (AES, 2010b). SBM 1 is scheduled to be the first to operate and would be the first to undergo decontamination and decommissioning. Decontamination and decommissioning of the other SBMs would follow in turn. SBM 4 would be the last module to operate and to be decommissioned. The remaining plant systems and buildings would be decommissioned after final shutdown of SBM 4 (AES, 2010b). All proprietary equipment and radiologically contaminated components would be removed, decontaminated, and shipped to a licensed disposal facility. The buildings, structures, and selected support systems would be cleaned and released for unrestricted use.

Decontamination and decommissioning of the proposed EREF would be funded in accordance with the Decommissioning Funding Plan (DFP) for the proposed EREF (AES, 2010b). The DFP, prepared by AES in accordance with 10 CFR 70.25(a) and the guidance in NUREG-1757 (NRC, 2006), would provide information required by 10 CFR 70.25(e) regarding AES's plans for funding the decommissioning of the proposed EREF and the disposal of depleted uranium tails generated as a result of plant operations. Funding would be provided by AES by means of a Letter of Credit in accordance with NRC regulations in 10 CFR Part 70 and guidance in NUREG-1757 (NRC, 2006).

Decontamination and decommissioning activities for the proposed EREF are anticipated to occur more than 20 years in the future, and therefore only a general description of the activities that would be conducted can be developed at this time for the EIS. The proposed facility would follow NRC decommissioning requirements in 10 CFR 70.38.

Decommissioning of a facility such as the proposed EREF would generally include the following activities:

- installation of decontamination facilities
- purging of process systems and equipment
- dismantling and removal of facilities and equipment
- decontamination and destruction of confidential materials
- decontamination of equipment, facilities, and structures
- survey and spot decontamination of outdoor areas
- removal and sale of any salvaged materials
- removal and disposal of wastes
- management and disposal of depleted uranium
- final radiation survey to confirm that the release criteria have been met

At the end of the useful life of each SBM, the enrichment process equipment would be shut down and UF_6 removed to the fullest extent possible by normal process operation. This would be followed by evacuation and purging with nitrogen. The shutdown and purging portion of the decommissioning process would take approximately 3 months for each cascade.

Decontamination Facilities

New decontamination facilities would be constructed in existing site buildings such as the Centrifuge Assembly Building prior to shutdown of SBM 1. The decontamination facilities would provide specialized handling of the thousands of centrifuges along with the UF_6 vacuum pumps and valves.

Contaminated plant components would be cut up or dismantled and then processed through the decontamination facilities. Contamination of site structures would be limited to areas in the Separations Building Modules and Technical Services Building, and would be maintained at low levels throughout plant operation by regular surveys and cleaning. The use of special sealing and protective coatings on porous and other surfaces that might become radioactively contaminated during operation would simplify the decontamination process, and the use of standard good-housekeeping practices during operation of the proposed facility would ensure that final decontamination of these areas would require minimal removal of surface concrete or other structural material.

Dismantling the Facility

Dismantling would require cutting and disconnecting all components requiring removal. The activities would be simple but very labor-intensive and would generally require the use of protective clothing. The work process would be optimized through consideration of the following measures:

- minimizing the spread of contamination and the need for protective clothing

- balancing the number of cutting and removal operations with the resultant decontamination and disposal requirements

- optimizing the rate of dismantling with the rate of decontamination facility throughput

- providing storage and laydown space as required for effective workflow, criticality, safety, security, etc.

- balancing the cost of decontamination and salvage with the cost of disposal

To avoid laydown space and contamination problems, dismantling would proceed generally no faster than the downstream decontamination process.

Items to be removed from the facilities would be categorized as potentially reusable equipment, recoverable scrap, and wastes. However, operating equipment would not be assumed to have reuse value after 30 years of operation. Wastes would also have no salvage value.

A significant amount of scrap aluminum, steel, copper, and other metals would be recovered during the disassembly of the enrichment equipment. For security and convenience, the uncontaminated materials would likely be shredded or smelted to standard ingots and, if possible, sold at market price. The contaminated materials would be disposed of as low-level radioactive waste.

Prompt decontamination or removal of all materials from the proposed site that would prevent release of the facility for unrestricted use would be performed. This approach would avoid long-term storage and monitoring of radiological and hazardous wastes onsite. All of the enrichment equipment would be removed, and only the building shells and site infrastructure would remain. All remaining facilities would be decontaminated to levels that would allow for unrestricted use.

Disposal

All wastes produced during decontamination and decommissioning would be collected, handled, and disposed of in a manner similar to that described for those wastes produced during normal operation. Wastes would consist of normal industrial trash, nonhazardous chemicals and fluids, small amounts of hazardous materials, and radioactive wastes. Radioactive wastes would consist primarily of crushed centrifuge rotors, trash, and citric cake. Citric cake consists of uranium and metallic compounds precipitated from citric acid decontamination solutions.

Radioactive wastes would ultimately be disposed of in licensed low-level radioactive waste disposal facilities. Hazardous wastes would be disposed of in licensed hazardous waste disposal facilities. Nonhazardous and nonradioactive wastes would be disposed of in a manner consistent with good industrial practice and in accordance with applicable regulations. A complete estimate of the wastes and effluent to be produced during decommissioning would be provided in the Decommissioning Plan that AES would submit prior to the start of the decommissioning.

Final Radiation Survey

A final radiation survey would verify complete decontamination of the proposed EREF prior to allowing the proposed site to be released for unrestricted use. The evaluation of the final radiation survey would be based in part on an initial radiation survey performed prior to initial operation. The initial site radiation survey would determine the natural background radiation levels in the area of the proposed EREF, thereby providing a benchmark for identifying any increase in radioactivity levels in the area. The final survey would measure radioactivity over the entire site and compare it to the original benchmark survey. The intensity of the survey would vary depending on the location (i.e., the buildings, the immediate area around the buildings, and the remainder of the site). A final radiation survey report would document the survey procedures and results, and would include, among other things, a map of the survey of the proposed site, measurement results, and a comparison of the proposed EREF site's radiation levels to the surrounding area. The results would be analyzed to show that they were below allowable residual radioactivity limits; otherwise, further decontamination would be performed.

2.1.5 Depleted Uranium Management

The term "depleted uranium" refers to any chemical form of uranium (e.g., UF_6 and U_3O_8) that contains uranium-235 in concentrations less than the 0.7 percent found in natural uranium. As discussed in Section 2.1.4.2, the uranium enrichment process would generate a depleted UF_6 stream (also called tails). In contrast to the uranium in the enriched UF_6 produced by the enrichment facility, the uranium in the depleted UF_6 stream would be depleted in the uranium-235 isotope of uranium. At full production, the proposed EREF would generate 15,270 metric tons per year (16,800 tons per year) of depleted UF_6. Initially, the depleted UF_6 would be stored in

Waste Classification of Depleted Uranium

Depleted uranium is different from most low-level radioactive waste in that it consists mostly of long-lived isotopes of uranium, with small quantities of thorium-234 and protactinium-234. Depleted uranium is source material as defined in 10 CFR Part 40, and, if treated as a waste, it falls under the definition of low-level radioactive waste per 10 CFR 61.2. The Commission affirmed that depleted uranium is properly considered a form of low-level radioactive waste in Louisiana Energy Services, L.P. (National Enrichment Facility), CLI-05-5, 61 NRC 22 (January 18, 2005). This means that depleted uranium could be disposed of in a licensed low-level radioactive waste facility if the licensing requirements for land disposal of radioactive waste as indicated in 10 CFR Part 61 are met.

Sources: NRC, 1991, 2005b.

Type 48Y cylinders on the Full Tails Cylinder Storage Pads (AES, 2010a). Each Type 48Y cylinder would hold approximately 12.5 metric tons (13.8 tons), which means that at full production the proposed site would generate approximately 1222 cylinders of depleted UF_6 every year. During the operation of the proposed facility, the plant could generate and store up to 25,718 cylinders of depleted UF_6 (AES, 2010a). AES would own the depleted UF_6 and maintain the cylinders while they are in storage. Maintenance activities would include periodic inspections for corrosion, valve leakage, and distortion of the cylinder shape, and touch-up painting as required. Problem cylinders would be removed from storage and the material transferred to another storage cylinder. The proposed storage area would be kept neat and free of debris, and all stormwater or other runoff would be routed to the Cylinder Storage Pad Stormwater Retention Basins for monitoring and evaporation.

The Defense Nuclear Facilities Safety Board (DNFSB) has reported that long-term storage of depleted UF_6 in the UF_6 form represents a potential chemical hazard if not properly managed (DNFSB, 1995). For this reason, the strategic management of depleted uranium includes the conversion of depleted UF_6 stock to a more stable uranium oxide (e.g., triuranium octaoxide [U_3O_8]) form for long-term management (OECD, 2001). Also, the DOE evaluated multiple disposition options for depleted UF_6 and agreed that conversion to U_3O_8 was preferable for long-term storage and disposal of the depleted uranium in its oxide form, due to the chemical stability of U_3O_8 (DOE, 2000). Therefore, the disposal option considered in the EIS is the conversion of the depleted UF_6 to U_3O_8 at either a DOE-owned or commercial conversion facility followed by disposal as U_3O_8. Direct disposal of depleted UF_6 was ruled out because of its chemical reactivity (DOE, 1999b).

2.1.5.1 Conversion of Depleted UF_6

AES has requested the DOE to accept all depleted UF_6 generated at the proposed EREF for conversion to the oxide form for disposal (AES, 2010a). This plan is based on Section 3113 of the 1996 *USEC Privatization Act*, 42 U.S.C. 2297h-11, which states the DOE "shall accept for disposal low-level radioactive waste, including depleted uranium if it were ultimately determined to be low-level radioactive waste, generated by ... any person licensed by the Nuclear Regulatory Commission to operate a uranium enrichment facility under section 53, 63, and 193 of the *Atomic Energy Act of 1954* (42 U.S.C. 2073, 2093, and 2243)." On January 18, 2005, the Commission issued its ruling that depleted uranium is considered a form of low-level radioactive waste (NRC, 2005a). The Commission also stated that, pursuant to Section 3113 of the *USEC Privatization Act*, disposal at a DOE facility represents a "plausible strategy" for the disposition of depleted uranium tails (NRC, 2005a).

DOE has constructed two conversion plants to convert the depleted UF_6 now in storage at Portsmouth, Ohio, and Paducah, Kentucky, to U_3O_8 and hydrofluoric acid. Both plants are currently undergoing operational tests. The Portsmouth plant is expected to go into full operation in summer 2011, and the Paducah plant by early fall of 2011 (Sparks, 2011). AES would transport the depleted UF_6 generated by the proposed EREF to either of these new facilities and pay DOE to convert and dispose of the material. The proposed EREF would generate approximately 321,235 metric tons (354,101 tons) in total over its operating lifetime (AES, 2010a). The depleted UF_6 would be processed in a DOE-operated conversion facility and then shipped offsite for disposal.

Depleted UF_6 Conversion Process

Depleted UF6 conversion is a continuous process in which depleted UF6 is vaporized and converted to U3O8 by reaction with steam and hydrogen in a fluidized-bed conversion unit. The hydrogen is generated using anhydrous ammonia, although an option of using natural gas is being investigated. Nitrogen is also used as an inert purging gas and is released to the atmosphere through the building stack as part of the clean off-gas stream. The depleted U3O8 powder is collected and packaged for disposition. The process equipment would be arranged in parallel lines. Each line would consist of two autoclaves, two conversion units, a hydrofluoric acid recovery system, and process off-gas scrubbers. The Paducah facility would have four parallel conversion lines. Equipment would also be installed to collect the hydrofluoric acid co-product and process it into any combination of several marketable products. A backup hydrofluoric acid neutralization system would be provided to convert up to 100 percent of the hydrofluoric acid to calcium fluoride for storage and/or sale in the future, if necessary.

Source: DOE, 2004a,b.

In addition to the DOE disposition option for depleted UF_6, one or more NRC-licensed commercial depleted UF_6 conversion facilities may become available during the proposed EREF's operational lifetime. One commercial entity (International Isotopes, Inc.) submitted a license application (International Isotopes, 2009) on December 31, 2009, to construct and operate a new depleted UF_6 "de-conversion" facility in Hobbs, New Mexico.

The NRC staff is currently reviewing this application (NRC, 2010b). Although International Isotopes calls its process "de-conversion," it is similar to DOE's conversion process. If a commercial facility performs the conversion to U_3O_8, DOE is still obligated to accept the U_3O_8 for disposal if requested by AES, per Section 3113 of the *USEC Privatization Act*.

2.1.5.2 Disposal of Depleted Uranium

The Commission has stated that depleted uranium in any form (e.g., UF_6, U_3O_8) is considered a form of low-level radioactive waste (NRC, 2005a). However, the chemical reactivity of depleted UF_6 precludes it from being a stable waste form, and thus makes it unsuitable for direct disposal without conversion (DOE, 1999b). As discussed in Section 2.1.5.1, AES has requested the DOE to accept all depleted UF_6 generated at the proposed EREF for conversion to the oxide form for disposal (AES, 2010a). After conversion of depleted uranium tails (depleted UF_6) to U_3O_8, disposal of this U_3O_8 at a commercial low-level waste disposal facility would be a viable option if the disposal facility meets the requirements of 10 CFR Part 61.

2.2 No-Action Alternative

Under this alternative, AES would not construct, operate, and decommission the proposed EREF in Bonneville County, Idaho. Under the no-action alternative, the NRC assumes that the preconstruction activities that have been approved by exemption and are described in Section 2.1.4.1 will take place.

Under the no-action alternative, the uranium fuel fabrication facilities in the United States would continue to obtain low-enriched uranium from the currently available sources or potential new sources. As described in Section 1.3.1, the two currently available domestic sources of low-enriched uranium available to fuel fabricators are the Paducah Gaseous Diffusion Plant (PGDP) and the URENCO USA facility. Foreign enrichment sources are currently supplying as much as 85 percent of U.S. nuclear power plants' demand.

The Megatons to Megawatts Program will expire by 2013, potentially eliminating downblending as a source of low-enriched uranium (LEU) (DOE, 2010). The PGDP, which opened in 1952, uses gaseous diffusion technology, a process that is more energy intensive than newer technologies such as gas centrifuge. The NRC has already granted licenses to two commercial entities to construct and operate gas centrifuge enrichment facilities: the Louisiana Energy Services (LES) URENCO USA facility in New Mexico and the USEC American Centrifuge Plant (ACP) in Ohio. These two facilities are currently under construction and are designed to produce 3 million and 3.5 million SWUs per year, respectively, when complete and generating at full licensed capacity. However, the URENCO USA facility, while currently operating, is still under construction and is not expected to reach half of its currently licensed annual capacity of 3 million SWUs until August 2011, and LES has yet to submit an application to the NRC for a potential expansion from 3 million to 5.9 million SWUs per year. In addition, the NRC is currently reviewing an application from GE-Hitachi Global Laser Enrichment, LLC to construct and operate the Global Laser Enrichment (GLE) Facility, a proposed laser-based enrichment facility that would be located in North Carolina. If the GLE Facility is licensed and constructed, it would produce enriched uranium with annual production levels of up to 6 million SWU annually. If the three facilities begin operations, this would represent a more efficient and less costly means of producing low-enriched uranium than the current gaseous diffusion technology at the PGDP.

2.3 Alternatives Considered but Eliminated

As required by NEPA and NRC regulations, the NRC staff has considered alternatives to the proposed action of construction, operation, and decommissioning of the proposed EREF. The range of alternatives to the proposed action was determined by considering the underlying purpose and need for the proposed action. Specifically, the range of alternatives was determined by considering other ways to provide enriched uranium to fulfill electricity generation requirements and provide reliable and economic domestic supplies of enriched uranium for national energy security. This analysis led to the following set of alternatives:

- alternative sites other than the proposed Bonneville County site

- alternative sources of LEU

- alternative technologies available for uranium enrichment

These alternatives were considered but eliminated from further analysis based on economic, environmental, national security, or technological maturity factors. The following sections discuss these alternatives and the reasons NRC staff eliminated them from further consideration.

2.3.1 Alternative Sites

This section discusses AES's site-selection process and site selection criteria, and identifies the alternative sites for the proposed AES uranium enrichment facility (including the proposed EREF site in Bonneville County, Idaho). AES used a structured four-step approach to select a preferred site within the United States that met technical, environmental, safety, and business requirements (AES, 2010a):

1. Identify potential regions and sites,
2. Screen candidate sites (Phase I),
3. Evaluate sites passing Phase I criteria (Phase II), and
4. Identify a preferred site.

The primary objectives of environmental acceptability, meeting technical requirements, and providing operational efficiencies were adhered to by AES throughout the screening process. Many environmental impacts can be avoided or significantly reduced through proper site selection.

The NRC staff reviewed the AES site-selection process to determine if a site considered by AES was obviously superior to the proposed EREF site in Bonneville County, Idaho (NRC, 2002). The NRC staff determined that the process used by AES was rational and objective, and that the results were reasonable. None of the candidate sites was obviously superior to the AES preferred site in Bonneville County, Idaho.

2.3.1.1 Identification of Regions and Sites

Four criteria were used for the identification of suitable regions in which to site a proposed uranium enrichment facility:

1. *Peak ground acceleration (PGA).* Consideration of PGA is necessary due to centrifuge sensitivity to vibration; U.S. Geological Survey (USGS) general seismic hazard maps were reviewed to identify areas with a PGA less than 0.09g.

2. *Tornado frequency*. Construction of facilities designed to withstand tornado wind speeds greater than 257 kilometers per hour (160 miles per hour; probability of 10^{-5} per year) was considered to be cost-prohibitive to meeting design standards and safety and operational requirements.

3. *Hurricane frequency*. Areas were identified where hurricanes with wind speeds no greater than 154 kilometers per hour (96 miles per hour) were likely to occur in order to meet design standards and safety and operational requirements.

4. *Severe winter weather*. Evaluated because of their potential impact on maintaining operations, weather and road closure data were reviewed in order to avoid areas with a high potential for road closures caused by severe winter weather.

Areas of the United States that were clearly to be avoided because of seismic or weather concerns were excluded from further consideration. Those regions that were marginal were retained. Figure 2-8 shows the regions of the United States that were found to meet the initial four criteria. Suitable sites were identified within the retained areas with assistance from local elected officials and economic development organizations.

2.3.1.2 Screen Candidate Sites (Phase I)

Following application of the initial criteria, the 44 sites as identified in Table 2-3 were considered in the next site selection step. Phase I screening consisted of evaluation of the candidate sites against 11 criteria. Professional judgment was used by AES staff to assign a passing or failing grade to each criterion. Sites were not considered further if they failed any one criterion. The criteria used were: (1) Seismic History, (2) Geology, (3) Facility/Site (site size relative to facility footprint), (4) Redundant Electrical Power Supply, (5) Flooding Potential, (6) Prior Land Contamination, (7) Availability of Existing Site Data, (8) Threatened and Endangered Species near or on site, (9) Sensitive Properties (e.g., national parks), (10) Climate and Meteorology, and (11) Wetlands within the Facility Footprint on the site. Table 2-3 summarizes the results of the Phase I screening. Based on this screening, 10 of the 44 sites were recommended for further evaluation. Figure 2-9 shows the locations of these 10 sites.

2.3.1.3 Site Evaluation (Phase II)

A decision analysis approach known as multi-attribute analysis was used to produce a consistent, repeatable, and documented evaluation of the 10 candidate sites identified by Phase I screening. Site rankings were assigned based on 38 criteria spanning the 12 categories and the 3 site selection objectives shown in Figure 2-10. The weighting system used by AES, as shown in Table 2-4, was assigned to each objective, category, and criterion and was applied to a score of 1 to 10, which was given to each criterion for a particular site. Table 2-5 summarizes the features and drawbacks of each site. Figure 2-11 summarizes the total weighted scores for the candidate sites, with the Bonneville site having the highest score by a slim margin over the McNeil site.

2.3.1.4 Preferred Site Identification

Forty-four sites in 7 States of 54 potential sites in 9 States were passed on from Step 1 to Step 2 (Phase I) of the selection process. The Phase I selection process identified 10 candidate sites (see Figure 2-9) for detailed evaluation in Phase II. The Phase II evaluation demonstrated that all 10 sites would be technically and environmentally suitable locations for AES's proposed uranium enrichment facility, with none obviously superior to the others. AES selected the Bonneville County, Idaho, site as the proposed site for an enrichment plant because this site has the greatest amount of acreage; readily available water supply; some of the lowest estimated costs for electric power, labor, and materials; and Bonneville County and the State of Idaho have shown strong support for the proposed enrichment plant. The second highest rated site, the McNeil, Idaho, site, has a size that is only one-quarter that of the Bonneville County site and has a much closer nearest resident that is about 2.0 kilometers (1.25 miles) away vs. 7.6 kilometers (4.75 miles) for the Bonneville County site. With the larger size (which provides a greater distance to the site boundary from the proposed facility) and greater distance to the nearest resident, selection of the Bonneville County site would be expected to result in reduced air, visual, noise, human health, transportation, and potential accident impacts as compared to those at the McNeil, Idaho, site.

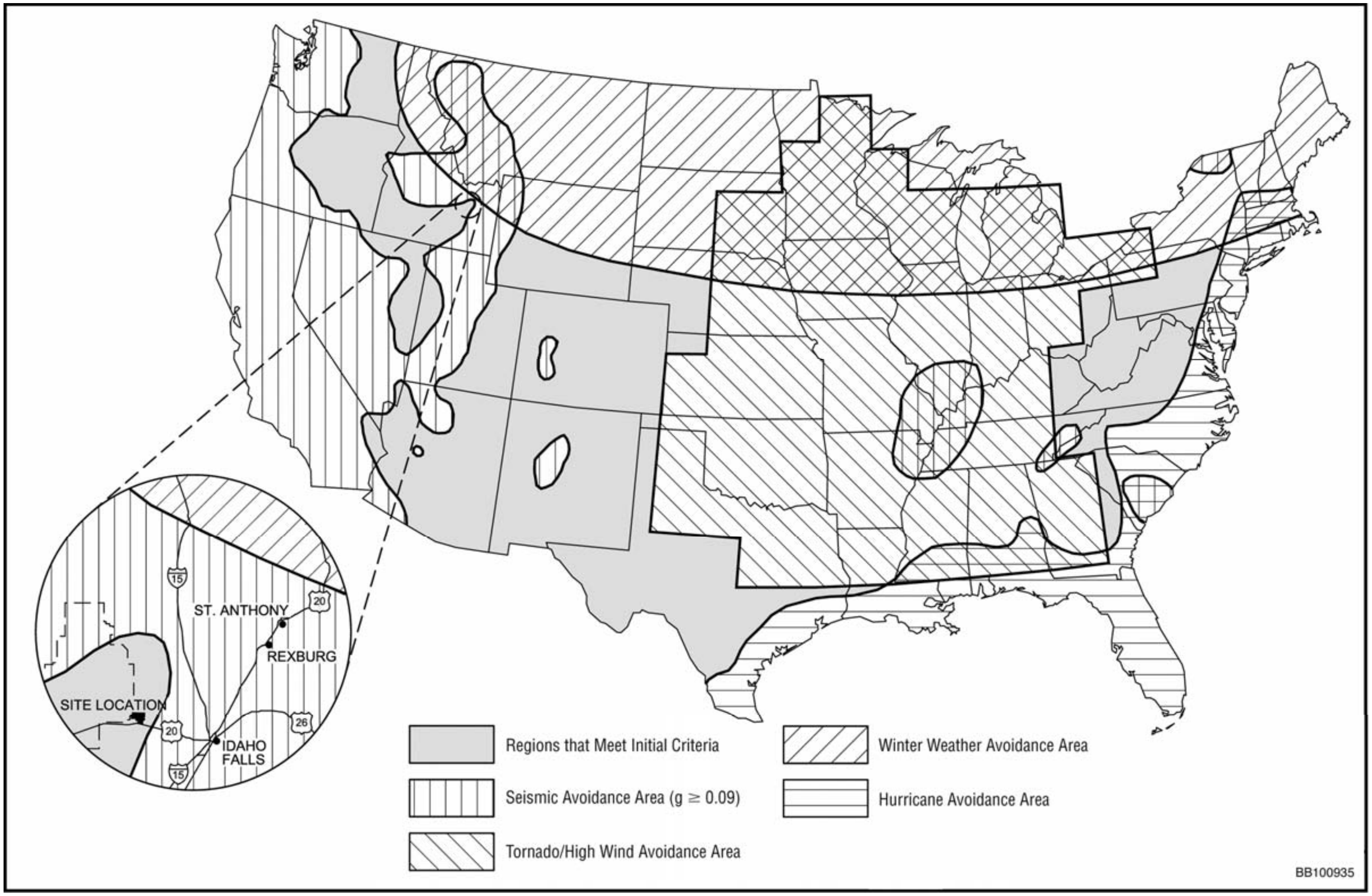

Figure 2-8 United States Regions Meeting the Original Site Selection Criteria (modified from AES, 2010a)

Table 2-3 Candidate Sites for Phase I Screening

No.	County, State	Site	Result: Basis for Exclusion
1	Bonneville, ID	Bonneville	Passed: Evaluated in Phase II
2	Bonneville, ID	McNeil	Passed: Evaluated in Phase II
3	Power, ID	Power County-1	Failed: Sensitive properties
4	Power, ID	Power County-2	Failed: Contamination
5	Bingham, ID	Blackfoot	Failed: Sensitive properties
6	Butte, ID	Atomic City	Failed: Ownership/transfer
7	Lea, NM	ELEA	Passed: Evaluated in Phase II
8	Lea, NM	Lea County-1	Failed: Data availability
9	Lea, NM	Lea County-2	Failed: Wetlands
10	Lea, NM	Lea County-3	Failed: Karst
11	Eddy, NM	Seven Rivers	Failed: Size, bisected by a public road
12	Eddy, NM	Berry Parcel	Failed: Liquefaction
13	Eddy, NM	Harroun	Failed: Liquefaction, karst, electric power, sensitive properties
14	Eddy, NM	Becker	Failed: Liquefaction, karst, contamination
15	Eddy, NM	WIPP-1	Failed: Ownership/transfer
16	Eddy, NM	WIPP-2	Passed: Evaluated in Phase II
17	Pike, OH	Portsmouth	Passed: Evaluated in Phase II
18	Pike, OH	Zahn's Corner-1	Failed: Size, contamination, wetlands
19	Pike, OH	Zahn's Corner-2	Failed: Wetlands, contamination
20	Aiken, SC	Savannah River Site (DOE)	Failed: Ownership/transfer, endangered species, wetlands
21	Cherokee, SC	Jobe Sand	Failed: Size
22	Laurens, SC	Copeland Stone	Failed: Sensitive properties, wetlands
23	Laurens, SC	Fleming Smith	Passed: Evaluated in Phase II
25	Greenwood, SC	Solutia	Failed: Size
26	Chester, SC	L&C Mega Site	Failed: Data availability, wetlands
27	Edgefield, SC	Gracewood	Failed: Wetlands
28	Andrews, TX	Grist	Passed: Evaluated in Phase II
29	Andrews, TX	Tom	Failed: Site characterization data
30	Andrews, TX	Parker	Failed: Site characterization data

Table 2-3 Candidate Sites for Phase I Screening (Cont.)

No.	County, State	Site	Result: Basis for Exclusion
31	Andrews, TX	Fisher	Failed: Site characterization data
32	Andrews, TX	WCS-1	Modified: To become part of WCS-2
33	Andrews, TX	WCS-2	Passed: Evaluated in Phase II
34	Martin, TX	Midland North	Failed: Site characterization data
35	Midland, TX	Midland South	Failed: Data availability
36	Amherst, VA	Amherst County-1	Failed: Floodplains, wetlands
37	Amherst, VA	Amherst County-2	Failed: Endangered species, sensitive properties
38	Appomattox, VA	Concord	Failed: Floodplains, wetlands
39	Carroll, VA	Wildwood	Passed: Evaluated in Phase II
40	Benton, WA	West Richland	Failed: Seismic, faults
41	Benton, WA	Horn Rapids (DOE)	Passed: Evaluated in Phase II
42	Benton, WA	Energy NW-1 (DOE)	Failed: Faults, contamination, ownership/transfer
43	Benton, WA	Energy NW-2 (DOE)	Failed: Contamination, ownership/transfer
44	Benton, WA	Highway 240 (DOE)	Failed: Seismic, ownership/transfer, sensitive properties

2.3.2 Alternative Sources of Low-Enriched Uranium

The NRC staff examined three alternatives to fulfill U.S. domestic enrichment needs. These alternatives were eliminated from further consideration for reasons summarized below.

2.3.2.1 Re-Activate the Portsmouth Gaseous Diffusion Facility at Piketon

In 2001, USEC closed the Portsmouth Gaseous Diffusion Plant (GDP) (in Piketon, Ohio) to reduce operating costs (DOE, 2003). USEC cited long-term financial benefits, more attractive power price arrangements, operational flexibility for power adjustments, and a history of reliable operations as reasons for choosing to continue operations at the Paducah GDP. In a June 2000 press release, USEC explained that it "clearly could not continue to operate two production facilities." (USEC, 2000). Key business factors in USEC's decision to reduce operations to a single production plant included long-term and short-term power costs, operational performance and reliability, design and material condition of the plants, risks associated with meeting customer orders on time, and other factors relating to assay levels, financial results, and new technology issues (USEC, 2000).

The NRC staff does not believe that there has been any significant change in the factors that were considered by USEC in its decision to cease uranium enrichment at the Portsmouth GDP. In addition, the gaseous diffusion technology is substantially more energy intensive than other enrichment technologies. The higher energy consumption results in larger indirect impacts, especially those impacts that are attributable to significantly higher electricity usage (e.g., air

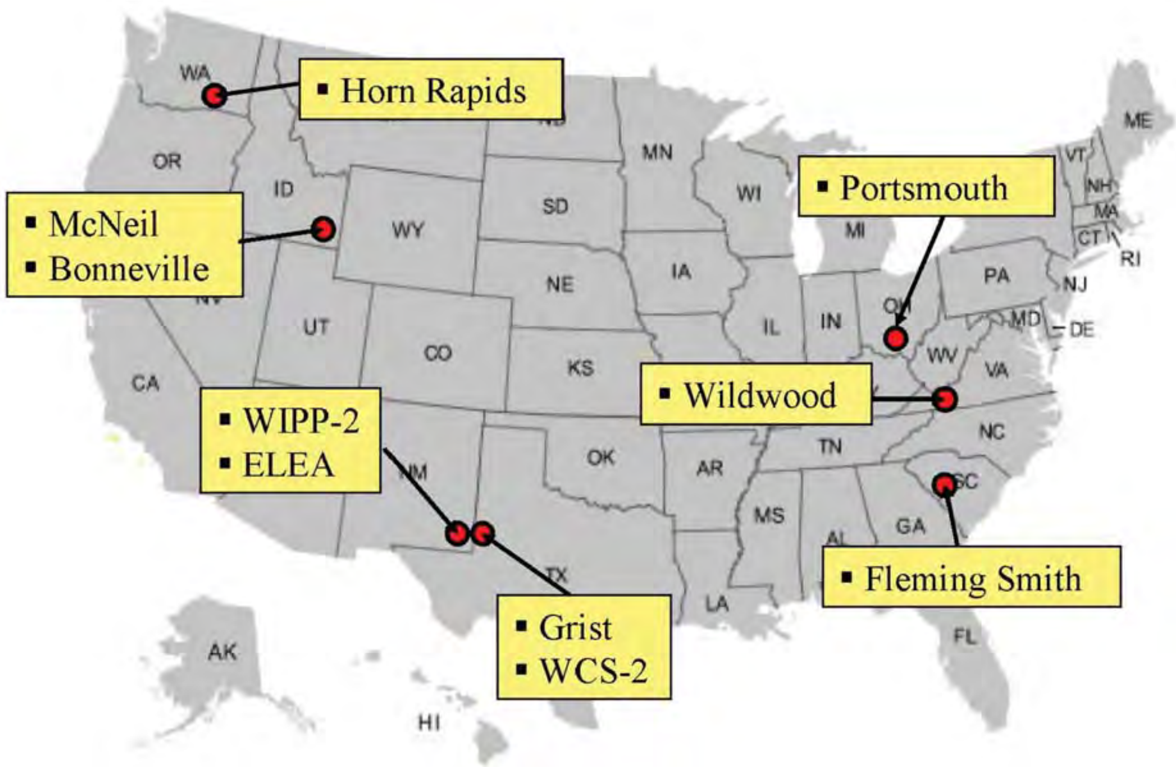

Figure 2-9 Final 10 Candidate Gas Centrifuge Uranium Enrichment Facility Site Locations (AES, 2010a)

emissions from coal-fired electricity generation plants) (DOE, 1995). The age of the existing plant also calls into question its overall reliability. Furthermore, a contract has been awarded to decommission the plant (DOE, 2010b). Therefore, this proposed alternative was eliminated from further consideration.

2.3.2.2 Downblending Highly Enriched Uranium

Under this alternative, a domestic uranium enrichment plant would not be constructed to replace existing production. Instead, an equivalent amount of SWU would be obtained from downblending highly enriched uranium from either United States or Russian nuclear warheads. This alternative was eliminated because U.S. reliance on foreign sources of enrichment services, as an alternative to the proposed action, would not meet the national energy policy objective of a "viable, competitive, domestic uranium enrichment industry for the foreseeable future" (DOE, 2000). Also, it does not meet the need for a reliable source of enriched uranium, as discussed in Section 1.3. Furthermore, as discussed in Section 1.3.1, the Megatons to Megawatts Program downblending agreement is set to expire in 2013.

2.3.2.3 Purchase Low-Enriched Uranium from Foreign Sources

There are several potential sources of enrichment services worldwide. However, U.S. reliance on foreign sources of enrichment services, as an alternative to the proposed action, would not

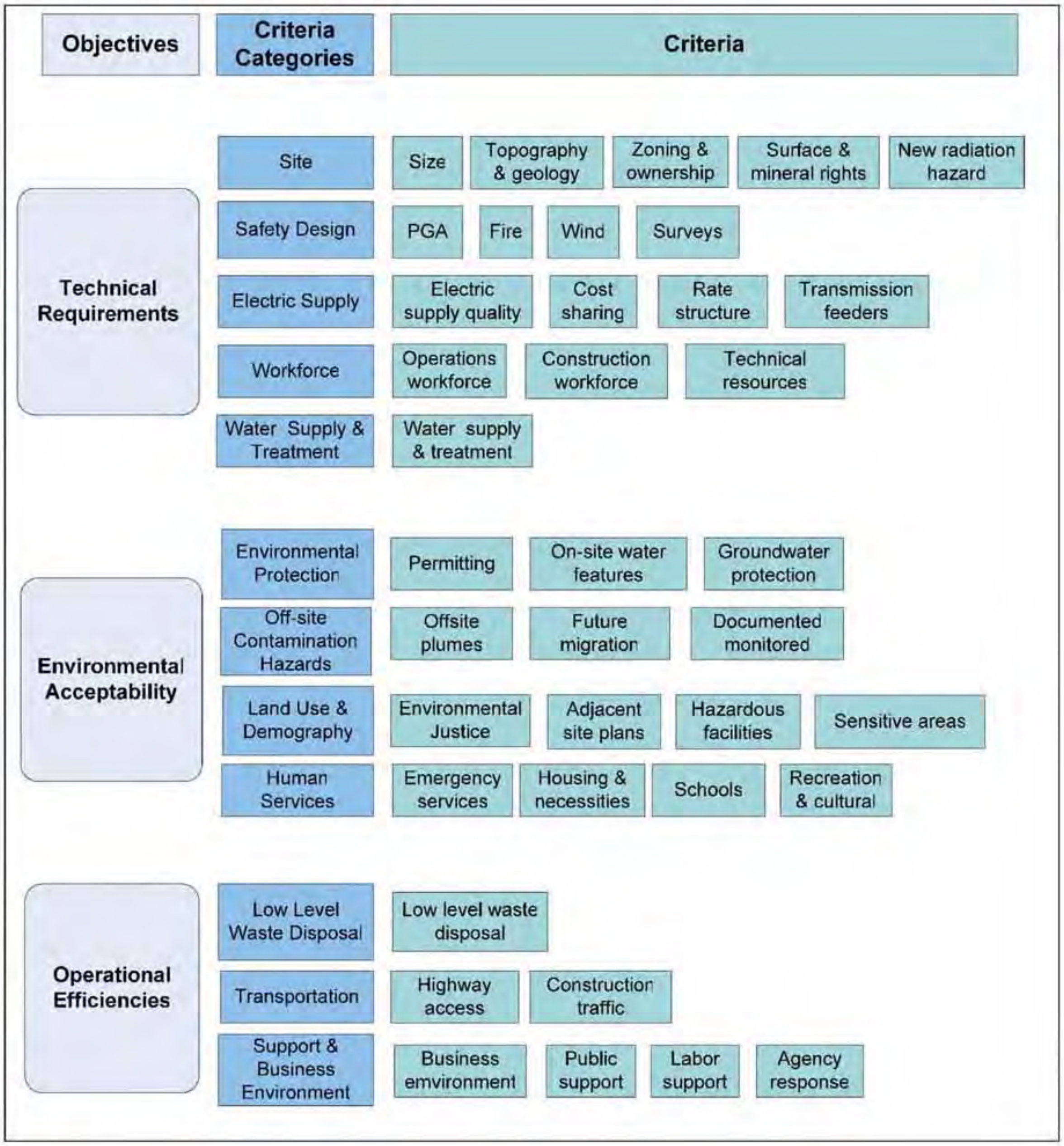

Figure 2-10 Organization of Gas Centrifuge Uranium Enrichment Facility Site Selection Objectives, Criteria Categories, and Criteria (AES, 2010a)

Table 2-4 Objectives, Categories, and Criteria with Weights and Contribution to Site Score

OBJECTIVE			CATEGORY			CRITERIA		
Objective	Weight	Contribution	Category	Weight	Contribution[a]	Criteria & Contribution	Weight	Contribution
Technical Requirements	100	0.49	Site	100	0.17	Topography & Geology	100	0.05
						Size	70	0.04
						Surface & Mineral Rights	70	0.04
						Zoning & Ownership	70	0.04
						New Radiation Hazard	5	<0.01
			Safety Design	70	0.12	Peak Ground Acceleration	100	0.06
						Fire Hazard	15	0.01
						Wind Hazard	40	0.02
						Existing Survey Data	60	0.03
			Electrical System	60	0.10	Quality	100	0.03
						Rates	90	0.03
						Cost	75	0.02
						Feeders	70	0.02
			Workforce	30	0.05	Construction Workforce	100	0.03
						Operational Workforce	65	0.02
						Technical Resources	35	0.01
			Water Treatment & Supply	20	0.04	Water Treatment & Supply	100	0.04

Table 2-4 Objectives, Categories, and Criteria with Weights and Contribution to Site Score (Cont.)

OBJECTIVE			CATEGORY			CRITERIA		
Objective	Weight	Contribution	Category	Weight	Contribution[a]	Criteria & Contribution	Weight	Contribution
Environmental Acceptability	70	0.34	Environmental Protection	95	0.10	Permitting	100	0.04
						Onsite Water Features	65	0.02
						Groundwater	100	0.04
			Offsite Contamination Hazard	40	0.04	Current Offsite Plumes	100	0.02
						Future Migration	30	0.01
						Documented Monitoring	50	0.01
			Land Use & Demography	100	0.11	Environmental Justice	100	0.04
						Hazardous Facilities	95	0.03
						Sensitive Areas	75	0.03
						Adjacent Site Plans	40	0.02
			Human Services	80	0.09	Emergency Services	100	0.03
						Housing & Necessities	90	0.03
						Schools	65	0.02
						Recreational & Cultural Options	50	0.01
Operational Efficiencies	34	0.17	Low-Level Waste (LLW) Disposal	15	0.02	LLW Disposal	100	0.02
			Transportation	35	0.04	Highway Access	100	0.02
						Construction Traffic	80	0.02
			Support & Business Environment	100	0.11	Business Environment	30	0.02
						Public Support	100	0.05
						Agencies	50	0.03
						Labor Support	30	0.02

[a] Values do not add to 1.00 in the contribution columns for category and criteria due to rounding.

Table 2-5 Candidate Sites Considered in Phase II Evaluation

Site	Location	Selection Considerations	Potential Drawbacks
Bonneville	Bonneville, ID	Remote location; near major highway; few nearby residences/activities; bounded by BLM and private land used for grazing/farming; topology and geology are favorable; simple land transfer; no surface or mineral rights issues; close to power; water from onsite wells; good workforce availability and housing; strong local and state support.	
McNeil	Bonneville, ID	Similar attributes as the Bonneville site.	Smaller than Bonneville (1000 acres [405 hectares] vs. >4000 acres [1619 hectares]); nearest resident closer than Bonneville (2.0 kilometers [1.25 miles] vs. 7.6 kilometers [4.75 miles]).
ELEA	Lea, NM	Remote location; near major highway; few nearby residences/activities; bounded by BLM and private land; favorable seismic characteristics; strong local support; privately owned/simple land transfer; most site-specific data of all 10 sites; Lea County water system capable of additional load.	Mineral leases under and adjacent to site; rights-of-way onsite (pipelines, transmission line, water line, and communication tower); workforce availability and housing not as good as other sites.
WIPP-2	Eddy, NM	Remote location; near major highway; few nearby residences/activities; bounded by BLM and private land; favorable seismic characteristics; strong local support; good regional data.	Complicated land transfer – portions owned by BLM and State of New Mexico; mineral leases under and adjacent to site; may require additional cultural resources permitting; Eddy County water system would require expansion; workforce availability and housing not as good as other sites.
Portsmouth	Piketon, OH	Adjacent to major interstate highway; DOE and USEC enrichment facilities adjacent to site; excellent utility infrastructure; good workforce availability; no surface or mineral rights.	Residents within 2 kilometers (1 mile) of the site; multiple private owners of site could affect land transfer; earthmoving required because of topography; fill may adversely affect seismic characteristics; floodplain onsite near boundary; irregular shape – small effective area compared to most other sites; site divided by road and rail line; closed landfill adjacent to site with trichloroethylene contamination.

Table 2-5 Candidate Sites Considered in Phase II Evaluation (Cont.)

Site	Location	Selection Considerations	Potential Drawbacks
Fleming Smith	Laurens, SC	Near major interstate highway; next to existing and proposed industrial developments; available electric supply and other utilities; large workforce; sufficient water capacity from existing system; strong local and state support.	Residents within 0.4 kilometer (0.25 mile) of the site; extensive earthmoving required because of topography; extensive fill may impact seismic stability; several ROWs onsite including sewer and a pressurized pipeline; wetland permit may be required.
Grist	Andrews, TX	Remote location; near major highway; few nearby residences; favorable seismic characteristics, topography, and geology; simple land transfer; surrounded by private landowners; strong local and state support; no special permitting issues.	New water lines from Gaines County would be needed; one of smallest sites at 900 acres (364 hectares); mineral rights onsite would have to be purchased; low workforce availability and housing score.
WCS-2	Andrews, TX	Similar attributes as the Grist site; second largest site at 2560 acres (1036 hectares).	New water lines from Gaines County would be needed; within 3 kilometers (2 miles) of the WCS low-level and hazardous waste facility; pipeline ROWs are present; mineral rights onsite would have to be purchased; low workforce availability and housing score.
Wildwood	Carroll, VA	Adjacent to major interstate highway and a commercial development; privately owned – simple land transfer; no surface or mineral rights.	Residents within 3 kilometers (2 miles) of the site; extensive earthmoving required because of topography; extensive fill may impact seismic stability; drainage that bisects site may have associated wetlands; irregular shape – smallest effective area of all sites; small regional airport less than 3 kilometers (2 miles) away with flight patterns over the site; water available but system capacity would require expansion; has least amount of site-specific data available.
Horn Rapids	Benton, WA	On south edge of the DOE Hanford Reservation; no surface or mineral rights; excellent utility infrastructure and workforce availability; no nearby sensitive resources or areas; AES fuel fabrication facility adjacent to the site.	Land transfer may be complicated because of DOE requirements; small regional airport about 3 kilometers (2 miles) away with flight patterns over the site; lacks strong support at the State and national levels.

Source: AES, 2010a.

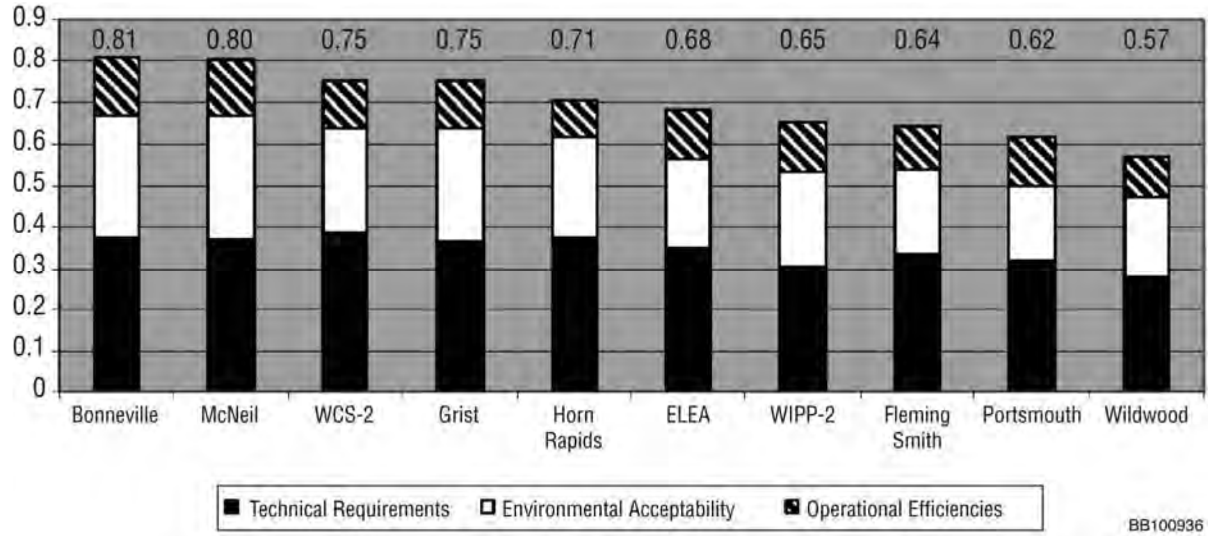

Figure 2-11 Candidate Sites Phase II Evaluation Results (modified from AES, 2010a)

meet the national energy policy objective of a "viable, competitive, domestic uranium enrichment industry for the foreseeable future" (DOE, 2000). For this reason, the NRC staff does not consider this alternative to meet the need for the proposed action, and therefore has eliminated it from further study.

2.3.3 Alternative Technologies for Enrichment

A number of different processes have been invented for enriching uranium; only three (gaseous diffusion, gas centrifuge, and laser excitation) are candidates for commercial use, and of those only the gaseous diffusion and gas centrifuge technologies have been deployed for large-scale industrial use. Other technologies – namely, electromagnetic isotope separation, liquid thermal diffusion, and early-generation laser enrichment – have proven too costly to operate or remain at the research and laboratory developmental scale, or in the case of laser-enrichment have been superseded by a more advanced technology. All of these technologies are discussed below.

2.3.3.1 Electromagnetic Isotope Separation Process

Figure 2-12 shows a sketch of the electromagnetic isotope separation process. In this process, a monoenergetic beam of ions of normal uranium travels between the poles of a magnet. The magnetic field causes the beam to split into several streams according to the mass of the isotope. Each isotope has a different radius of curvature and follows a slightly different path. Collection cups at the ends of the semicircular trajectories catch the homogenous streams. Because the energy requirements for this process proved very high – in excess of 3000 kilowatt hours per SWU – and production was very slow (Heilbron et al., 1981), electromagnetic isotope separation was not considered viable and was removed from further consideration.

2.3.3.2 Liquid Thermal Diffusion

Figure 2-13 is a diagram of the liquid thermal diffusion process, which was investigated in the 1940s. It is based on the concept that a temperature gradient across a thin layer of liquid or gas causes thermal diffusion that separates isotopes of differing masses. When a thin, vertical column is cooled on one side and heated on the other, thermal convection currents are generated and the material flows upward along the heated side and downward along the cooled side. Under these conditions, the lighter UF_6 molecules diffuse toward the warmer surface and heavier UF_6 molecules concentrate near the cooler side. The combination of this thermal diffusion and the thermal convection currents causes the lighter uranium-235 molecules to concentrate on top of the thin column while the heavier uranium-235 goes to the bottom. Taller columns produce better separation. Eventually, a facility using this process was designed and constructed at Oak Ridge, Tennessee, but it was closed after about a year of operation because of cost and maintenance concerns (Settle, 2004). Based on high operating costs and high maintenance requirements, the liquid thermal diffusion process has been eliminated from further consideration.

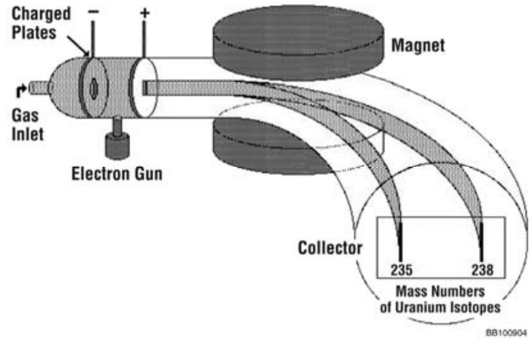

Figure 2-12 Electromagnetic Isotopic Separation Process (Milani, 2005)

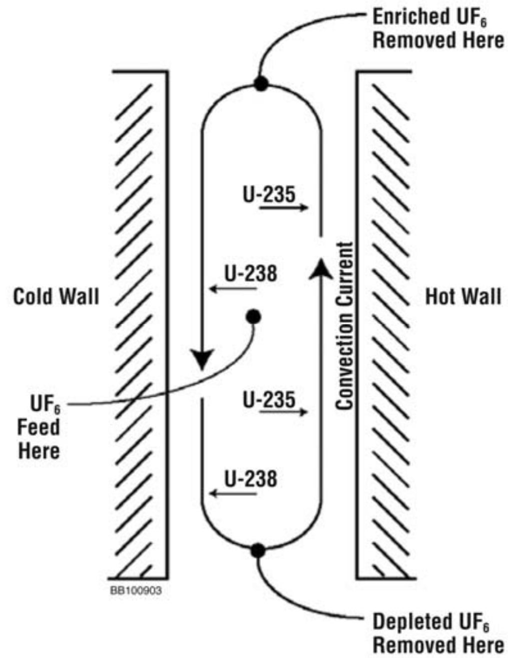

Figure 2-13 Liquid Thermal Diffusion Process (NRC, 2005b)

2.3.3.3 Gaseous Diffusion Process

The gaseous diffusion process is based on molecular effusion, a process that occurs whenever a gas is separated from a vacuum by a porous barrier. The gas flows from the high-pressure side to the low-pressure side. The rate of effusion of a gas through a porous barrier is inversely proportional to the square root of its mass. Thus, lighter molecules pass through the barrier faster than heavier ones. Figure 2-14 is a diagram of a single gas diffusion stage. The gaseous diffusion process consists of thousands of individual stages connected in series to multiply the separation factor.

Gaseous diffusion is the only enrichment technology in commercial use in the United States, but it has relatively large resource requirements. The Paducah GDP contains 1760 enrichment stages and is designed to produce UF_6 enriched up to 5.5 percent uranium-235. The design capacity of the Paducah GDP is approximately 8 million SWUs per year, but it has never operated at greater than 5.5 million SWUs. Paducah consumes approximately 2200 kilowatt hours per kilogram of SWU (DOE, 2000). DOE anticipates “the inevitable cessation of all domestic gaseous diffusion enrichment operations” due to the higher cost of aging diffusion facilities (DOE, 2001). Therefore, the gas diffusion process has been eliminated from further consideration.

2.3.3.4 Atomic Vapor Laser Isotope Separation

The Atomic Vapor Laser Isotope Separation (AVLIS) process, shown in Figure 2-15, is based on the circumstance that different isotopes of the same element, though chemically identical, have different electronic energies and absorb different wavelengths of laser light. The isotopes of most elements can be separated by a laser-based process if they can be efficiently vaporized into individual atoms or molecules. In AVLIS, uranium metal is vaporized, and the vapor stream is illuminated with a laser light of a specific wavelength that is absorbed only by uranium-235. The laser selectively adds enough energy to ionize or remove an electron from uranium-235 atoms, while leaving the other isotopes unaffected. The ionized uranium-235 atoms are then collected on negatively charged surfaces inside the separator unit. The collected material (enriched product) is condensed as a liquid on the charged surfaces and then drains to a caster where it solidifies as metal nuggets.

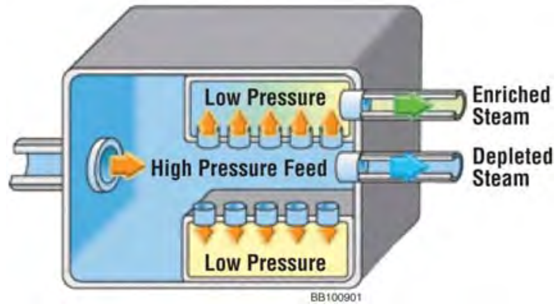

Figure 2-14 Gaseous Diffusion Stage (NRC, 2009a)

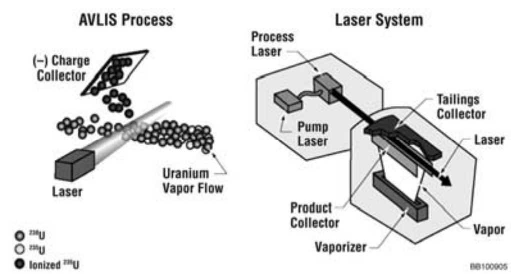

Figure 2-15 Atomic Vapor Laser Isotope Separation Process (Hargrove, 2000)

The high separation factor in AVLIS means fewer stages to achieve a given enrichment, lower energy consumption, and smaller waste volume. However, budget constraints compelled USEC to discontinue development of the U.S. AVLIS program in 1999 (USEC, 1999). Because development of the AVLIS process was not continued, and the technology has been superseded by a more advanced laser-based technology discussed in Section 2.3.3.6, AVLIS has been eliminated from further consideration.

2.3.3.5 Molecular Laser Isotope Separation

Like AVLIS, the Molecular Laser Isotope Separation (MLIS) process uses a tuned laser to excite uranium-235 molecules in the UF_6 feed gas. A second laser then dissociates excited molecules into UF_5 and free fluorine atoms. The enriched UF_5 then precipitates and is filtered as a powder from the feed gas. Each stage of enrichment requires conversion of enriched UF_5 back to UF_6. The advantages of MLIS include low power consumption and the use of UF_6 as a process gas. However, it is less efficient and up to four times more energy intensive than AVLIS. Therefore, all countries except Japan have discontinued development of MLIS. Because development of the MLIS process was not continued and the technology has been superseded by the more advanced laser-based technology discussed in Section 2.3.3.6, MLIS has been eliminated from further consideration.

2.3.3.6 Separation of Isotopes by Laser Excitation

The separation of isotopes by laser excitation (SILEX) process is a third-generation laser-based technology for enriching natural uranium. The SILEX technology, developed by Silex Systems Ltd., in partnership with GE-Hitachi Global Laser Enrichment, LLC (GLE) (and formerly, USEC), is similar to the two earlier laser-excitation technologies, MLIS and AVLIS, discussed in above in Sections 2.3.3.4 and 2.3.3.5, respectively (USEC, 2003; GLE, 2008). All three laser-based processes isolate uranium-235 by optical rather than mechanical means. The SILEX laser-based technology has several advantages over the conventional technologies of gas diffusion and gas centrifuge, including lower capital costs, lower operating costs, simpler and more versatile deployment, more flexibility in product enrichment, smaller facility footprint for comparable enrichment capacity, and reduced environmental impacts.

In laser excitation enrichment, UF_6 vapor is illuminated with a tuned laser of a specific wavelength that is absorbed only by uranium-235 atoms while leaving other isotopes unaffected. The stream then passes through an electromagnetic field to separate the ionized uranium-235 atoms from other uranium isotopes.

The SILEX technology is the world's only third-generation laser-based enrichment technology. (GLE, 2008). In a 2006 agreement with Silex Systems, General Electric (GE) acquired "the exclusive rights to complete the process development and commercial deployment of Silex's enrichment technology" (GE, 2006). GLE has submitted an application to the NRC for a proposed facility in Wilmington, North Carolina, that would be the first enrichment facility to employ the SILEX technology. This application is currently under NRC review (NRC, 2009b), and a Draft EIS was published for public comment (NRC, 2010c).

It is possible at some point in the future that after successfully obtaining a license and designing, constructing, and deploying its first SILEX-based enrichment facility, GLE could decide to license the technology to other companies. However, such a possibility is merely speculative at this time because the first full-scale commercial facility has yet to be licensed, constructed, or operated. At present, only GLE has the rights to the SILEX technology, and thus only GLE has the ability to design and build a facility using the technology. Therefore, because this alternative is not available for use by AES for the proposed EREF, it has been eliminated from further consideration.

2.4 Summary and Comparison of Predicted Environmental Impacts

Chapter 4 of this EIS presents a detailed evaluation of the environmental impacts of the proposed action and the no-action alternative. Table 2-6 summarizes and compares these environmental impacts. A common element between the two alternatives is the occurrence of preconstruction activities. It is assumed that preconstruction activities take place under both alternatives and, therefore, the impacts associated with preconstruction activities take place regardless of which alternative is selected. As a result, the comparison of alternatives presented in Table 2-6 is intended primarily to highlight the differences between the two alternatives after preconstruction activities have occurred.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Land Use	SMALL. The property to be purchased by AES for the proposed project is privately owned, contains mostly sagebrush rangeland and agricultural areas, and is bordered by similar land covers. The proposed property is zoned by Bonneville County G-1 Grazing, and a uranium enrichment facility is consistent with current zoning. Restrictions to land use would begin with the purchase of the property by AES. All grazing and agriculture would cease on the proposed property prior to construction. Similar land uses on surrounding properties would continue. Impacts on land use due to construction would be SMALL. Operation of the proposed EREF would restrict land use on the proposed property to the production of enriched uranium. The operation of the proposed EREF is not expected to alter land use on adjacent properties. Impacts on land use due to operations would be SMALL. At the end of decommissioning, the buildings and structures would be available for unrestricted use. As a result, impacts on land use due to decommissioning would be SMALL.	SMALL. AES would purchase the proposed property and restrictions on grazing and agriculture would initially occur. However, the zoning designation for the proposed property would remain G-1 Grazing whether the proposed EREF is built or not, and the land uses of grazing and farming could potentially resume. Should another domestic enrichment facility be constructed at an alternate location, land use impacts could occur and could range from SMALL to LARGE, depending on factors such as the existing land uses at the alternate location and the nature of the facility.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Historic and Cultural Resources	SMALL to MODERATE. Construction would take place on ground previously disturbed by preconstruction activities, and impacts on historic or archaeological resources would primarily occur prior to construction. There are 13 cultural resource sites (3 prehistoric, 6 historic, and 4 multi-component) in the surveyed areas of the proposed EREF property. One of these sites, the John Leopard Homestead (MW004), is located within the footprint of the proposed EREF and has been recommended as eligible for the *National Register of Historic Places*. The removal of site MW004, which has already occurred, resulted in a LARGE impact because the site no longer exists; however, because AES removed the site through professional excavation and data recovery and there are other homestead sites of this type found in the region, the impact has been mitigated to a MODERATE level. The Wasden Complex is an important group of archaeological sites, located approximately 1.6 kilometers (1 mile) from the proposed EREF site. Construction and operation of most of the proposed facility would not be visible from the Wasden Complex because a ridgeline would obscure views of the lower portions of the proposed facility. Other impacts during operations would be SMALL because no intact historic or cultural resources would	SMALL to MODERATE. The proposed EREF would not be constructed. Site MW004 would not be affected by NRC's licensing action, and Section 106 of the *National Historic Preservation Act* would not apply because no Federal action would be involved. However, the removal of site MW004, which has already occurred, resulted in a LARGE impact because the site no longer exists; but because AES removed this site through professional excavation and data recovery and there are other homestead sites of this type found in the region, the impact has been mitigated to a MODERATE level. No visual effects would occur to the viewshed for the Wasden Complex. Should another domestic enrichment facility be constructed at an alternate location, historical and cultural resource impacts could occur and could range from SMALL to LARGE. Consideration of historical and cultural resources at the alternate location would be reviewed in consultation with the appropriate SHPO.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Historic and Cultural Resources (Cont.)	remain and nearby resources would not be impacted by noise. Decommissioning would not likely affect historic and cultural resources because any areas disturbed during decommissioning would have been previously disturbed during construction. Impacts would be SMALL.	
Visual and Scenic Resources	SMALL to MODERATE. The visual environment of the proposed EREF property and of surrounding areas is predominantly rangeland and cropland. Activities such as clearing and grading of the proposed site would change the visual setting, but would not drastically alter the appearance of the area. The same is true for fugitive dust generation during construction (which would be of temporary duration) and construction traffic on the proposed property. However, because of the extent of the proposed EREF project, the type and size of equipment involved in construction, and the industrial character of buildings to be used, construction of the proposed EREF would create significant contrast with the surrounding visual environment. The proposed facility would be located approximately 2.4 kilometers (1.5 miles) from areas of public view, including US 20 and the Hell's Half Acre Wilderness Study Area (WSA). The U.S. Bureau of Land Management (BLM) gave a Visual Resource Management (VRM) Class I designation to the WSA,	SMALL. Since the proposed EREF would not be constructed, no major visual intrusions to the existing landscape would occur. The current land cover would be altered by preconstruction activities, but no large industrial structures would be constructed. The existing natural character of the area would largely remain intact. The lack of development would be consistent with BLM's VRM Class I designation for the Hell's Half Acre WSA, and no intrusions to the Wasden Complex viewshed would occur. Should another domestic enrichment facility be constructed at an alternate location, visual and scenic resource impacts could occur and could range from SMALL to LARGE. These impacts would depend on factors such as the visual setting in which the facility is to be constructed and operated and the nature of the facility.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Visual and Scenic Resources (Cont.)	which applies to areas of high scenic quality. Construction of the proposed EREF would introduce visual intrusions that are out of character with the surrounding area. While certain construction activities would have a SMALL impact (e.g., fugitive dust generation), the significant contrast posed by the buildings under construction would have a MODERATE impact. Construction and operation of most of the proposed facilities would not be visible from the Wasden Complex because a ridgeline obscures views of the proposed facility. Operations would have an impact on the surrounding visual landscape. The proposed facility is visually inconsistent with the current setting, and its operation is expected to alter visual ratings on surrounding public lands, which constitutes a MODERATE visual impact. At the end of decommissioning, the buildings and structures would be available for unrestricted use. As a result, impacts on visual and scenic resources would remain MODERATE.	

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Air Quality	SMALL. Air emissions during construction would include fugitive dust from heavy equipment working on the proposed site and engine emissions from construction equipment onsite and vehicles transporting workers and materials to the proposed site. Toward the latter portion of the construction period, the auxiliary diesel electric generators would also contribute to air emissions. Air quality impacts during construction would be SMALL for all hazardous air pollutants (HAPs) and all criteria pollutants. During operations, the proposed EREF would not be a major source of air emissions, although there is a potential for small gaseous releases associated with operation of the process that could contain uranium isotopes, hydrogen fluoride (HF), and uranyl fluoride (UO_2F_2). Also, small amounts of nonradioactive air emissions consisting of carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM), volatile organic compounds (VOCs), and sulfur dioxide (SO_2) would be released: • from auxiliary diesel electric generators to supply electrical power when power from the utility grid is not available,	SMALL. The air quality impacts associated with construction and operation of the proposed EREF would not occur. The proposed site could revert to agricultural activities, which would impact ambient air quality through the release of criteria pollutants from the operation of agricultural vehicles and equipment and the release of fugitive dusts from the tilling of soils. Should another domestic enrichment facility be constructed at an alternate location, air quality impacts could occur and could range from SMALL to LARGE. The nature and scale of air impacts resulting from the operation of similar enrichment technologies at alternative locations could be similar to those predicted for the proposed action, but the impacts on the local environments of such alternative facilities would be dependent on extant local conditions and cannot be predicted at this time.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Air Quality (Cont.)	• during building and equipment maintenance activities, and • from trucks, automobiles, and other vehicles in use onsite. Air emissions are not expected to impact regional visibility. Ambient air modeling predicts that impacts on ambient air quality from routine operation of the proposed EREF would be SMALL with respect to all criteria pollutants and all HAPs. During decommissioning, emissions could include fugitive dust and CO, NO_x, PM, VOCs, and SO_2 from transportation equipment, and the impacts of these emissions would be SMALL.	
Geology and Soil	SMALL. Construction activities could cause short-term impacts such as an increase in soil erosion at the proposed site. Soil erosion could result from wind action and rain, although rainfall in the vicinity of the proposed site is low. Compaction of soils due to heavy vehicle traffic would increase the potential for soil erosion via runoff. Impacts would be SMALL. Impacts on soils during operations at the proposed facility would also be SMALL because activities would not increase the potential for soil erosion beyond that for the	SMALL. No additional land disturbance from construction would occur, and the proposed site could revert to crop and grazing activities. Wind and water erosion would continue to be the most significant natural processes affecting the geology and soils at the proposed site. Should another domestic enrichment facility be constructed at an alternate location, geology and soil impacts could occur and could range from SMALL to LARGE. These impacts could be

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Geology and Soil (Cont.)	surrounding area. The impacts to soil quality from atmospheric deposition of pollutants during operations would be SMALL. Land disturbance associated with decommissioning could temporarily increase the potential for soil erosion at the proposed EREF site, resulting in impacts similar to (but less than) those during construction. As a result, impacts to soils due to decontamination and decommissioning activities would be SMALL.	similar to those of the proposed action, but would depend on factors such as the design of the facility, construction and operations methods used, and local geology and soil conditions.
Water Resources	SMALL. Annual maximum groundwater usage rates during construction comprise about 16 percent of the annual water right appropriation that has been transferred to the proposed property for use as industrial water. No surface water sources would be used. As a result, only SMALL impacts to water resources during construction would occur. No wastewater would be generated or discharged during the construction period. Because natural surface water bodies are absent within and near the proposed EREF site and groundwater occurs at depths of 202 meters (661 feet) to 220 meters (722 feet), water quality impacts during the construction period would be SMALL.	SMALL. Additional water use may or may not occur, depending on future plans for the property. Water resources would be unchanged. Water usage could continue at the current rate should agricultural activities resume at the proposed site, and impacts on the ESRP aquifer and downgradient water users would be SMALL. No changes to surface water quality would be expected, and natural (intermittent) surface flow of stormwater on the proposed site would continue; therefore, the impact on surface water is expected to be SMALL. Because no additional groundwater use or adverse changes to groundwater quality

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	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Water Resources (Cont.)	Water usage rates during operations are well within the water right appropriation. Both average and peak annual water use requirements would be less than 1 percent of the total groundwater usage from the Eastern Snake River Plain (ESRP) aquifer in Bonneville County. No process effluents would discharge to the retention or detention basins or into surface water. Therefore, liquid effluents would have a SMALL impact on water resources. Because all of the water discharged to the Cylinder Storage Pads Stormwater Retention Basins would evaporate, the basins would have a SMALL impact on the quality of water resources. The site Stormwater Detention Basin seepage would also have a SMALL impact on water resources of the area because no wastewater would be discharged to the basin. Since the usage and discharge impacts to water resources during the decommissioning phase would be similar to those during construction, the impacts to water resources would remain SMALL.	would be expected, the impact on groundwater resources would be SMALL. Should another domestic enrichment facility be constructed at an alternate location, surface water or groundwater impacts could occur and could range from SMALL to LARGE. These impacts would depend on factors such as the water usage and discharge characteristics of the facility and the nature and extent of groundwater and surface water conditions at the alternate location.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Ecological Resources	SMALL. Construction activities that could impact ecological resources include constructing the proposed EREF buildings and uranium hexafluoride (UF_6) cylinder storage pads. Most construction activities would occur in areas that would have already been disturbed by preconstruction activities. Impacts on vegetation would occur primarily from any additional vegetation clearing. Indirect impacts would include the generation of fugitive dust, spread of invasive species, changes in drainage patterns, soil compaction, erosion of disturbed areas, potential sedimentation of downgradient habitats, and accidental releases of hazardous or toxic materials (e.g., fuel spills). These activities would also result in some wildlife mortality and would cause other wildlife to relocate as a result of noise, lighting, traffic, and human presence. Collisions with construction equipment and other vehicles may cause some wildlife mortality. No rare or unique plant communities, or threatened or endangered species, have been found or are known to occur on the proposed site, although habitat on the proposed property is known to be used by greater sage-grouse (a Federal candidate species). No population-level impacts would be expected on any Federally listed or State-listed species from construction activities. Impacts of construction of the proposed facility would be SMALL.	SMALL. Most impacts on ecological resources would occur during the preconstruction phase. However, such impacts would also occur under the proposed action. The potential impacts associated with the construction, operation, and decommissioning of the proposed EREF would not occur. The land on the proposed EREF site could revert to crop and grazing activities. Because denying the license would not result in additional land disturbance on the proposed EREF property, anticipated impacts on ecological resources from the no-action alternative would be SMALL. Should another domestic enrichment facility be constructed at an alternate location, ecological impacts could occur and could range from SMALL to LARGE. The nature and scale of impacts at the alternate location would depend on factors such as the ecological resources present and type of facility.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Ecological Resources (Cont.)	Operation of the proposed EREF could result in impacts on wildlife and plant communities as a result of noise, lighting, traffic, human presence, air emissions, and retention/detention ponds. However, these impacts would be SMALL. No impacts from operations would be expected on any Federally listed or State-listed species. Impacts on greater sage-grouse would be SMALL Vegetation and wildlife that became established near the proposed facility could be affected by decommissioning activities. Impacts during decommissioning would be similar to those during construction and would be SMALL.	
Noise	SMALL. The nearest resident is located approximately 7.7 kilometers (4.8 miles) east of the proposed site. No residence is expected to experience unacceptable noise levels during construction. Noise impacts from construction may exceed established standards at some offsite locations for relatively short periods of time. However, because of the distances involved, expected levels of attenuation, and AES's commitment to appropriate mitigations, the impacts would be SMALL for human receptors. During the overlap period when partial operations begin while building construction continues, noise impacts from construction and operation are expected to be additive, but still substantially reduced from noise levels during initial construction.	SMALL. None of the noise impacts associated with construction, operation, or decommissioning of the proposed EREF would occur. Land uses on the proposed EREF site could revert to previous applications, livestock grazing and/or crop production, with concomitant SMALL noise impacts. Should another domestic enrichment facility be constructed at an alternate location, noise impacts could occur and could range from SMALL to LARGE. These impacts could be similar to those of the proposed action. However, impacts would be dependent on circumstantial factors such as

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Noise (Cont.)	Major noise sources associated with operation of the proposed facility include the six diesel-fueled emergency generators, commuter traffic, the movement of delivery vehicles, and operation of various pumps, compressors, and cooling fans. Operational noise estimates at the proposed property boundary satisfy all relevant or potentially relevant U.S. noise standards and guidance. Residents in the vicinity of US 20, who are otherwise unaffected by noise from the proposed EREF industrial footprint, would be impacted by slightly increased traffic noise. Noise impacts from operation of the proposed EREF would be SMALL. Noise sources and levels during decommissioning would be similar to those during construction, and peaking noise levels would be expected to occur for short durations. As a result, noise impacts from decommissioning would be SMALL.	local meteorologic conditions, the number and location of the nearest members of the public, and the types and extent of activities necessary to prepare the site for construction at the alternate location.
Transportation	SMALL to MODERATE. The primary impact of the proposed action would be increased traffic on nearby roads. Impacts during construction would occur from transportation of personnel, construction materials, and nonradiological waste. All traffic to and from the proposed EREF during construction and operations would use US 20. Construction activities at the proposed EREF site could result in a 55 percent increase in traffic volume on	SMALL. Traffic volumes and patterns would remain unchanged from existing conditions. The current volume of radioactive material and chemical shipments to/from facilities other than the proposed EREF would not increase. Should another domestic enrichment facility be constructed at an alternate location, transportation

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Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Transportation (Cont.)	US 20 (including the period when construction and operations overlap). Because traffic volume is expected to remain below the design capacity of Interstate 15 (I-15) and traffic slowdowns or delays would only be expected to occur at the entrance to the proposed EREF during access road construction and shift changes, the impacts on overall traffic patterns and volumes during construction would be SMALL to MODERATE on US 20 and SMALL on I-15. The impacts from the truck traffic to and from the proposed site during construction would be SMALL. Operations impacts would occur from the transport of personnel and nonradiological and radioactive materials to and from the proposed EREF, especially during the period when construction and operation overlap. Increased traffic during operation of the proposed facility would have a SMALL to MODERATE impact on the current traffic on US 20 (SMALL for any off-peak shift change). The impacts of truck traffic to and from the proposed site during operation would be SMALL. Annual transportation accident impacts (radiological and chemical) would be SMALL.	impacts could occur and could range from SMALL to LARGE. These impacts could be similar to those of the proposed action, depending on factors such as the existing road network and traffic patterns.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Transportation (Cont.)	Traffic during the initial portion of decommissioning would be approximately the same as for the period when construction and operations overlap. Traffic after the cessation of operations would be less than during either construction or operation. Impacts on local traffic on US 20 would be SMALL to MODERATE.	
Public and Occupational Health	SMALL. During construction, nonradiological impacts include injuries and illnesses incurred by workers as well as impacts due to exposure to chemicals or other nonradiological substances. All such potential impacts would be SMALL. No radiological impacts are expected during construction. Nonradiological impacts during operation include worker illnesses and injuries and impacts from worker or public exposure to hazardous chemicals used or present during operations, mainly uranium and HF. Due to low estimated concentrations of uranium and HF at public (proposed property boundary) and workplace receptor locations, nonradiological impacts due to exposures to hazardous chemicals (including uranium and HF) during operations would be SMALL.	SMALL. Health impacts from construction, operation, and decommissioning would not occur. Associated worker and public impacts from chemical and radioactive hazards would also not occur. Should the land be returned to grazing and agriculture, current use impacts would be expected. Should another domestic enrichment facility be constructed at an alternate location, public and occupational health impacts could occur and could range from SMALL to LARGE. These impacts could be similar to those of the proposed action, but would depend on factors such as the nature of the facility and the population density in the area and its proximity to the facility.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Public and Occupational Health (Cont.)	Assessment of potential radiological impacts from facility operations considers both public and occupational exposures to radiation, and includes exposures to workers completing facility construction during initial phases of operation. Exposure pathways include inhalation of airborne contaminants, ingestion of contaminated food crops, direct exposure from material deposited on the ground, and external exposure associated with stored UF_6 cylinders. Worker exposures would vary by job type, but would be carefully monitored and maintained as low as reasonably achievable (ALARA) and impacts would be SMALL. For a hypothetical individual member of the public at the proposed EREF property boundary and the nearest resident, the maximum annual total effective dose equivalents would be 0.014 millisievert per year (1.4 millirem per year) and 2.1×10^{-6} millisievert per year (2.1×10^{-4} millirem per year), respectively. This equates to impacts from exposure of members of the public that would be SMALL. Dose equivalents attributable to operation of the proposed EREF would be small compared to the normal background radiation range of 2.0 to 3.0 millisievert	

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

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Public and Occupational Health (Cont.)	(200 to 300 millirem) dose equivalent. This equates to radiological impacts during operation of the proposed EREF that would be SMALL. The nature of decommissioning activities would be similar to those during construction and operation. Impacts from occupational injuries and illnesses and chemical exposures would be SMALL. Occupational radiological exposures would be bounded by the potential exposures during operation, because the quantities of uranium material handled would be less than or equal to that during operations. An active environmental monitoring and dosimetry (external and internal) program would be conducted to maintain ALARA doses to workers and to individual members of the public. Therefore, the impacts of decommissioning on public and occupational health would be SMALL.	
Waste Management	SMALL. Construction would generate about 6116 cubic meters (8000 cubic yards) of nonhazardous solid waste, in addition to scrap structural steel, sheet metal, piping, etc., that would be recycled. About 23,000 liters (6200 gallons) and 1000 kilograms (2200 pounds) of hazardous waste would be generated annually. Disposal impacts would be SMALL because there is adequate disposal capacity at the appropriate disposal facilities.	SMALL. No EREF construction, operational, or decommissioning wastes (including sanitary, hazardous, low-level radioactive, or mixed wastes) would be generated or require disposition. Local impacts from waste management would be SMALL as under current site conditions.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Waste Management (Cont.)	Annually, during operations, generation of approximately 70,307 kilograms (154,675 pounds) of industrial, nonhazardous, nonradioactive solid waste and approximately 146,400 kilograms (322,080 pounds) of low-level radioactive waste (not including depleted UF_6) are expected. The proposed facility would also generate approximately 5062 kilograms (11,136 pounds) of hazardous wastes and 100 kilograms (220 pounds) of mixed waste annually. All wastes would be transferred to offsite licensed waste disposal facilities with adequate capacity for the proposed EREF wastes. Therefore, impacts during operations would be SMALL. Liquid process effluents would be treated and discharged by evaporation to the atmosphere. No process effluents from plant operations would be discharged to the retention or detention basins or into surface water. Impacts due to process water discharges from operations of the proposed EREF would be SMALL.	Should another domestic enrichment facility be constructed at an alternate location, waste management impacts could occur and could range from SMALL to LARGE. These impacts could be similar to those of the proposed action but would depend on factors such as the nature of the facility and availability of waste disposal sites.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Waste Management (Cont.)	The proposed EREF is expected to generate 1222 cylinders of depleted UF_6 annually, which would be temporarily stored on an outdoor cylinder storage pad. Storage of depleted UF_6 tails cylinders at the proposed site would occur for the duration of, but not beyond, the proposed facility's 30-year operating lifetime. An active cylinder maintenance program for stored cylinders such as that proposed by AES would result in a SMALL impact for cylinder storage. During decommissioning, materials eligible for recycling would be sampled or surveyed to ensure that contaminant levels would be below release limits. Radioactive material from decontamination and contaminated equipment would be packaged and shipped offsite to an appropriately licensed facility. Waste disposal would include approximately 7700 cubic meters (10,070 cubic yards) of low-level radioactive waste. Due to the availability of adequate disposal capacity, waste management impacts would be SMALL.	

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Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Socioeconomics	SMALL. The economic impacts of the proposed EREF project are evaluated for an 11-county region of influence (ROI) in Idaho – including Bannock, Bingham, Blaine, Bonneville, Butte, Caribou, Clark, Fremont, Jefferson, Madison, and Power Counties – which encompasses the area that is expected to be the primary source of labor for each phase of the proposed project, and where workers employed during construction and operation of the proposed EREF are expected to live and spend most of their salaries. The 11-county ROI is also the area in which a significant portion of site purchase and non-payroll expenditures are expected to occur. The impacts of the EREF on population, housing, and community services are assessed for the two-county ROI, consisting of Bingham and Bonneville Counties, where most in-migrating construction and operations workers are likely to live, and where the majority of economic impacts would occur. The impacts of facility construction and operation would be SMALL. There would be increases in regional employment, income, and tax revenue during construction and operation. Wage and salary spending and expenditures associated with materials, equipment, and supplies would produce income and employment and local and State tax revenue. Although these impacts	SMALL. Any beneficial or adverse consequences of the proposed action would not occur. Socioeconomic conditions in the ROI would remain unchanged, and the impact of no action would be SMALL. Population in the area surrounding the proposed EREF, in Bonneville and Bingham Counties, is expected to grow in accordance with current projections, with the total population in the region projected to be approximately 156,491 in 2013 and 168,331 in 2017. In addition to population growth, the social characteristics of the region, including housing availability, school enrollment, and availability of law enforcement and fire-fighting resources, are expected to change over time. However, future changes in these characteristics are difficult to quantify, and no projections of their future growth are available. Should another domestic enrichment facility be constructed at an alternate location, socioeconomic impacts could occur and could range from SMALL to LARGE. These impacts could be similar to those of the proposed action,

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	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Socioeconomics (Cont.)	would be SMALL compared to the 11-county economic baseline, they are generally considered to be positive. Construction would create 1687 jobs and $65.0 million in the peak year, while operations would produce 3289 jobs and $92.4 million in income in the first year of operations. In-migration into the two-county ROI during construction and operation of the facility would also impact area housing resources and community services such as schools and law enforcement, and the availability and cost of public utilities such as electricity, water, sanitary services, and roads. These impacts could be negative if significant population in-migration were to occur; however, impacts would be SMALL. Decommissioning would provide continuing employment opportunities for the existing workforce and for other residents of the 11-county ROI. Expenditures on salaries and materials would contribute to the area economy, although less than during operations, and the State would continue to collect sales tax and income tax revenues. The socioeconomic impact of decommissioning activities would be SMALL.	but would depend on the nature of the facility and on existing socioeconomic factors in the ROI associated with the alternate facility location.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Environmental Justice	SMALL. The majority of the environmental impacts on environmental resources associated with construction and operation of the proposed EREF would be mostly SMALL, and generally would be mitigated where necessary. For these resource areas, the associated impacts on all human populations would be SMALL, so there would not be any disproportionately high and adverse impacts on minority or low-income populations. Resources for which environmental impacts would be MODERATE are expected to most directly affect residents in the immediate area of the proposed EREF, but because there are no low-income or minority populations defined according to CEQ guidelines within the 4-mile area around the proposed facility, operation of the proposed facility also would not be expected to result in disproportionate impacts on low-income or minority residents, and therefore would not produce any environmental justice concerns. Impacts of decommissioning would be SMALL. Because impacts on the general population would generally be SMALL to MODERATE in other resource areas and because there are no low-income or minority populations defined according to CEQ guidelines within the 4-mile area around the proposed facility, decommissioning would not be expected to result in disproportionately high or adverse impacts on minority or low-income populations.	SMALL. The no-action alternative would not be expected to cause any high and adverse impacts; it would not raise any environmental justice issues. Therefore, any impacts would be SMALL. Should another domestic enrichment facility be constructed at an alternate location, environmental justice impacts could occur and could range from SMALL to LARGE. These impacts would depend on factors such as the nature of the impact significance levels and populations impacted by the facility at the alternate location.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Accidents	SMALL to MODERATE. A range of six hypothetical facility accidents were considered. The accidents include a criticality accident and the remaining five accidents were representative accident scenarios that varied in severity from high- to intermediate-consequence events, including accidents initiated by natural phenomena (earthquake), operator error, and equipment failure. The latter five accidents could cause varying amounts of UF_6 to be released, resulting in potential exposure to UF_6 and its reaction products with humidity in the air, UO_2F_2, and HF. All credible accidents at the proposed EREF were considered. The consequence of a criticality accident would be high (fatality) for a worker in close proximity. Worker health consequences are low to high from five scenarios involving the release of $UF_{6,}$ due to uranium and/or HF chemical exposure. Radiological consequences to a maximally exposed individual (MEI) at the Controlled Area Boundary (proposed EREF property boundary) are low for all six accidents including the criticality accident. Uranium chemical exposure to the MEI is high for one accident and low for the remainder. For HF exposure to an MEI at the proposed property boundary, the consequence of three accidents is intermediate, with a low consequence estimated for the remainder. All accident scenarios predict consequences to the collective offsite public of less than one lifetime cancer fatality. Impacts	SMALL. Under the no-action alternative, potential accidents and accident consequences from operation of the proposed EREF would not occur. Should another domestic enrichment facility be constructed at an alternate location, accident impacts could occur and could range from SMALL to LARGE. These impacts could be similar to those of the proposed action, but would depend on the nature of the facility at the alternate location.

Table 2-6 Summary of Environmental Impacts for the Proposed Action and the No-Action Alternative (Cont.)

Affected Environment	Proposed Action	No-Action Alternative
	AES would construct, operate, and decommission the proposed EREF in Bonneville County, Idaho.	***The proposed EREF would not be constructed, operated, and decommissioned. Enrichment services would be met with existing domestic and foreign uranium enrichment suppliers and other planned or future facilities.***
Accidents (Cont.)	from accidents would be SMALL to MODERATE. Plant design, passive and active engineered controls, and administrative controls would reduce the likelihood of accidents.	

A standard of significance has been established for assessing environmental impacts. Based on the Council on Environmental Quality's regulations (40 CFR 1508.27), each impact is to be assigned one of the following three significance levels:

- SMALL. The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

- MODERATE. The environmental effects are sufficient to noticeably alter but not destabilize important attributes of the resource.

- LARGE. The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

These impact levels are used in the summary and comparison of alternatives in Table 2-6.

2.5 Staff Recommendation Regarding the Proposed Action

After weighing the impacts of the proposed action and comparing the proposed action and the no-action alternative, the NRC staff, in accordance with 10 CFR 51.91(d), sets forth its NEPA recommendation regarding the proposed action.

The NRC staff recommends that, unless safety issues mandate otherwise, the proposed license be issued to AES. In this regard, the NRC staff has concluded that environmental impacts are generally SMALL, and application of the environmental monitoring program described in Chapter 6 and the proposed AES mitigation measures discussed in Chapter 5 would eliminate or substantially lessen any potential adverse environmental impacts associated with the proposed action.

The NRC staff has concluded that the overall benefits of the proposed EREF outweigh the environmental disadvantages and costs based on consideration of the following:

- The need for an additional economical domestic source of enrichment services.

- The environmental impacts from the proposed action are generally SMALL, although they could be as high as MODERATE for certain aspects of the areas of historic and cultural resources, visual and scenic resources, ecological resources, and transportation and as high as LARGE for certain aspects of air quality on a temporary basis.

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3 AFFECTED ENVIRONMENT

This chapter describes the existing regional and local environmental conditions at and near the site of the proposed AREVA Enrichment Services, LLC (AES) Eagle Rock Enrichment Facility (EREF) before any preconstruction activities are performed and prior to the proposed action. After an initial overview of the proposed site location and activities, this chapter presents information on land use; historic and cultural resources; visual and scenic resources; climatology, meteorology, and air quality; geology, minerals, and soils; water resources; ecological resources; noise; transportation; public and occupational health; socioeconomics; and environmental justice. This information forms the basis for assessing the potential impacts of the proposed action in Chapter 4.

3.1 Site Location and Description

The proposed EREF site is located in eastern Idaho in Bonneville County, approximately 32 kilometers (20 miles) west of Idaho Falls, Idaho, along US 20 and 117 kilometers (70 miles) west of the Idaho/Wyoming border (Figure 3-1). Idaho Falls, the closest population center, is located at the cross-junction of Interstate 15 (I-15) with US 20 and US 26. Approximately 2 kilometers (1 mile) to the west of the proposed EREF property is the Idaho National Laboratory (INL), a large Federal Government-owned research laboratory that encompasses 230,321 hectares (890 square miles or 569,135 acres).

The proposed EREF property consists of approximately 1700 hectares (4200 acres) to be purchased by AES from a single landowner. The proposed EREF site would occupy approximately 186 hectares (460 acres) within this area. An additional 53 hectares (132 acres) will be disturbed during preconstruction and construction by excavation of underground utilities and by temporary use for construction facilities, material storage, and parking. The proposed site and surrounding area within the proposed property boundary consist of rangeland, nonirrigated seeded pasture, and irrigated cropland. Wheat, barley, and potatoes are grown on 389 hectares (962 acres) of the irrigated land (AES, 2010). Aside from the areas devoted to crops, the predominant plant type in the area is sagebrush steppe, which is seasonally grazed.

3.2 Land Use

This section describes the land uses in and near the proposed EREF property to be purchased by AES and the proposed EREF site within that property. This area includes the 186 hectares (460 acres) that the proposed EREF industrial site itself will occupy, plus an additional 53 hectares (132 acres) that will be temporarily disturbed during preconstruction and construction. Therefore, this is the area that would be directly affected by preconstruction, construction, operation, and decommissioning of the proposed EREF.

The following discussion focuses on the region within 8 kilometers (5 miles) of the proposed EREF site. The proposed EREF site is located in Bonneville County; however, both Jefferson County to the north and Bingham County to the west are within 8 kilometers (5 miles) of the proposed EREF site. As a result, land use in all three counties is discussed below. Special land use classification areas are also discussed.

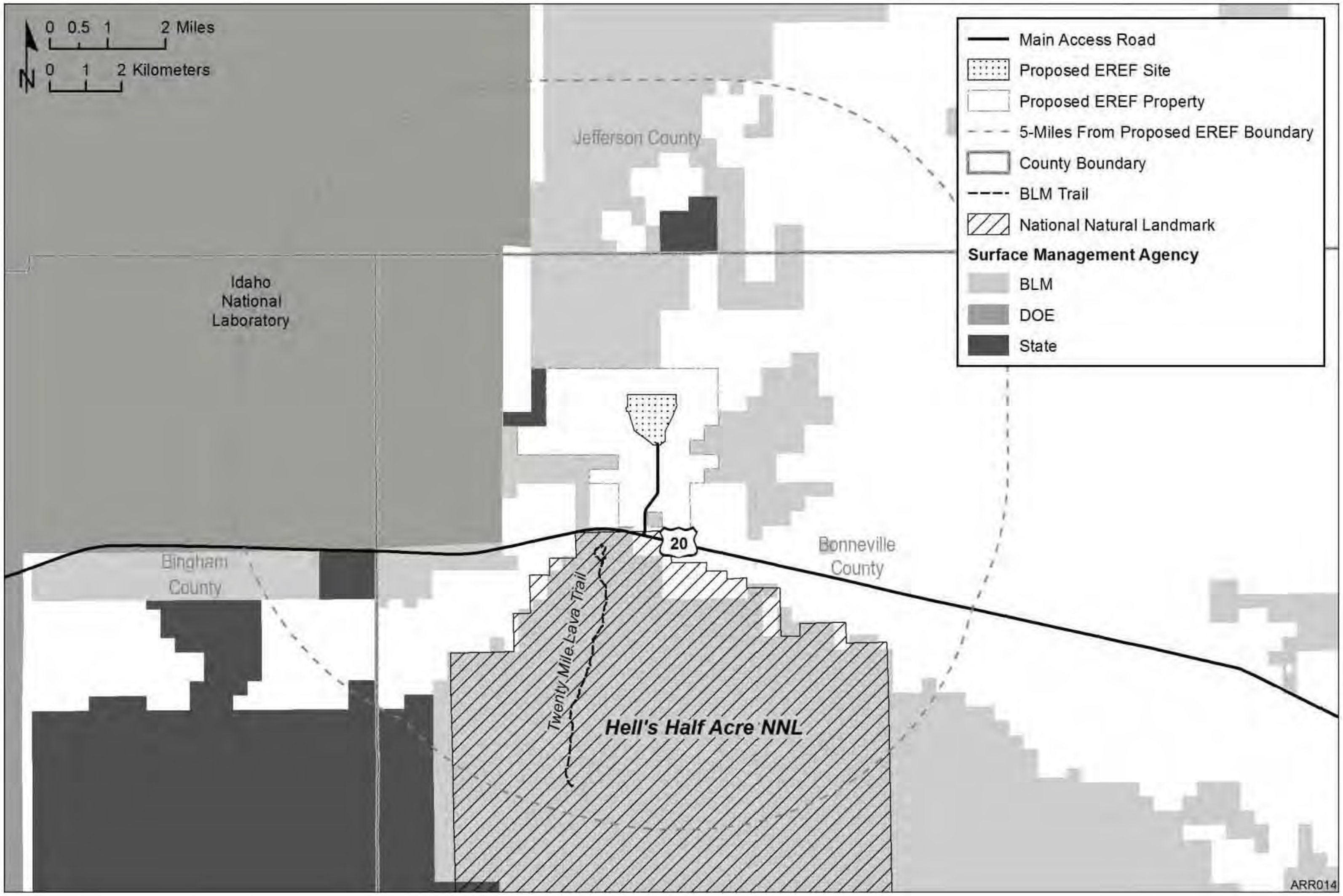

Figure 3-1 Location of Proposed Eagle Rock Enrichment Facility

3.2.1 Bonneville County and Proposed EREF Property

Bonneville County is located in southeastern Idaho. The largest community in the county is Idaho Falls, the county seat, with a population of 101,667 as of the 2000 Census. Idaho Falls is located 32 kilometers (20 miles) east of the proposed EREF site. No other large cities are found in Bonneville County. Based on the available land use data for the county, the dominant land use is cultivated crops (17 percent), with undeveloped sagebrush or woodlands being the next largest land use (14 percent). Less than 3 percent of the land in the county is developed (USGS, 2009g).

The 1700-hectare (4200-acre) parcel of land to be purchased by AES is bordered on the west by State-owned land and to the south and east by U.S. Bureau of Land Management (BLM)-managed lands as shown in Figure 3-2. The BLM land is managed for multiple uses, which include grazing and hunting (Reynolds, 2010). Also, there is private land to the northeast and south. To the north and west is the INL, which is a U.S. Department of Energy (DOE) applied engineering laboratory that covers approximately 2306 square kilometers (890 square miles). Much of the INL property is an undeveloped sagebrush-steppe environment. Laboratory complexes are scattered throughout the INL property. The nearest INL complex to the proposed EREF site is the Materials and Fuels Complex located approximately 18 kilometers (11 miles) to the west. South of the proposed EREF site is the Hell's Half Acre National Natural Landmark (NNL) and Wilderness Study Area (WSA). A lava flow occurred in this location approximately 4100 years ago. The lava flow covers 57,498 hectares (222 square miles) of the Idaho desert. (See Section 3.2.4 for more discussion of Hell's Half Acre.) Farming occurs northeast and southeast of the proposed EREF site. The nearest residence to the proposed EREF site is 8 kilometers (5 miles) to the east.

Land use within the 1700-hectare (4200-acre) parcel of land to be purchased by AES is primarily cultivated cropland (43 percent), followed by sagebrush-steppe (36 percent) and pasture/hay (7 percent), with the remainder being open space and upland grasslands (14 percent) (USGS, 2009g). A few agricultural buildings are located along US 20 near the south end of the proposed EREF property. There are no existing rights-of-way (ROWs) within the proposed EREF property. The proposed EREF property consists entirely of private land. Within the proposed property, there is a 16-hectare (40-acre) parcel of land managed by the BLM. AES has no plans to purchase the BLM parcel (AES, 2010). The 16-hectare parcel is surrounded by the proposed EREF property. Adjacent to an access road being purchased for the proposed project are two 6.5-hectare (16-acre) parcels on which the Federal Government previously held uranium land patents. The uranium leases have been relinquished (42 U.S. Code (U.S.C.) 2098 Sec. 68b). Some of the land located within the proposed property was designated as prime farmland by the U.S. Natural Resources Conservation Service (NRCS). The use of prime farmland is subject to review under the *Federal Farmland Protection Policy Act* (FPPA) (see Title 7 of the U.S. *Code of Federal Regulations* (7 CFR 658.2). Per 7 CFR 658.2 (c)(1)(i), the intent of this Act is to protect prime farmland from other uses as the result of certain Federal actions. The Act does not apply to Federal permitting or licensing actions on private lands, such as the potential licensing of the proposed EREF by the NRC. In May 2010, DOE issued a conditional commitment for a Federal loan guarantee to AES for the proposed EREF (DOE, 2010a). Issuing a loan guarantee is subject to review under the FPPA to assess the effect of the project associated with the loan guarantee on prime farmland. DOE has conducted and submitted the required farmland conversion impact analysis to the NRCS

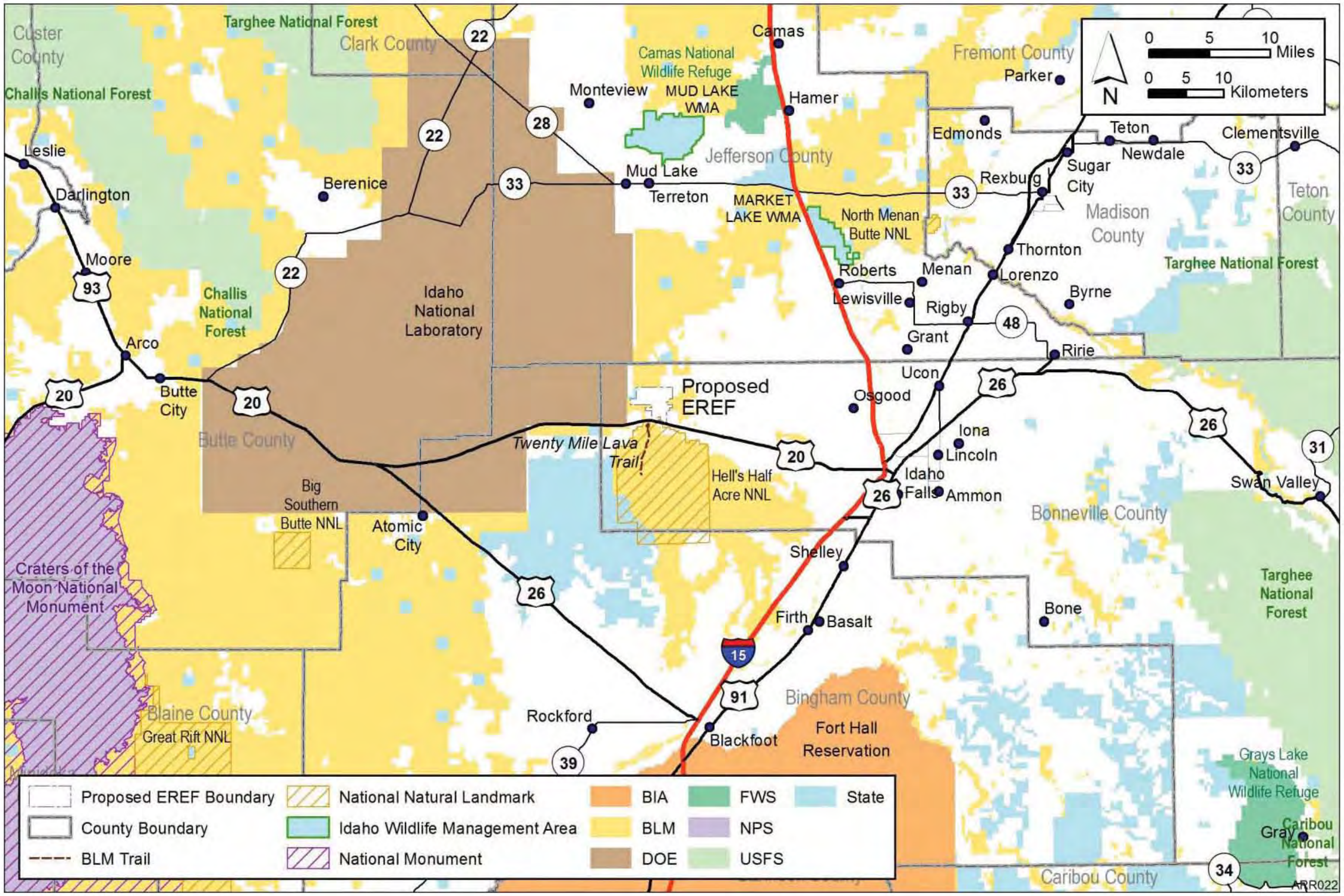

Figure 3-2 Special Land Use Classification Areas (BLM, 2009a; IDFG, 2010)

(DOE, 2010b). The issuance of the Federal loan guarantee is not a factor in the NRC's decision to issue a license.

The proposed EREF property is zoned by Bonneville County as Grazing Zone G-1. The zoning allows for manufacturing, testing, and storage of materials or products considered to be hazardous. Areas with this zoning designation are generally large tracts of open land. The purpose of the zone is to allow for certain uses and activities that should be conducted in locations removed from densely populated areas of the county. There are no building size or height restrictions within this zoning designation (Serr, 2009).

3.2.2 Bingham County

Bingham County is located approximately 6 kilometers (4 miles) west of the proposed EREF site. The county seat of Bingham County is Blackfoot, located 43 kilometers (27 miles) south of the proposed site. The population of Blackfoot was 10,419 in the 2000 Census. Atomic City, 32 kilometers (20 miles) west of the proposed EREF site, is the nearest community in Bingham County to the proposed EREF. The population of Atomic City was reported as 25 in the 2000 Census. The portion of the county within 8 kilometers (5 miles) of the proposed EREF site is zoned natural resources/agricultural (Halstead, 2009). Land use in the county consists primarily of rangeland (46.8 percent), with agricultural land (31.7 percent) and barren lands (14.9 percent) being the other main land uses (Bingham County, 2005). The primary agricultural products from Bingham County in 2002 were wheat and potatoes (USDA, 2002).

3.2.3 Jefferson County

Jefferson County is located directly north of the proposed EREF site The portion of the county that falls within 8 kilometers (5 miles) of the proposed EREF site is zoned Agricultural Forty Zone (Ag. 40 Acres) (Jefferson County, 2008). This zone allows for agricultural uses and the development of residential lots that are minimally 16 hectares (40 acres) in size (Jefferson County, 2005). Industrial uses are not permitted within this zoning designation. The nearest town in Jefferson County to the proposed site is Rigby, approximately 42 kilometers (26 miles) to the northeast. Rigby has a population of 2998 (2000 Census). Land use in Jefferson County is dominated by undeveloped sagebrush and rangeland (56 percent) and cultivated cropland and pasture (39 percent), with only minimal development (3 percent) (USGS, 2009g).

3.2.4 Special Land Use Classification Areas

There are ten special land use areas near the proposed EREF site (Figure 3-2). The closest is Hell's Half Acre WSA just south of US 20, approximately 2 kilometers (1 mile) from the proposed site. A WSA is a BLM management designation for areas that (1) have retained their naturalness, with the imprint of man's work substantially unnoticeable; (2) are large (at least 2023 hectares [5000 acres]); and (3) have outstanding opportunities for solitude or for primitive or unconfined types of recreation in at least parts of the areas. Retaining wilderness characteristics is achieved by limiting road access and not allowing mineral leasing within a WSA. The northern portion of the Hell's Half Acre WSA was named a National Natural Landmark (NNL) in 1973. National Natural Landmarks are chosen by the Secretary of the Interior to recognize some of the best examples of biological or geological resources in the nation. National Natural Landmarks are designated by the National Park Service. There are three additional NNLs in the region: Big Southern Butte NNL (51 kilometers [32 miles] to the southwest), North Menan Butte NNL (32 kilometers [20 miles] to the northeast), and Great Rift NNL (72 kilometers [45 miles] to the southwest). The 750,000-acre Craters of the Moon National Monument and Preserve is 80 kilometers (50 miles) west of the proposed EREF site; it is managed by the National Park Service and the BLM. There are two national forests located northwest of the INL property; these are the Challis National Forest (48 kilometers [30 miles] northwest) and the Targhee National Forest (48 kilometers [30 miles] north northwest). The Mud Lake Wildlife Management Area (WMA), located 35 kilometers (22 miles) north of the proposed site, and Market Lake WMA, located 32 kilometers (20 miles) northeast, are both managed for hunting by the Idaho Department of Fish and Game (IDFG). Camas National Wildlife Refuge is 43 kilometers (27 miles) north of the proposed EREF site and is managed by the U.S. Fish and Wildlife Service (FWS). Fort Hall Indian Reservation is 60 kilometers (37 miles) south of the proposed EREF site and is the property of the Shoshone-Bannock Tribes. The reservation was established in 1868 by the Fort Bridger Treaty.

3.3 Historic and Cultural Resources

This section describes the prehistoric and historic background of the area.

3.3.1 Prehistoric

The prehistory of southern Idaho is divided into the Early Prehistoric Period (13,000 B.C. to 5500 B.C.), the Middle Prehistoric Period (5500 B.C. to A.D. 700), and the Late Prehistoric Period (A.D. 700 to A.D. 1700). The Clovis and Folsom cultures are associated with the Early Prehistoric Period. These cultures relied on hunting large mammals for survival. The climate was cooler and wetter than today. Projectile points associated with the Early Prehistoric Period's Folsom culture have been found at sites within a mile of the proposed EREF site. There is evidence of more intensive use of local resources during the Middle Prehistoric Period. Grinding stones for processing plant food are commonly found on Middle Prehistoric archaeological sites. Large spear points were used during the Early Prehistoric Period. Smaller darts from the Middle Prehistoric Period suggest the hunting of smaller game. There were large climatic fluctuations during the Middle Prehistoric Period. The Late Prehistoric Period is marked by the introduction of the bow and arrow and the use of pottery. Most evidence suggests that mobility and hunting remained important parts of the subsistence strategies of the late prehistoric cultures. Sedentary seasonal farming along major rivers was more prevalent during the Late Prehistoric Period (INL, 2007).

3.3.2 Protohistoric and Historic Indian Tribes

Three tribal groups are known to have been in the vicinity of the proposed site during the protohistoric period (A.D. 1700 to 1850). They were the Shoshone, Paiute, and Bannock (Ringhoff et al., 2008). These groups engaged in seasonal rounds of foraging during which they exploited various resources. The lifeways of protohistoric tribes were greatly modified after 1700 with the introduction of horses. The increased mobility allowed by the horse expanded the ranges of these groups and altered many of their customs. These were the same tribes that were present in the historic period.

3.3.3 Historic Euro-American

Historic use of the area began in the early 1800s when trappers came into the area to collect beaver skins. More intensive use of the land began in 1852 with the establishment of Goodale's Cutoff in the northern portion of what is now the INL property. The cutoff began as a northern extension of the Oregon Trail. By 1860, the route began to be used for moving cattle and sheep from Oregon and Washington to eastern markets. From the 1860s to 1880s, numerous gold and other precious metal mines began to open in central Idaho, which led to increased traffic on Goodale's Cutoff and the creation of numerous other roads and trails through the area. Ranches were established along the Big Lost River by the 1880s where livestock was raised and then transported across what would become INL. Populations began to rise steadily with passage of the *Carey Land Act of 1894* and the *Desert Reclamation Act of 1902*, which set aside a million acres of public lands for homesteading and provided funds to aid in development of irrigation systems, respectively (INL, 2007).

By the early 20th century, the town of Powell had been established on the INL property near the intersection of the Oregon Shortline Railroad (now the Union Pacific Railroad) and the Big Lost River. The town was located near the current location of INL's Radioactive Waste Management Complex. Most of the homesteads failed by the 1920s and were abandoned due to a lack of available water resulting from extensive water use upstream of the INL property for irrigation (INL, 2007).

3.3.4 Historic and Archaeological Resources in the Vicinity of the Proposed Site

Significant archaeological sites are found in the vicinity surrounding the proposed EREF property. One of the most important sites found in the region is the Wasden Complex located approximately 1.6 kilometers (1 mile) from the proposed EREF site. The Wasden Complex is a series of lava blister caves that contain evidence of human use dating back to at least 10,000 B.C. The complex shows evidence of people hunting mammoth and a type of bison that is now extinct (INL, 2007). Complexes of this age that have direct evidence of humans hunting extinct animals are extremely rare. The complex is made up of three distinct sites. The sites contain evidence of continuous use up to the Historic Period.

The Area of Potential Effect (APE) for the *National Historic Preservation Act of 1966* (NHPA) Section 106 review of the proposed project, as defined by the U.S. Nuclear Regulatory Commission (NRC), is the 240-hectare (592-acre) portion of the proposed site that would be directly affected by preconstruction and construction activities. Archaeological surveys have been undertaken by AES's archaeological contractor for the proposed project. The contractor directly examined 381 hectares (941 acres) of the proposed EREF property (Ringhoff et al., 2008), within which the 240-hectare (592-acre) APE is included. The acreage surveyed included additional areas for expansion outside the presently proposed construction and operations areas, which are no longer deemed necessary for the proposed project. An additional 26 hectares (64 acres) was surveyed in 2009 due to changes in the project design (Estes and Raley, 2009). This brought the amount of land surveyed for historic and cultural resources to 407 hectares (1005 acres). The AES surveys identified 13 archaeological sites and 24 isolated finds within the APE. Isolated finds are isolated occurrences of cultural resource material that are not associated with subsurface remains and are not considered archaeological sites. Three of the archaeological sites were prehistoric in age, six were from the historic era, and four contained evidence from both the historic and prehistoric periods (Ringhoff et al., 2008). The prehistoric sites consisted of stone tools or evidence of stone tool manufacture. The historic sites were primarily historic trash scatters consisting of cans and glass. None of the isolated finds are considered eligible for listing on the NRHP. On the basis of the survey results, nine of the sites were recommended not eligible for listing on the *National Register of Historic Places* (NRHP). One site, the John Leopard Homestead (MW004), is recommended eligible for listing on the NRHP for its potential to provide information on the practices of historic era farmers in the region. Several other sites of this type have been previously identified on INL property north of the proposed EREF site (Gilbert, 2010). MW004 consists of several structural remains including a cistern, privy, and historic dugout house foundation. AES's archaeological contractor recommended additional research for three other sites found during the survey (MW002, MW012, and MW015). Subsequently, AES's archaeological contractor found that these three sites lacked sufficient information to be considered significant (Ringhoff et al., 2008).

The NRC conducted a file search for the 1700-hectare (4200-acre) parcel. The file search revealed that the proposed EREF property had not been previously surveyed for the presence of historic and cultural resources (i.e., prior to AES's license application); therefore, no resources were previously known. The file search identified seven previously recorded archaeological sites within one mile of the proposed EREF. Three of the sites are associated with the Wasden Complex (10BV30, 10BV31, and 10BV32) and are all eligible for listing on the NRHP. 10BV30 is known as Owl Cave and contains some of the only known evidence of early prehistoric peoples in association with extinct mammoth bones. 10BV31 is known as Coyote Cave and also contains extensive evidence of human use. The final site associated with the Wasden Complex is 10BV32, which is also a collapsed lava tube. A fourth site (10BV47) consisted of a fluted spear point and associated materials and is considered eligible for listing on the NRHP. No information was available for the remaining three sites (10BV83, 10BV84, and 10BV87).

3.4 Visual and Scenic Resources

This section describes the visual and scenic resources in the vicinity of the proposed EREF.

The proposed EREF site is on undeveloped land 32 kilometers (20 miles) west of Idaho Falls, Idaho. The main portion of the proposed facility would be located approximately 3 kilometers (1.7 miles) north of US 20 (Figure 3-3). The tallest structures at the proposed facility would be approximately 20 meters (65 feet) high. The area is gently rolling, sagebrush semi-desert, with some high points (Figure 3-4). The tallest vegetation on the proposed property is sagebrush that stands approximately 1 meter (3 feet) tall. The highest point in the vicinity of the proposed project is Kettle Butte, which is located 1.2 kilometers (0.75 mile) east of the proposed EREF (Figure 3-5). Larger buttes are visible in the distance. The eastern portion of the proposed EREF site is currently used for agriculture. Single-story agriculture storage structures are located adjacent to US 20 on the proposed property in the vicinity of the proposed EREF site (Figure 3-6). The nearest residence is 7.7 kilometers (4.8 miles) east of the proposed site along US 20.

Figure 3-3 Photo of the Proposed EREF Site Area (AES, 2010)

Figure 3-4 Center of Proposed EREF Site Area Facing South (AES, 2010)

Figure 3-5 Photo from US 20 Facing North
(Note butte in distance.) (Argonne staff photo)

Figure 3-6 Agricultural Sheds near Proposed EREF Site Area (AES, 2010)

Figure 3-7 Hell's Half Acre National Natural Landmark (Argonne staff photo)

The lands immediately surrounding the proposed property to the west, north, and east are primarily covered in sagebrush semi-desert. The land to the west and north is managed by BLM and currently used for grazing and multiple use, a BLM land management designation (Reynolds, 2010). The land to the south of US 20 is a mix of private and BLM-managed land. Some of the private land to the southeast is under cultivation. Much of the land south of the proposed site is the remains of a 4000-year-old lava flow, which is managed by the BLM as Hell's Half Acre WSA (Figure 3-7). See Section 3.2.4 for a description of WSA and NNL.

Another visually sensitive resource in the vicinity of the proposed project is the Wasden Complex, a significant archaeological complex. See Section 3.3.4 for a discussion of the Wasden Complex.

BLM has developed a visual resource management (VRM) system to manage the resources under its control (BLM, 2009b). Even though the BLM's VRM system is officially applicable only to BLM land, it does provide a useful tool for generally inventorying and managing visual resources. The system has two main components. The first is the visual resource inventory (VRI), which attempts to establish the inherent visual qualities of an area, assess whether the public has any concerns related to scenic quality for a location, and determine if there are key observation points for a given location. The inventory characterizes the visual appeal of a location and is discussed further below. The second component of the system is the VRM rating, which reflect the management decisions made by the BLM defining how they will manage the visual resources in a given location. There are four levels of VRM rating, designated as VRM Classes I to IV, with VRM Class I being the most restrictive and protective of the visual landscape and IV being the least restrictive. VRM Class I areas are managed to preserve their existing visual character. VRM II areas are managed to retain their existing visual character; VRM III areas are managed to partially retain their existing visual character; and VRM IV areas are those that allow major modification of the existing visual character of the landscape.

The Hell's Half Acre WSA has a VRM rating of I, which indicates that the BLM has decided to manage the area to retain its existing character. Under VRM I, the level of change must not attract viewer attention. The lands surrounding the WSA and the property to be purchased by AES are designated as VRM II by the BLM. They are managed to retain their existing visual character. Changes in the characteristics of the location should be low and should not attract the attention of a viewer (BLM, 2009b).

The BLM VRI process involves evaluating the visual landscape to determine the (1) sensitivity of the location for visual intrusions, (2) scenic qualities of the location, and (3) distance from which the location would be viewed. Sensitivity refers to the public's concern or expectation for scenic quality. Sensitivity is based on the types of users that would view the location (e.g., recreational users, commuters, or workers), the amount of use, public interest, and adjacent land uses. Distance considerations are a factor when determining visual resource inventory values and associated impacts. The proposed EREF site is located within 3 kilometers (2 miles) of US 20, which would place it in the foreground-middleground zone where visual intrusions are very obvious, as opposed to the distant background where they are less obvious. Visual intrusions in this zone typically have the greatest apparent contrast because they are highly visible from key observation points.

Sensitivity is an important factor in the VRI process because it addresses the expectation for pristine environments. The proposed EREF property is in a relatively undeveloped setting. US 20 is most heavily used by workers commuting to INL. Other people traveling US 20 include farmers going to their fields and tourists visiting the Hell's Half Acre WSA. The public has not expressed any opinions indicating a preference for or against maintaining the current visual situation (see Appendix A). Uses for adjacent land in the immediate vicinity of the proposed property include farming and the Hell's Half Acre WSA. Most of the area surrounding the proposed EREF site is undeveloped sagebrush semi-desert. Industrial developments are found on INL, but none of them are visible from the proposed site. Sensitivity to changes in the visual landscape would be expected to be low for workers and farmers using the area and moderate to high for those using the Hell's Half Acre WSA.

The VRI process measures the scenic quality of an area through application of the scenic quality rating criteria, which cover landforms, vegetation, water, color, adjacent scenery, scarcity, and cultural modification. The scenic quality criteria applied to a landscape are presented in Table 3-1. Examples of how to apply the criteria are presented in Table 3-2. The landform is rolling desert landscape with large open vistas (Rating 1). The vegetation is primarily sagebrush semi-desert (Rating 1). No water sources are evident from the proposed site (Rating 0). The color range in the proposed site area is various hues of green from the sagebrush environment and the agricultural fields (Rating 1). Adjacent scenery is similar to that found in the proposed site area and has little influence on the visual quality (Rating 1). Although the proposed site is adjacent to the unique geologic features associated with Hell's Half Acre WSA, the land occupied by the proposed project is not unique (Rating 1). Currently, very little by way of cultural modifications are visible in the proposed site area. Storage sheds,

Table 3-1 Scenic Quality: Explanation of Rating Criteria

Landform	Topography becomes more interesting as it gets steeper, more massive, or more severely or universally sculptured. Outstanding landforms may be monumental (e.g., Grand Canyon in Arizona, Sawtooth Mountain Range in Idaho, Wrangell Mountain Range in Alaska) or exceedingly artistic and subtle (e.g., certain badlands, pinnacles, arches, and other extraordinary formations).
Vegetation	Ratings give primary consideration to the variety of patterns, forms, and textures created by plant life. They consider short-lived displays when they are known to be recurring or spectacular. They also consider smaller-scale vegetative features that add striking and intriguing detail elements to the landscape (e.g., gnarled or wind-beaten trees and joshua trees).
Water	Ratings consider ingredients that add movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.
Color	Ratings consider the overall color(s) of the basic components of the landscape (e.g., soil, rock, vegetation) as they appear during seasons or periods of high use. Key factors to use when rating "color" are variety, contrast, and harmony.
Adjacent Scenery	Ratings consider the degree to which scenery outside the unit being rated enhances the overall impression of the scenery within the rating unit. The distance from which adjacent scenery influences scenery within the rating unit normally ranges from zero to 8 kilometers (5 miles), depending on the characteristics of the topography, vegetative cover, and other such factors. This criterion is generally applied to units that would normally score very low, but for which the influence of the adjacent unit would enhance the visual quality and raise the score.
Scarcity	This criterion provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique or rare within one physiographic region. It also covers cases for which a separate evaluation of each of the key criteria does not give a true picture of the overall scenic quality of an area. It is often the case that a number of rather unspectacular elements, in the proper combination, produce the most pleasing and memorable scenery. The scarcity criterion can be used to recognize this type of area and give it the added emphasis it needs.
Cultural Modifications	Cultural modifications in the landform, water, and vegetation, as well as the addition of structures, should be considered. They may detract from the scenery in the form of a negative intrusion or complement or improve the scenic quality of a unit. They should be rated accordingly.

Source: BLM, 2007.

Table 3-2 Scenic Quality Inventory and Evaluation Chart

Key Factors	Rating Criteria and Score		
Landform	High vertical relief as expressed in prominent cliffs, spires, or massive rock outcrops; or severe surface variation or highly eroded formations, including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing, such as glaciers. 5	Steep canyons, mesas, buttes, cinder cones, and drumlins; or interesting erosional patterns or variety in the size and shape of landforms; or detail features that are interesting but not dominant or exceptional. 3	Low rolling hills, foothills, or flat valley bottoms; or few or no interesting landscape features. 1
Vegetation	A variety of vegetative types as expressed in interesting forms, textures, and patterns. 5	Some variety of vegetation, but only one or two major types. 3	Little or no variety or contrast in vegetation. 1
Water	Clear and clean appearing, still, or cascading white water, any of which is a dominant factor in the landscape. 5	Flowing, or else still but not dominant in the landscape. 3	Absent, or else present but not noticeable. 0
Color	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water, or snow fields. 5	Some intensity or variety in colors and contrasts of the soil, rock, and vegetation, but not a dominant scenic element. 3	Subtle color variations, contrast, or interest; generally mute tones. 1
Adjacent Scenery	Adjacent scenery greatly enhances visual quality. 5	Adjacent scenery moderately enhances overall visual quality. 3	Adjacent scenery has little or no influence on overall visual quality. 0
Scarcity	One of a kind; or unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing, etc. 5+	Distinctive, although somewhat similar to others within the region. 3	Interesting within its setting, but fairly common within the region. 1
Cultural Modification	Modifications add favorably to visual variety while promoting visual harmony. 2	Modifications add little or no visual variety to the area and do not introduce discordant elements. 0	Modifications add variety but are very discordant and promote strong disharmony. -4

Source: BLM, 2007.

agricultural crops, and US 20 are the only visible cultural modifications (Rating 0). The overall scenic quality rating is 5. According to the BLM VRI criteria, an A or high quality classification is for a rating of 19 or more. For a rating of 12 to 15, the area is considered a B, and a rating of 11 or less is a C (BLM 2009). The scenic resource inventory rating for the landscape near the proposed EREF is a C, which means that the proposed EREF site does not contain a high level of scenic quality.

3.5 Climatology, Meteorology, and Air Quality

This section describes the climatology, meteorology, and air quality of the proposed EREF site and vicinity.

3.5.1 Climatology

3.5.1.1 Idaho

Idaho lies 480 kilometers (300 miles) east of the Pacific Ocean, but is nevertheless influenced by maritime air carried east by the prevailing westerly winds. The maritime influence is strongest in the northern part of the State with wet winters and dry summers. Eastern Idaho's climate is more continental in character than the western and northern portions of the State and is instead characterized as a semiarid steppe with dry winters and wet summers. Temperature patterns in the State are influenced by latitude and elevation. Precipitation patterns in Idaho are complex, with most of the moisture coming from the Pacific Ocean. Snowfall is affected by elevation and moisture availability with major mountain ranges accumulating deep snow in the winter. Floods occur most often during the spring snowmelt, but there are out-of-season floods. Fog events are extremely variable in frequency. Windstorms are not uncommon, but Idaho has no hurricanes and an extremely small incidence of tornadoes. The annual percentage of possible sunshine ranges from about 50 percent in the north to about 70 percent in the south, with lower frequencies in the winter and up to near 80 percent during July and August in the east and north (NCDC, 2009a).

3.5.1.2 Proposed EREF Site

The proposed EREF site lies in the middle of the Eastern Snake River Plain (ESRP), a broad, flat river valley running southwest to northeast for about 80 kilometers (50 miles). The average elevation of the valley is about 1524 meters (5000 feet) mean sea level (MSL), and it is bordered by mountain ranges rising to about 3353 meters (11,000 feet) MSL. The orientations of the valley and the bordering mountains have a significant impact on the wind flow patterns at the proposed EREF site. Air masses typically move from west to east and lose their moisture over the mountains to the west before reaching the ESRP. Thus, rainfall is generally light and the region is semiarid. The temperature regime is moderate. There is little cloud cover and generally large diurnal temperature variation (AES, 2010).

3.5.2 EREF Site Meteorology

Four National Weather Service (NWS) stations in the vicinity of the proposed EREF produce meteorological data that are generally representative of conditions at the proposed EREF site:

- Kettle Butte (KET),
- Idaho National Laboratory (MFC),
- Idaho Falls 46 West (ID46W), and
- Idaho Falls 2 ESE (ID2ESE), an urban location.

These stations are all located in the ESRP, and are shown in Figure 3-8. These are the closest NWS monitoring stations to the proposed EREF site; weather data collected at these sites is therefore most representative of weather that can be expected at the proposed EREF site.

3.5.2.1 Temperature

Figure 3-9 presents monthly mean temperature data for all four meteorological stations. Temperature trends throughout the year are similar at all four stations. During July and August, the monthly average temperatures at MFC and KET are higher than at the other two stations, and the monthly average temperature is always lowest at ID46W (AES, 2010).

Table 3-3 tabulates more detailed, long-term data from NCDC for the ID46W (48 years of data) and ID2ESE (50 years of data) sites. Both stations show monthly average temperatures as being lowest in January and highest in July.[1] The smallest daily temperature range at both stations occurs in winter and the largest in summer, due to the more intense solar radiation experienced in summer. The urban ID2ESE station experiences a smaller daily variation in temperature than the rural ID46W station. The highest and lowest temperatures recorded at ID2ESE are 38°C (100°F) and –37°C (–34°F), and are 38°C (101°F) and –44°C (–47°F) at ID46W (AES, 2010).

3.5.2.2 Precipitation and Relative Humidity

<u>**Precipitation**</u>

Air masses approaching the proposed EREF site from the west must cross high mountain ranges, making the annual precipitation light. Table 3-4 presents normal and extreme precipitation data collected at the ID2ESE and ID46W monitoring stations. Showers and thundershowers occur in the summer. Spring and fall precipitation are generally showers or steady rain. Winter precipitation is usually snow (AES, 2010; NOAA, 2004a,b).

Annual average precipitation at ID2ESE is about 361 millimeters (14.2 inches) with a peak in May. The maximum monthly recorded precipitation is 116 millimeters (4.56 inches) in May 1993. Annual average precipitation at ID46W is less, about 224 millimeters (9 inches). The maximum monthly recorded precipitation is 118 millimeters (4.64 inches) in June 1995. There have been at least 10 months with no recorded precipitation in the 30-year period of record.

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[1] The monthly average temperature is –6.1°C (21.1°F) in January and 20.4°C (68.7°F) in July at ID2ESE, and –8.8°C (16.2°F) in January and 19.8°C (67.6°F) in July at ID46W.

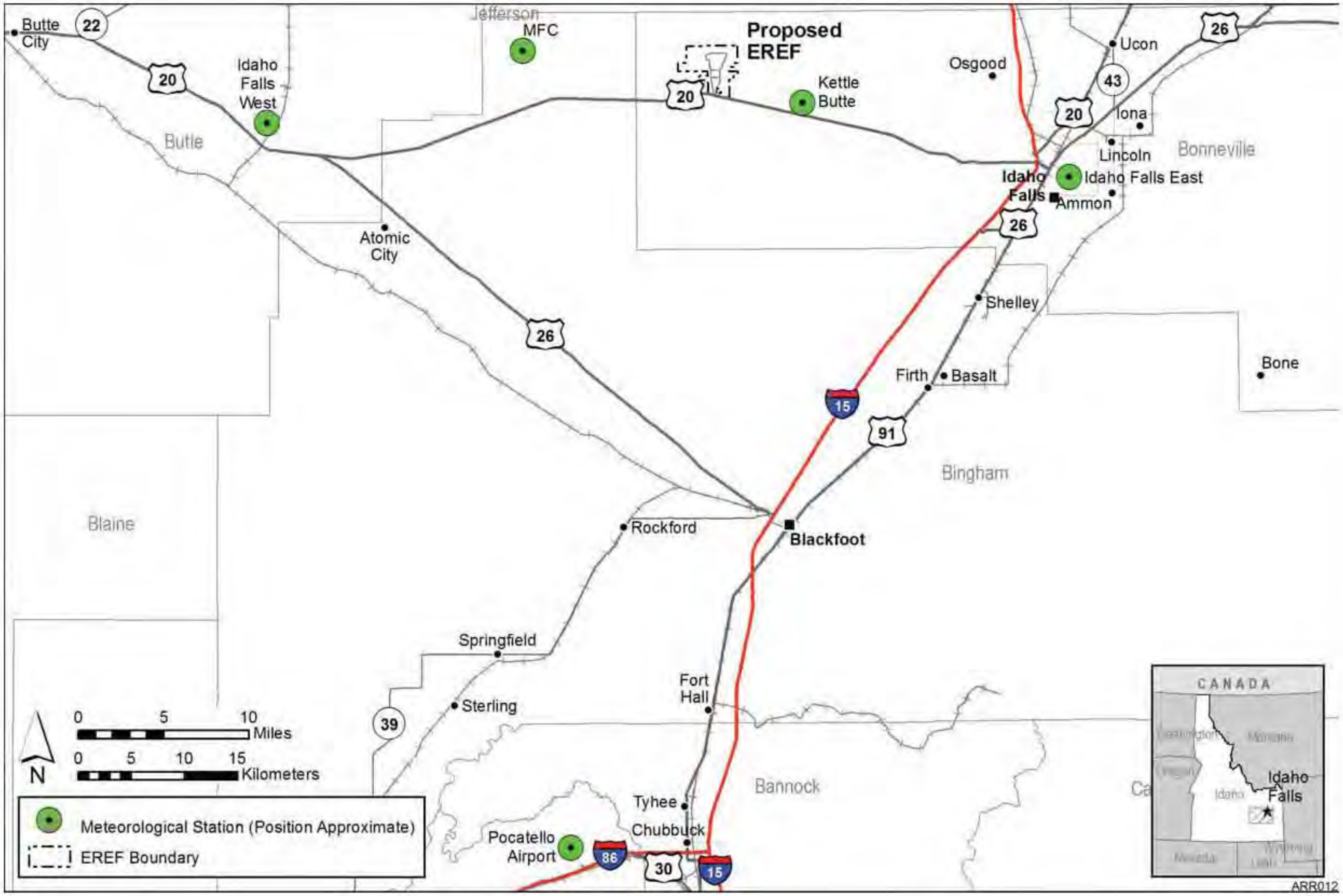

Figure 3-8 Meteorological Monitoring Stations near the Proposed EREF Site

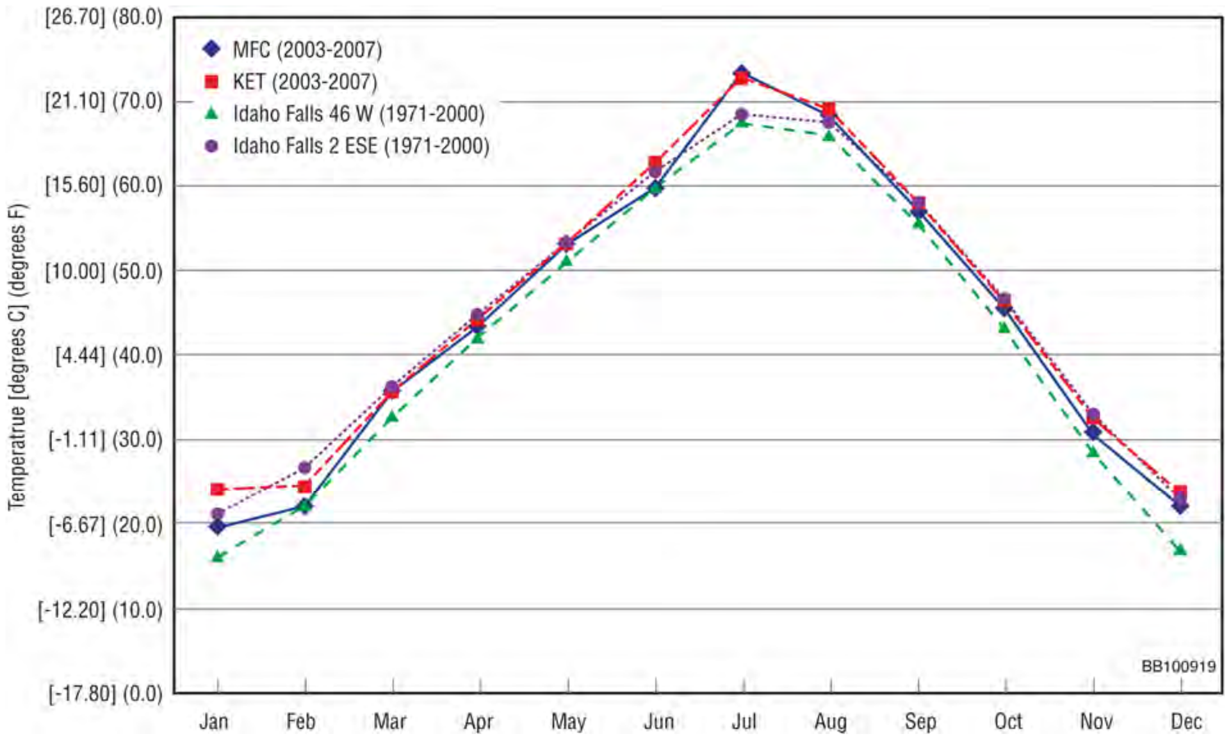

Figure 3-9 Monthly Mean Temperatures in the Vicinity of the Proposed EREF Site (AES, 2010)

Figure 3-10 compares monthly mean precipitation at the four nearby stations (the data for MFC and KET are from 2003 to 2007 and are not concurrent with the 1971–2000 record for the other two sites. All four stations have higher precipitation in the spring (April–June) with a second increase in October at MFC and KET. IDESE2 always has the highest precipitation (AES, 2010; NOAA, 2004a,b).

Based on hourly data for KET and MFC for 2003–2007, precipitation occurs only 3 percent of the time and is mostly less than 2.5 millimeters (0.1 inch) (AES, 2010).

Annual average snowfall at ID2ESE is 833 millimeters (32.8 inches) with a highest daily snowfall of 254 millimeters (10 inches) that has occurred at least twice during the 39 years from January 1950 through December 1988. The highest monthly snowfall was 572 millimeters (22.5 inches) in December 1994. Annual average snowfall at ID46W is 637 millimeters (25.1 inches) with a highest daily snowfall of 218 millimeters (8.6 inches). The highest monthly snowfall was 566 millimeters (22.3 inches) in December 1971 (NOAA, 2004a,b).

Relative Humidity

Table 3-5 presents monthly and annual average relative humidity data for ID46W for the period 1956–1961. Relative humidity is higher in the winter and lower in the summer. Values of 100 percent have been observed in all months except July. During the day, the highest relative humidity generally occurs near sunrise, and the lowest in mid-afternoon (Clawson et al., 1989).

Table 3-3 Mean, Average, and Extreme Temperatures near the Proposed EREF Site

Station	Temperature[a]	POR[b]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Idaho Falls 2 ESE (ID2ESE)	Extreme highest	1952–2001	55.0	63.0	75.0	85.0	92.0	100.0	100.0	100.0	95.0	87.0	73.0	60.0	100.0
			12.8	17.2	23.9	29.4	33.3	37.8	37.8	37.8	35.0	30.6	22.8	15.6	37.8
	Mean maximum	1971–2000	29.7	36.6	47.6	58.7	67.9	77.8	86.0	85.8	75.1	61.4	43.0	31.3	58.4
			–1.3	2.6	8.7	14.8	19.9	25.4	30.0	29.9	23.9	16.3	6.1	–0.4	14.7
	Average	1971–2000	21.1	26.7	36.2	45.0	53.3	61.9	68.7	67.9	58.2	46.8	33.1	22.4	45.1
			–6.1	–2.9	2.3	7.2	11.8	16.6	20.4	19.9	14.6	8.2	0.6	–5.3	7.3
	Mean minimum	1971–2000	12.5	16.8	24.8	31.3	38.7	46.0	51.4	49.9	41.3	32.2	23.2	13.4	31.8
			–10.8	–8.4	–4.0	–0.4	3.7	7.8	10.8	9.9	5.2	0.1	–4.9	–10.3	–0.1
	Extreme lowest	1952–2001	–29.0	–34.0	–15.0	9.0	20.0	28.0	34.0	31.0	18.0	7.0	–12.0	–29.0	–34.0
			–33.4	–36.7	–26.1	–12.8	–6.7	–2.2	1.1	–0.6	–7.8	–13.9	–24.4	–33.7	–36.7
Idaho Falls 46 W	Extreme highest	1954–2001	51.0	60.0	73.0	86.0	91.0	100.0	101.0	101.0	96.0	87.0	67.0	57.0	101.0
			10.6	15.6	22.8	30.0	32.8	37.8	38.3	38.3	35.6	30.6	19.4	13.9	38.3
	Mean maximum	1971–2000	27.9	34.0	44.8	56.9	66.3	76.8	86.6	85.7	74.6	60.9	41.4	29.4	57.1[c]
			–2.3	1.1	7.1	13.8	19.1	24.9	30.3	29.8	23.7	16.1	5.2	–1.4	13.9
	Average	1971–2000	16.2	22.1	32.8	42.4	51.2	60.0	67.6	66.2	55.7	43.4	28.7	17.1	42.0
			–8.8	–5.5	0.4	5.8	10.7	15.6	19.8	19.0	13.2	6.3	–1.8	–8.3	5.6
	Mean minimum	1971–2000	4.5	10.2	20.7	27.9	36.1	43.2	48.5	46.7	36.8	25.9	15.9	4.8	26.8[c]
			–15.3	–12.1	–6.3	–2.3	2.3	6.2	9.2	8.2	2.7	–3.4	–8.9	–15.1	–2.9
	Extreme lowest	1954–2001	–40.0	–36.0	–28.0	6.0	13.0	23.0	28.0	24.0	12.0	1.0	–24.0	–47.0	–47.0
			–40.0	–37.8	–33.3	–14.4	–10.6	–5.0	–2.2	–4.4	–11.1	–17.2	–31.1	–43.9	–43.9

[a] For each temperature, the first line gives the temperature in °F, the second in °C.
[b] POR: Period of Record.
[c] Average of the twelve monthly means.
Source: NOAA, 2004a,b.

Table 3-4 Monthly Precipitation near the Proposed EREF Site

Station	Total[a]	POR[b]	Monthly Precipitation												
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
Idaho Falls 2 ESE	Highest	1952–2001	2.38	3.13	4.30	2.82	4.56	3.16	2.13	2.66	2.81	2.49	3.20	3.18	
			60.45	79.50	109.22	71.63	115.82	80.26	54.10	67.56	71.37	63.25	81.28	80.77	
	Average	1971–2000	1.25	1.01	1.33	1.27	2.01	1.18	0.74	0.93	0.94	1.12	1.17	1.26	14.21
			31.75	25.65	33.78	32.26	51.05	29.97	18.80	23.62	23.88	28.45	29.72	32.00	360.93
	Lowest	1952–2001	0.22	0.00	0.04	0.20	0.33	0.15	0.00	0.07	0.00	0.00	0.00	0.00	
			5.59	0.00	1.02	5.08	8.38	3.81	0.00	1.78	0.00	0.00	0.00	0.00	
Idaho Falls 46 W	Highest	1954–2001	1.20	2.36	2.03	1.99	2.34	4.64	2.29	1.13	2.08	1.67	1.74	1.91	
			30.48	59.94	51.56	50.55	59.44	117.86	58.17	28.70	52.83	42.42	44.20	48.51	
	Average	1971–2000	0.64	0.62	0.69	0.79	1.24	1.08	0.66	0.44	0.73	0.57	0.69	0.67	8.82
			16.26	15.75	17.53	20.07	31.50	27.43	16.76	11.18	18.54	14.48	17.53	17.02	224.03
	Lowest	1954–2001	0.01	0.00	0.00	0.00	0.31	0.01	0.00	0.02	0.00	0.00	0.00	0.00	
			0.25	0.00	0.00	0.00	7.87	0.25	0.00	0.51	0.00	0.00	0.00	0.00	

[a] For each statistic, the first line gives the precipitation in inches, the second in millimeters.
[b] POR: Period of Record.
Source: NOAA, 2004a,b.

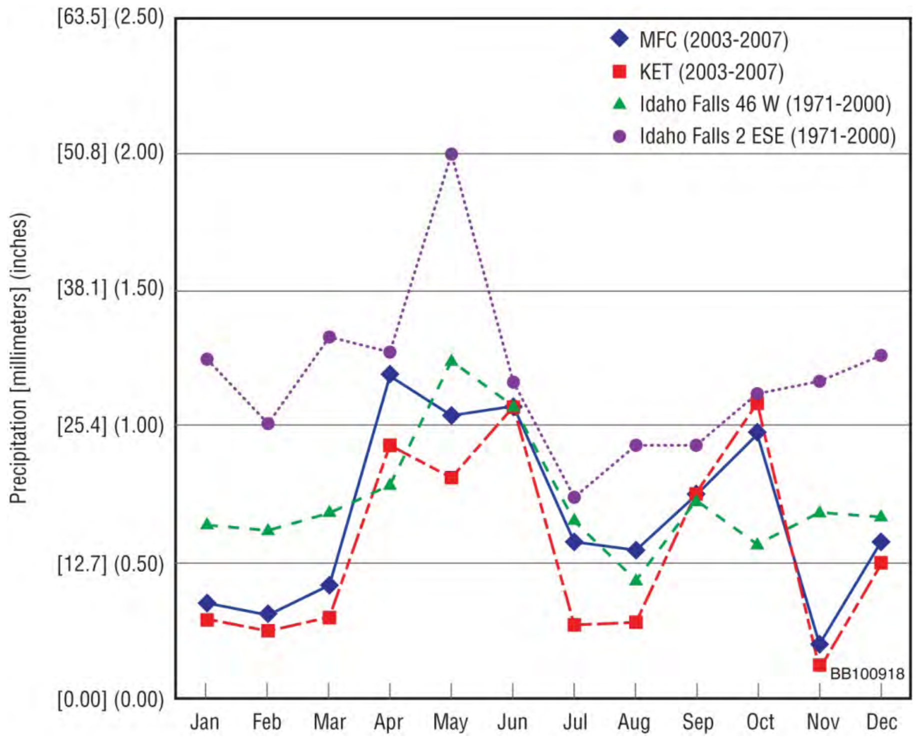

Figure 3-10 Monthly Mean Precipitation in the Vicinity of the Proposed EREF Site (AES, 2010; NOAA, 2004a,b)

3.5.2.3 Winds, Atmospheric Stability, and Temperature Inversions

Winds

Several phenomena influence the wind patterns at the proposed EREF property. It is in the region of prevailing westerly winds that are channeled by the topography within and surrounding the ESRP to produce predominantly west-southwest or southwesterly winds. Some of the highest wind speeds are observed under these conditions. Drainage winds[2] also affect the wind flow at the proposed EREF site. On clear nights, air near the ground, including mountain slopes, cools rapidly and sinks downslope into the valley floor. On sunny days, an opposite flow develops as the air near the surface heats and rises.

This flow upslope is generally weaker than the downslope flow and is often masked by the channeled prevailing westerlies.

[2] Drainage winds, also sometimes called katabatic winds or fall winds, are winds that carry high-density air masses down the slope of a mountain from higher elevations. The air masses involved are generally cold with low relative humidity and can greatly influence local air circulation patterns.

Figure 3-11 presents an annual wind rose[3] for MFC based on data for 2004 to 2008. This wind rose clearly shows the channeling effect of local topography with winds predominately from the southwest and northeast.

Table 3-6 presents average monthly and annual wind speeds for ID46W and MFC. The ID46W data were taken at 6 meters (20 feet) above the ground, and the MFC data were taken at 10 meters (33 feet) above the ground. Since wind speed changes with height, extensive direct comparisons between monitoring stations are problematic. Average wind speeds are generally highest in the spring and lowest in winter. The KET site which has the highest monitor also has the highest wind speeds for each month and for the year. Table 3-7 shows the peak winds and the concurrent direction by month. At both sites, March is the month with the highest hourly wind speeds that range between 41 and 51 miles per hour (18 and 23 meters per second). The highest hourly winds blow from the southwest.

Table 3-5 Relative Humidity at ID46W

Month[a]	Average Relative Humidity (%)
January	68
February	70
March	58
April	44
May	46
June	36
July	30
August	31
September	38
October	48
November	60
December	68
Annual	50

[a] Based on 1956–1961.
Source: Clawson et al., 1989.

Atmospheric Stability

Atmospheric stability plays an important role in dispersing atmospheric emissions. Vertical motions and pollution dispersion are enhanced in unstable atmospheres and suppressed in stable atmospheres. Stability is usually classified by the Pasquill-Gifford stability classes ranging from A though G, which depend on solar insolation, wind speed, and cloud cover.

A-stability (most unstable) occurs in low winds with high incoming levels of solar radiation typically during the daytime. E-stability (slightly stable) and F-stability (moderately stable) conditions arise on clear nights with little wind. G-stability (extremely stable) generally occurs infrequently with very light winds and clear skies and is often included with F-stability. D-stability (neutral) conditions occur with higher wind speeds and/or greater cloud cover during both day and night.

Table 3-8 shows the frequency of unstable, neutral, and stable conditions for the station nearest the proposed site (Doty et al., 1976). The frequency data are presented as ranges rather than as point estimates. The best dispersion (unstable conditions) occurs 16–25 percent of the time, and poor dispersion (stable conditions) occurs 26–35 percent of the time.

[3] A *wind rose* summarizes wind speed and direction graphically as a circle displaying series of radial bars pointing in different directions. The direction of a bar shows the direction *from* which the wind blows. Each bar is divided into segments. Each segment represents wind speeds in a given range of speeds; for example, 6–8 meters per second. The length of a given segment represents the percentage of the summarized hours that winds blew from the indicated direction with a speed in the given range.

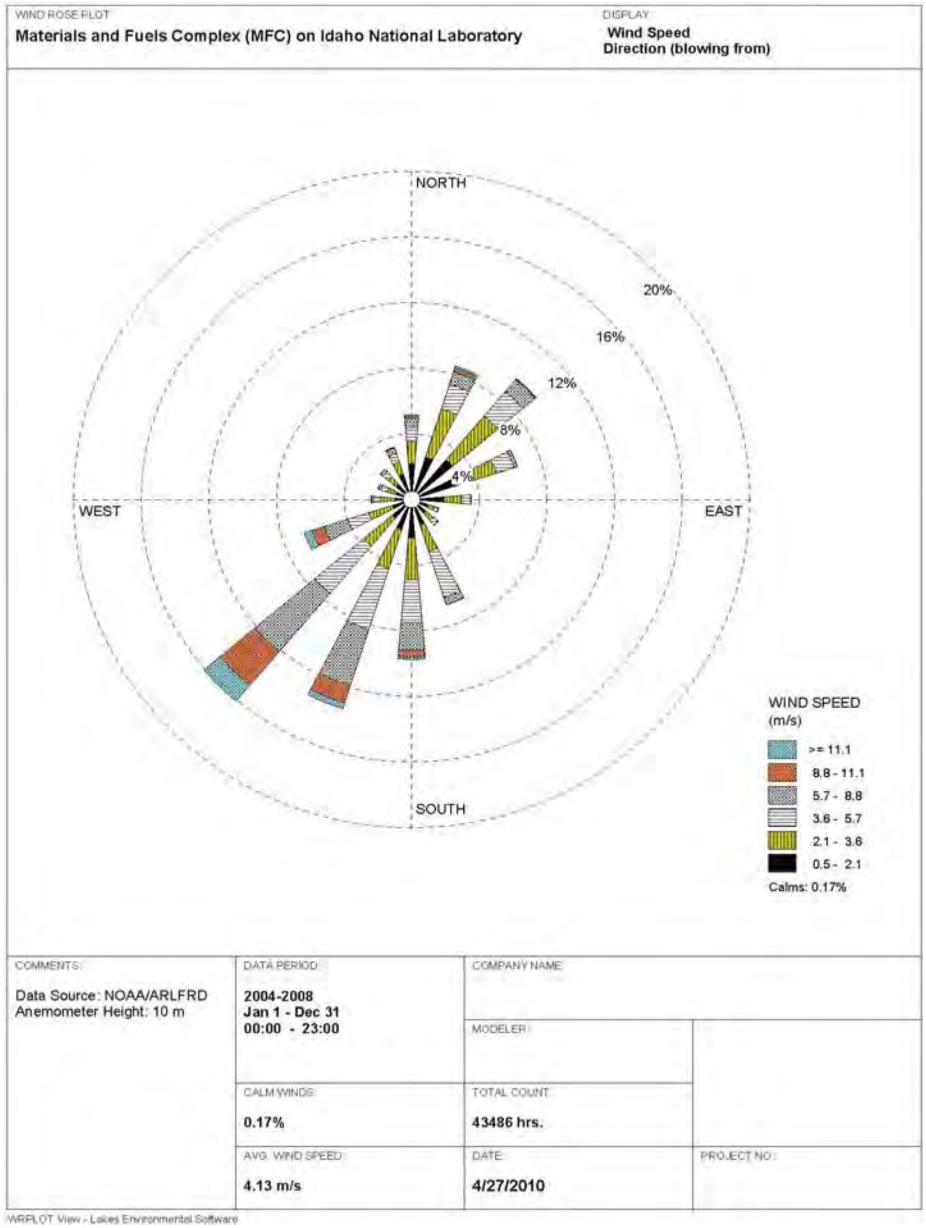

Figure 3-11 Wind Rose for MFC (data from Hukari, 2009)

Inversions

Normally, the temperature in the atmosphere decreases with altitude. A temperature inversion occurs when there is an increase in temperature of the air mass with increasing elevation above the ground (see Atmospheric Stability text box). Inversions limit vertical dispersion, causing pollutants to be trapped close to the ground. The length of time an inversion lasts (its persistence) is important for determining its impact on dispersion, and thus the ambient air quality in the area impacted by the inversion.

Table 3-9 summarizes inversion persistence for the MFC site for 1953 to 1960. The longest inversion for the 8-year period lasted 66 hours, and every month had at least one inversion lasting longer than 13 hours (Clawson et al., 1989).

Table 3-6 Average Monthly and Annual Wind Speeds near the Proposed EREF Site

Month	Wind Speed [mi/hr (m/sec)] ID46W[a]	MFC[b]
January	5.6 (2.5)	7.2 (3.2)
February	6.9 (3.1)	7.3 (3.2)
March	8.7 (3.9)	9.6 (4.3)
April	9.3 (4.2)	10.9 (4.9)
May	9.3 (4.2)	10.7 (4.8)
June	8.9 (4.0)	10.7 (4.8)
July	8.0 (3.6)	9.8 (4.4)
August	7.7 (3.4)	9.9 (4.4)
September	7.2 (3.2)	9.0 (4.0)
October	6.8 (3.0)	8.5 (3.8)
November	6.4 (2.9)	8.6 (3.9)
December	5.2 (2.3)	8.4 (3.8)
Annual	7.5 (3.4)	9.1 (4.1)

[a] 6-meter (20-foot) level for April 1950 to October 1964.
[b] 10 meters (33 feet) for 2004 to 2008.
Source: ID46W: Clawson et al., 1989; MFC: Hukari, 2009.

3.5.2.4 Severe Weather Conditions

The National Climatic Data Center (NCDC) storm event database tabulates storm events by county (NCDC, 2009b). Table 3-10 presents data from this database on various storm events in the four-county region comprised of Bonneville, Bingham, Butte, and Jefferson Counties. The proposed EREF property is entirely within Bonneville County but lies at the approximate centroid of these four counties. The following paragraphs discuss the most frequent storm events and identify additional classes of events documented in INL data (Clawson et al., 1989). There were no droughts, dust storms, hurricanes, tropical storms, waterspouts, or temperature-extreme events recorded in the NCDC data.

<u>**Thunderstorms and High Winds**</u>

NCDC (2009b) lists 236 thunderstorms and high wind days, or about 4.0 thunderstorms and high wind days per year, as having occurred during the period January 1, 1950, through December 31, 2008, in the four-county region. There may be several thunderstorms during a thunderstorm day. Storms can occur throughout the year but are most prevalent in the March to October period. Strong winds, hail, and tornadoes can accompany severe storms, but thunderstorms tend to be less severe than those east of the Rocky Mountains, as the associated precipitation often evaporates before reaching the ground (a meteorological phenomenon known as virga). Winds greater than 94 kilometers per hour (58 miles per hour) occurred on 147 of the days. Hail accompanied thunderstorms on 8 days.

<u>**Tornadoes**</u>

NCDC (2009b) lists 40 tornadoes during the period in the four-county region, giving an annual incidence of 0.68. One F2 tornado[4] was sighted during the period on April 7, 1978. It caused

[4] The Fujita six-point scale (F0 to F5) is used to rate the intensity of a tornado based on the damage it inflicts to structures and vegetation from the lowest intensity, F0, to the highest, F5. Fujitia scale categories are based on estimated (not measured) sustained wind speeds compared against observed structural damage. The enhanced Fujitia scale replaced the original Fujita scale in February 2007. The enhanced Fujita scale still uses six categories of tornado intensity (EF0 to EF5) but defines those categories differently. Overall, most tornadoes (around 77 percent) in the United States are EF0 or EF1 and about 95 percent are below EF3 in intensity. Approximately 0.1 percent of all tornadoes each EF5 status with sustained winds in excess of 200 mph (NOAA, 2008). For additional information about the Fujitia scales, see the NOAA Web site at http://www.spc.noaa.gov/efscale.

Table 3-7 Highest Hourly Wind Speed and Direction near the Proposed EREF Site

	ID46W[a]		MFC[b]	
Month	Speed [mi/hr(m/sec)]	Direction	Speed [mi/hr(m/sec)]	Direction
January	48 (21)	WSW	37 (17)	SSW/NNE[c]
February	36 (16)	SW	32 (14)	NNE
March	51 (23)	WSW	41 (18)	SW
April	39 (17)	WSW	11 (17)	SW
May	41 (18)	SW	34 (15)	SW
June	36 (16)	SW	35 (16)	SW
July	35 (16)	WSW	38 (17)	SW
August	40 (18)	WSW	36 (16)	SW
September	42 (19)	WSW	30 (13)	SSW
October	44 (20)	WSW	33 (15)	SSW
November	40 (18)	WSW	35 (16)	SW
December	43 (19)	SW	39 (17)	SSW
Annual	51 (23)	WSW	41 (18)	SW

[a] 6-meter (20-foot) level for April 1950 to October 1964.
[b] 10 meters (33 feet) for 2004 to 2008.
[c] Almost equal number of hours in both directions.
Source: ID46W: Clawson et al., 1989; MFC: Hukari, 2009.

$2.5 million in damage and one injury. Twenty of the tornadoes were F1 in strength; the remainder were F0.

In addition to tornadoes, 12 funnel clouds, violent atmospheric vortices that do not reach the ground, were sighted during the period in the four-county region.

Table 3-8 Stability Class Distribution near the Proposed Site

Stability	Frequency (%)
Unstable	16–25
Neutral	56–65
Stable	26–35

Source: Doty et al., 1976.

Airborne Dust and Sand

NCDC (2009b) lists no dust storms during the period in the four-county region. However, since the proposed EREF site is in a semiarid area, blowing and drifting dust could be a nuisance when winds are strong. Vehicles and construction equipment could also contribute to airborne dust.

Table 3-9 Inversion Persistence at MFC[a]

Month	Average Hours per Day	Max Hours per Day	Longest Duration (hr)
January	17.0	24	46
February	15.7	23	24
March	13.5	18	20
April	11.8	14	14
May	10.8	15	13
June	10.2	13	15
July	10.7	15	15
August	11.7	14	14
September	12.8	15	18
October	14.3	17	17
November	15.1	21	21
December	16.8	24	66

[a] Based on January 1953 to December 1960.
Source: Clawson et al., 1989.

Table 3-10 Storm Events in the Vicinity of the Proposed EREF Site

	Type and Number of Storm Event[a,b]								
County	Thunderstorms and High Winds	Tornados	Precipitation[c]	Snow and Ice[d]	Lightning	Funnel Cloud	Flood	Hail	Fog
Bonneville	48 (5)	5 (4)	6	4	4	4	3	22	1
Bingham	87 (20)	15 (8)	4	0	5	5	5	28	1
Butte	52 (1)	7 (2)	0	0	0	3	1	23	0
Jefferson	49 (3)	13 (9)	0	0	0	0	0	19	0
Total	236 (29)	40 (23)	10	4	9	12	9	92	2

[a] Period of Record: January 1, 1950, to May 31, 2009.
[b] Numbers in parentheses are number of events associated with property damage.
[c] All events were heavy rains.
[d] All events were snow.
Source: NCDC, 2009b.

Dust Devils

Dust devils are small rotating updrafts over hot land surfaces. Dust devils are common in the summer at the proposed EREF site when intense solar heating of the ground makes dust devil formation possible. Because of their relatively weak wind speeds and short duration, they rarely damage people or property (Clawson et al., 1989).

Blowing Snow

Blowing snow occurs when snow is picked up from the ground and entrained in the air by high winds. Blowing snow can reduce visibility and accumulate into drifts on the downwind side of buildings and other obstacles. The flat terrain around the proposed EREF is not conducive to the formation of snowdrifts. However, at INL to the immediate west, drifts may occasionally render parking lots and roads impassable and cause traffic to be rerouted (Clawson et al., 1989).

Floods

Of the nine listed flood events listed in NCDC (2009b), one was an urban event, one was a small stream event, three were combined urban/small stream events, and four were flash flood events.

Lightning

Lightning strikes can cause injury, death, and property damage. Of the nine events listed in NCDC (2009b) for the four-county region, none caused injury or death and five resulted in property damage. NOAA (2009) gives a lightning strike density for this area of 0.1 to 1 per square kilometer per year, a value at the lower end of the strike density range. The analysis presented in AES (2010) uses a more conservative density of one flash per square kilometer per year to estimate a lightning strike frequency of 0.75 flashes per square kilometer per year for the proposed EREF industrial complex (including the Cylinder Storage Pad).

3.5.2.5 Mixing Heights

The mixing height is defined as the height above the surface through which relatively vigorous vertical mixing occurs, primarily through the action of atmospheric turbulence. When the mixing height is low (i.e., very little vertical motion), ground-level pollutant concentrations will be relatively high because the pollutants are prevented from dispersing upward. Mixing heights commonly go through large diurnal variations due to solar heating and surface cooling. Mixing heights are generally lowest late at night or early in the morning and highest during mid to late afternoon. Afternoon mixing heights display a large seasonal variation, and mixing heights in summer are typically higher than those in winter.

Table 3-11 presents seasonal and annual mixing heights estimated at INL (Clawson et al., 1989). The mixing height is greatest on summer afternoons and least on summer mornings. The average annual mixing height is 370 meters (1210 feet) in the morning and 2090 meters (6860 feet) in the summer.

3.5.3 Air Quality

Table 3-11 Estimated Seasonal and Annual Mixing Heights in the Vicinity of the Proposed EREF Site

	Estimated EREF Average Mixing Heights [m (ft)]	
Season	**Morning**	**Afternoon**
Spring	480 (1600)	2330 (7640)
Summer	260 (850)	2900 (9510)
Autumn	330 (1100)	1550 (5100)
Winter	400 (1300)	730 (2400)
Annual	370 (1210)	2090 (6860)

Source: Clawson et al., 1989.

There are several U.S. Environmental Protection Agency (EPA) programs authorized by the *Clean Air Act* and its amendments that define the regulatory environment for air emission sources at the proposed EREF property. The Idaho Department of Environmental Quality (IDEQ) has authority to administer these programs in the State. The major programs are summarized below.

EPA's National Ambient Air Quality Standards (NAAQS) set maximum levels of air pollutants in the ambient air deemed to provide protection for human health and welfare. Areas where these standards are not being met are designated as nonattainment areas. When a nonattainment area attains the standard, it becomes a maintenance area. States must develop Federally approved plans specifying how the NAAQS will be attained and maintained. NAAQS are shown in Table 3-12.

Sulfur dioxide (SO_2) is a gas emitted largely by stationary internal or external combustion sources burning fossil fuels. Particulate matter (PM) includes solid matter and liquid droplets in the atmosphere. Particles with aerodynamic diameters below 10 micrometers (1 micrometer is about 0.000039 inch) constitute PM_{10}. Smaller particles with diameters below 2.5 micrometers constitute $PM_{2.5}$. Carbon monoxide (CO) is a gas produced primarily by the incomplete combustion of carbon in fuels; vehicles and stationary internal combustion engines emit most of the carbon monoxide. Nitrogen dioxide (NO_2) is a gas formed primarily when using fuels containing nitrogen, or when the temperatures of combustion are high enough to thermally degrade the otherwise inert nitrogen molecules in the stream of ambient air used to support the combustion. In the presence of sunlight, NO_2 reacts with volatile organic compounds (VOCs) in the atmosphere to produce ozone (O_3). Lead is a metal that can be emitted by some stationary combustion sources (as the stable oxide).[5]

In areas with pollutant levels below the NAAQS, the Prevention of Significant Deterioration (PSD) Program (40 CFR 52.21) places limits on the total allowable increases in ambient pollutant levels above established baseline levels for SO_2, NO_2, and PM_{10}. This prohibits "polluting up to the limits" specified in the NAAQS for these pollutants. Under these regulations, the allowable increases are smallest in Class I areas (e.g., national parks and wilderness areas) where the air quality value of visibility must be preserved. The rest of the country is subject to larger Class II increments.

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[5] Until 1976, a major source of lead in the atmosphere resulted from the combustion of leaded gasoline. Tetraethyl lead was used as an anti-knock and octane-boosting gasoline additive between the years 1930 and 1976.

Table 3-12 National Ambient Air Quality Standards[a]

Pollutant[b]	Averaging Time	Standard Value		Standard Type[c]
SO_2	3 h	0.5 ppm	(1300 $\mu g/m^3$)	S
	24 h	0.14 ppm	(365 $\mu g/m^3$)	P
	Annual arithmetic mean	0.030 ppm	(80 $\mu g/m^3$)	P
NO_2	Annual arithmetic mean	0.053 ppm	(100 $\mu g/m^3$)	P, S
CO	1 h	35 ppm	(40 mg/m^3)	P
	8 h	9 ppm	(10 mg/m^3)	P
O_3	1 h	0.12 ppm[d]	(235 $\mu g/m^3$)	P, S
	8 h	0.075 ppm	(157 $\mu g/m^3$)	P, S
PM_{10}	24 h	150 $\mu g/m^3$		P, S
$PM_{2.5}$	24 h	35 $\mu g/m^3$ [e]		P, S
	Annual	15.0 $\mu g/m^3$		P, S
Lead	Calendar quarter[f]	1.5 $\mu g/m^3$		P, S

[a] Refer to 40 CFR Part 50 for detailed information on attainment determination and reference method for monitoring (refer to http://www.gpoaccess.gov/cfr/index.html).

[b] CO = carbon monoxide; NO_2 = nitrogen dioxide; O_3 = ozone; $PM_{2.5}$ = particulate matter $\leq$ 2.5 μm; PM_{10} = particulate matter $\leq$10 μm; and SO_2 = sulfur dioxide.

[c] P = primary standards, which set limits to protect public health; S = secondary standards, which set limits to protect welfare and quality of life.

[d] On June 15, 2005, the 1-hour O_3 standard was revoked for all areas except the 8-hour O_3 nonattainment Early Action Compact areas (those do not yet have an effective date for their 8-hour designations). The 1-hour standard will be revoked for these areas 1 year after the effective date of their designation as attainment or nonattainment for the 8-hour O_3 standard.

[e] Effective December 17, 2006, EPA revoked the annual PM_{10} standard of the current 50 $\mu g/m^3$ and revised the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$.

[f] On October 15, 2008, the EPA revised the lead standard from a calendar-quarter average of 1.5 $\mu g/m^3$ to a rolling 3-month average of 0.15 $\mu g/m^3$.

Source: 40 CFR Part 50; 40 CFR 52.21 (for PSD).

Idaho has promulgated State Ambient Air Quality Standards (SAAQS) under analogous State authority (see *Idaho Administrative Procedures Act* [IDAPA] 58.01.01.577).[6] Standards for SO_2, NO_2, CO, 1-hour O_3, PM_{10}, and lead are substantively identical to the NAAQS. However, Idaho has not established standards for 8-hour O_3 or $PM_{2.5}$. The State has also adopted standards for fluorides.[7] EPA has granted IDEQ authority to implement the Federal program.

Section 112 of the *Clean Air Act* specifies a list of 188 air toxics. EPA has issued National Emission Standards for Hazardous Air Pollutants (NESHAP) requiring control of sources of these pollutants. These standards are based on an emission control technology, rather than being derived from a health-based approach; but an assessment of the health risk remaining after the emission controls are in place is still required.

3.5.3.1 Regional Air Quality

IDEQ (2007a) summarizes Idaho ambient air monitoring data through 2007: most areas of the State are well within the NAAQS. Isolated areas are nonattainment for PM_{10} and are areas of concern for $PM_{2.5}$. One area in the far western part of the State is a maintenance area for CO and PM_{10}. The locations of the above noted areas, as well as the Class I areas, are shown on Figure 3-12.

Ambient air quality data for Bonneville County for calendar year 2008 include the following: CO, 35 ppm (1-hour average), 9 ppm (8-hour average); NO_2, 0.053 ppm (annual mean).

3.5.3.2 Criteria Pollutant Emissions

Table 3-13 presents 2005 emissions of criteria pollutants from the four counties including and surrounding the proposed EREF site (Bingham, Bonneville, Butte, and Jefferson) (IDEQ, 2009). Emissions of all pollutants are dominated by nonpoint and mobile sources. There were 11 facilities in the point emissions inventory in Bingham, Butte, and Jefferson Counties. (These are traditional stationary sources rather than mobile or area source like wind-blown dust.) Eight were associated with activities at INL located in Bingham, Butte, and Jefferson Counties, and the other three were food processing facilities.

Table 3-14 presents 2005 emissions of air toxics in excess 9.1 metric tons per year (i.e., >10 tons per year) from the four counties surrounding the proposed EREF. (Single sources emitting 10 tons per year or more of an air toxic are defined as major and are subject to more stringent emission limits than smaller sources.) Other inventoried air toxics were emitted in lesser amounts.

Idaho does not require sources to report emissions of greenhouse gases. In response to the *Consolidated Appropriations Action of 2008* (Public Law 110-161), EPA promulgated final mandatory greenhouse gas reporting regulations on October 30, 2009, that became effective in December 2009 (EPA, 2009a). The rules are applicable to major sources of CO_2, defined as

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[6] Idaho regulations, “Rules for the Control of Air Pollution in Idaho,” can be accessed at http://www.deq.idaho.gov/air/data_reports/monitoring/overview.cfm.

[7] There is no Federal standard for fluorides. Idaho SAAQS for fluoride include 80 ppm monthly, 60 ppm bimonthly, and 40 ppm annual arithmetic mean. See IDAPA 58.01.01.577.06.

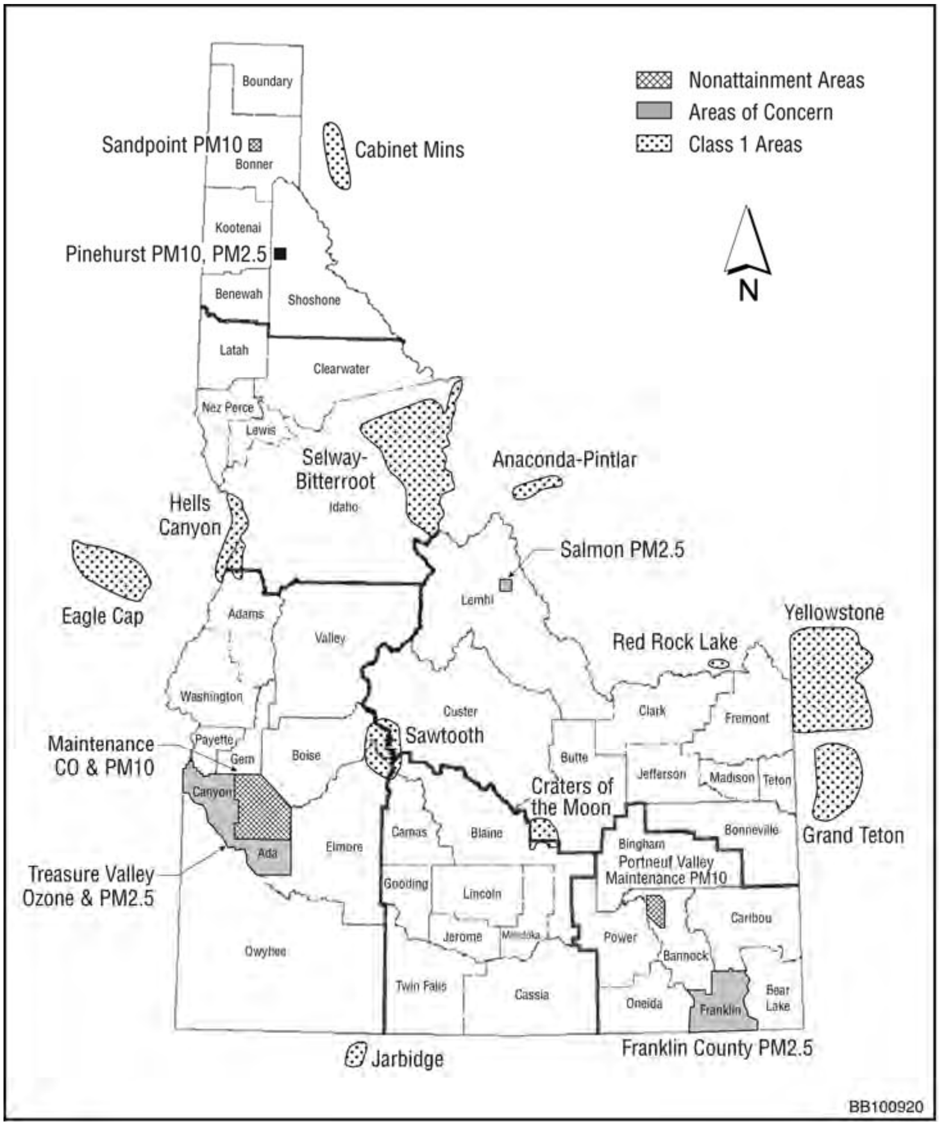

Figure 3-12 Idaho Air Quality Planning Areas (IDEQ, 2007b; Richards, 2009a,b)

Table 3-13 Emissions from the Four Counties Closest to the Proposed EREF Site[a]

2005 Annual Emissions [10^3 metric tons/yr (10^3 tons/yr)]					
PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC
69 (76)	0.58 (0.64)	1.3 (1.4)	7.1 (7.8)	65 (72)	12 (13)

[a] Bingham, Bonneville, Butte, and Jefferson Counties.
Source: IDEQ, 2009.

Table 3-14 Air Toxics Emissions from the Four Counties Closest to the Proposed EREF Site[a,b]

Pollutant	2005 Annual Emissions [metric tons/yr (tons/yr)]
Formaldehyde	220 (240)
Methanol	56 (62)
Benzene	200 (220)
Methyl bromide	44 (49)
Chloromethane	1000 (1100)
Hydrogen cyanide	12 (14)
Acetaldehyde	110 (120)
Methyl ethyl ketone	17 (18)
Trichloroethylene	210 (231)
2,4-D	25 (28)
Styrene	14 (15)
1,3-Butadiene	38 (42)
Acrolein	49 (54)
Methyl isobutyl ketone	40 (44)
Toluene	170 (190)
Chlorobenzene	10 (11)
Hexane	53 (58)
Tetrachloroethylene	53 (58)
Carbonyl sulfide	27 (30)
1,3-Dichloropropene	160 (180)
Xylene (mixed isomers)	57 (63)
Trifluralin	9.5 (10)
Hydrochloric acid	11 (12)
Hydrofluoric acid	28 (31)
Chlorine	11 (12)

[a] Bingham, Bonneville, Butte, and Jefferson Counties.
[b] Only pollutants with total emissions above 9 metric tons/yr (10 tons/yr) are listed.
Source: IDEQ, 2009.

those emitting more than 25,000 tons per year, and require annual reporting of greenhouse gas emissions directly to EPA.

3.5.3.3 Nonattainment and Maintenance Areas

Information in the section was compiled from IDEQ (2007a,b) and Richards (2009a,b). The areas discussed are shown in Figure 3-12.

The proposed EREF site is not located in, or in close proximity to, a nonattainment or maintenance area for any NAAQS.

There are no nonattainment or maintenance areas for lead, sulfur dioxide, or nitrogen dioxide.

Idaho is in attainment for CO, while a portion of Ada County remains a maintenance area.

The areas of Sandpoint and Pinehurst in far northern Idaho present PM issues. Idaho will submit a maintenance plan to EPA for Sandhurst this year. Pinehurst remains nonattainment for PM_{10}. A portion of Ada County and Bannock County (the Portneuf Valley) are maintenance areas for PM_{10}. Portneuf Valley, the closest nonattainment or maintenance area to the proposed EREF site, is located about 56 kilometers (35 miles) south. The Fort Hall area in Power County next to the Portneuf Valley is also designated as nonattainment for PM_{10}.

All of Idaho was designated attainment/unclassifiable for $PM_{2.5}$ in 2007. The State will probably recommend that EPA designate Pinehurst County and a portion of Franklin County as nonattainment for $PM_{2.5}$ (IDEQ, undated).

There are no nonattainment or maintenance areas for ozone in Idaho. However, Treasure Valley is close to the new standard and may go into nonattainment when the 2008 monitoring data are analyzed.

The U.S. Department of Energy (DOE) conducts ambient air monitoring for PM_{10} and NO_2 at various locations within and surrounding its INL, which is located proximate to the proposed EREF site (DOE, 2005).[8] PM_{10} monitoring is performed at the INL site boundary and in the surrounding communities of Rexburg, Blackfoot, and Atomic City. In 2003, 60 samples collected at Rexburg ranged from 0.42 to 153.9 micrograms per cubic meter, 60 samples collected at Blackfoot ranged from 1.3 to 173.7 micrograms per cubic meter, and 59 samples collected at Atomic City ranged from 0.7 to 73.0 micrograms per cubic meter. NO_2 monitoring is performed at two locations on INL. In 2003, both locations showed NO_2 levels well below the ambient standard of 0.053 ppm (53 parts per billion [ppb]). Quarterly mean concentrations at the first location ranged from 2.9 to 3.9 ppb with an annual mean of 3.5 ppb. Quarterly mean values at the second monitoring station ranged from 7.4 to 10.7 ppb with a mean annual concentration of 9.1 ppb (based on two quarters of data).

[8] The INL monitoring sites are used to measure INL's impact on its local environment and to demonstrate INL's compliance with applicable regulations, DOE orders, standards, and permit conditions. They are not part of the official monitoring network maintained by the State of Idaho with which conformance to NAAQS is demonstrated and ambient air quality status is established.

In 2006, the last year for which full yearly data are available,[9] PM_{10} 24-hour samples collected at the above three monitoring stations showed the following concentration ranges: Rexburg, 0.0–44.8 micrograms per cubic meter; Blackfoot, 0.3–50.1 micrograms per cubic meter; and Atomic City, 0.0–66.1 micrograms per cubic meter (DOE, 2007). These data indicate that the counties surrounding the proposed EREF site were in attainment with all NAAQS over the period the monitoring was performed.

3.5.3.4 Prevention of Significant Deterioration (PSD)

Figure 3-12 shows the Class I areas in and around Idaho. These areas are of special concern because of the small air quality increments that apply in them and because sources impacting them may need to consider visibility impacts and "air quality-related values." The following are the closest Class I areas to the proposed EREF site (NPS, 2007):

- Craters of the Moon National Monument and Preserve, about 75 kilometers (47 miles) to the west;
- Red Rock Lakes National Wildlife Refuge, about 95 kilometers (59 miles) to the north-northeast;
- Yellowstone National Park, about 105 kilometers (65 miles) to the northeast; and
- Grand Teton National Park, about 105 kilometers (65 miles) to the east.

All areas are Class II unless they are one of the listed Class I areas; no areas have requested redesignation to Class III. The proposed EREF site is not one of these Class I areas and retains the PSD Class II designation.

3.5.3.5 Conformity

Actions involving major Federal involvement may need to demonstrate that they conform to the State's implementation plan. Conformity applies only if the action will take place in a nonattainment or maintenance area. Since the proposed EREF site is not in such an area, conformity would not apply.

3.6 Geology, Minerals, and Soils

This section describes the regional and local geology and identifies the characteristics of the soil, mineral, and energy resources at the proposed EREF site. While the NRC staff's process for reviewing the license application includes an examination of the applicant's seismic and volcanic hazards assessment and the structural design of the proposed EREF, the discussion of geology in this section is not intended to support a detailed safety analysis. The NRC staff documented its analysis of seismic and volcanic hazards in its Safety Evaluation Report (SER) (NRC, 2010).

9 PM_{10} monitoring was discontinued at these three locations in March 2007 because the results were no longer required to demonstrate INL compliance.

Figure 3-13 shows a geologic time scale to depict when different geologic units formed, as described in the following sections.

3.6.1 Regional Geology

The proposed EREF site is located on the East Snake River Plain (ESRP), within the ESRP physiographic province (Figure 3-14). The ESRP is an east-northeast trending 600-kilometer (373-mile)-long and 100-kilometer (62-mile)-wide topographic depression extending from Twin Falls to Ashton, Idaho. The predominant physiographic features of the ESRP province are Quaternary-age volcanic landforms: basaltic lava flows, shield volcanoes, and rhyolitic domes. These landforms, along with other eruptive features (e.g., dikes and pyroclastic domes), are concentrated along a northeast-trending axial volcanic zone. That zone constitutes the topographically high central axis of the ESRP. The ESRP is bounded on the north and south by the north-to-northwest trending mountains of the northern Basin and Range physiographic province. The mountain peaks, reaching heights of 3660 meters (12,000 feet), are separated by basins filled with terrestrial sediments and volcanic rocks. The basins are 5 to 20 kilometers (3 to 12 miles) wide and grade onto the ESRP. The Yellowstone Plateau lies to the northeast of the ESRP (Hughes et al., 1999; DOE, 2005).

The upper 1 to 2 kilometers (0.62 to 1.2 miles) of the ESRP is composed of numerous basaltic lava flows with intercalated sediment. Several volcanic rift zones, each with a northwestern trend, cut across the ESRP and have been identified as the source areas for these lava flows (Figure 3-15). The volcanic rift zone orientations are the result of basalt dikes that intruded perpendicular to the northeast-southwest direction of crustal extension associated with the Basin and Range province, located to the north and south of the ESRP. Widespread basaltic volcanic activity occurred intermittently on the ESRP throughout the Pleistocene and Holocene. The most recent episode of basaltic volcanism occurred about 2000 years ago in the Great Rift volcanic rift zone to the west. Volcanism on the ESRP is a result of the movement of the North American tectonic plate southwestwardly over the Yellowstone mantle plume or hotspot (Hughes et al., 1999; DOE, 2005; Anderson et al., 1996; Smith, 2004).

Figure 3-16 shows the stratigraphy of the ESRP in the vicinity of the proposed EREF site. The ESRP is underlain by Quaternary and Tertiary age basaltic lava interbedded with poorly consolidated sedimentary materials to depths of 2 kilometers (1.2 miles). The thickness of most individual basalt flows in the upper part of the section ranges from 5 to 25 meters (16 to 82 feet), and their lengths extend up to 48 kilometers (30 miles). Sediments consist of materials deposited by streams (silts, sands, and gravels), lakes (clays, silts, and sands), and wind (silts and sands) that accumulated on the ESRP between volcanic events. During long periods of inactivity, sediments accumulated to thicknesses greater than 60 meters (197 feet). These interbedded sequences are collectively known as the Snake River Group. Underlying the Snake River Group is a thick sequence of Tertiary rhyolitic (silicic volcanic) rocks that erupted when the area was over the Yellowstone hotspot, more than 4 million years ago. The last 4 million years have been a period of crustal subsidence within the ESRP as it isostatically adjusts to the mass of dense mantle-derived basalt (gabbro) that now comprises the middle crust. Because temperatures in the upper mantle below the ESRP remain relatively high, partial melting of mantle material continues to produce basaltic magmas that rise to the surface and erupt as lavas that fill the subsiding basin (Hughes et al., 1999; DOE, 2005; Ackerman et al., 2006; Smith, 2004).

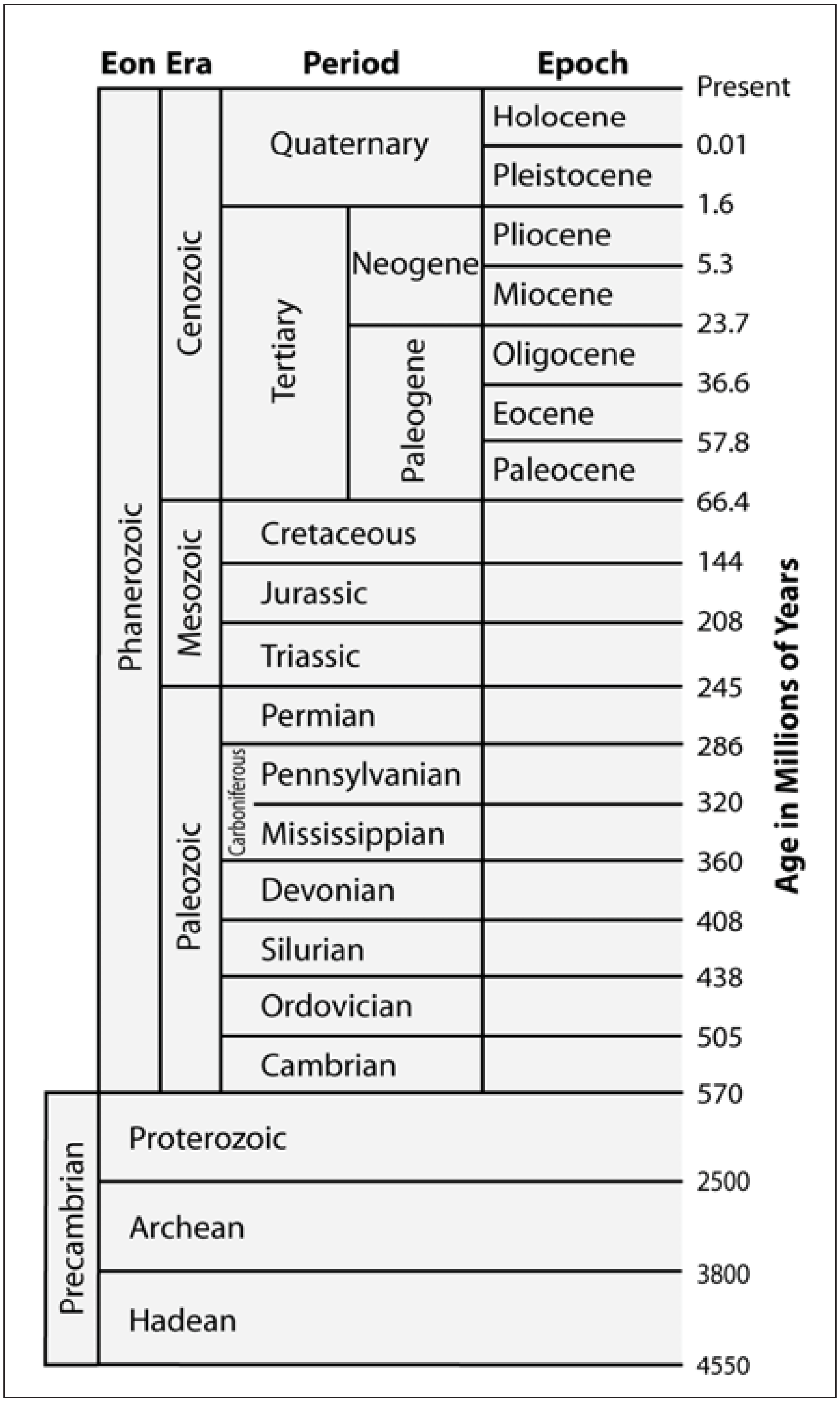

Figure 3-13 Geologic Time Scale (USGS, 2009a)

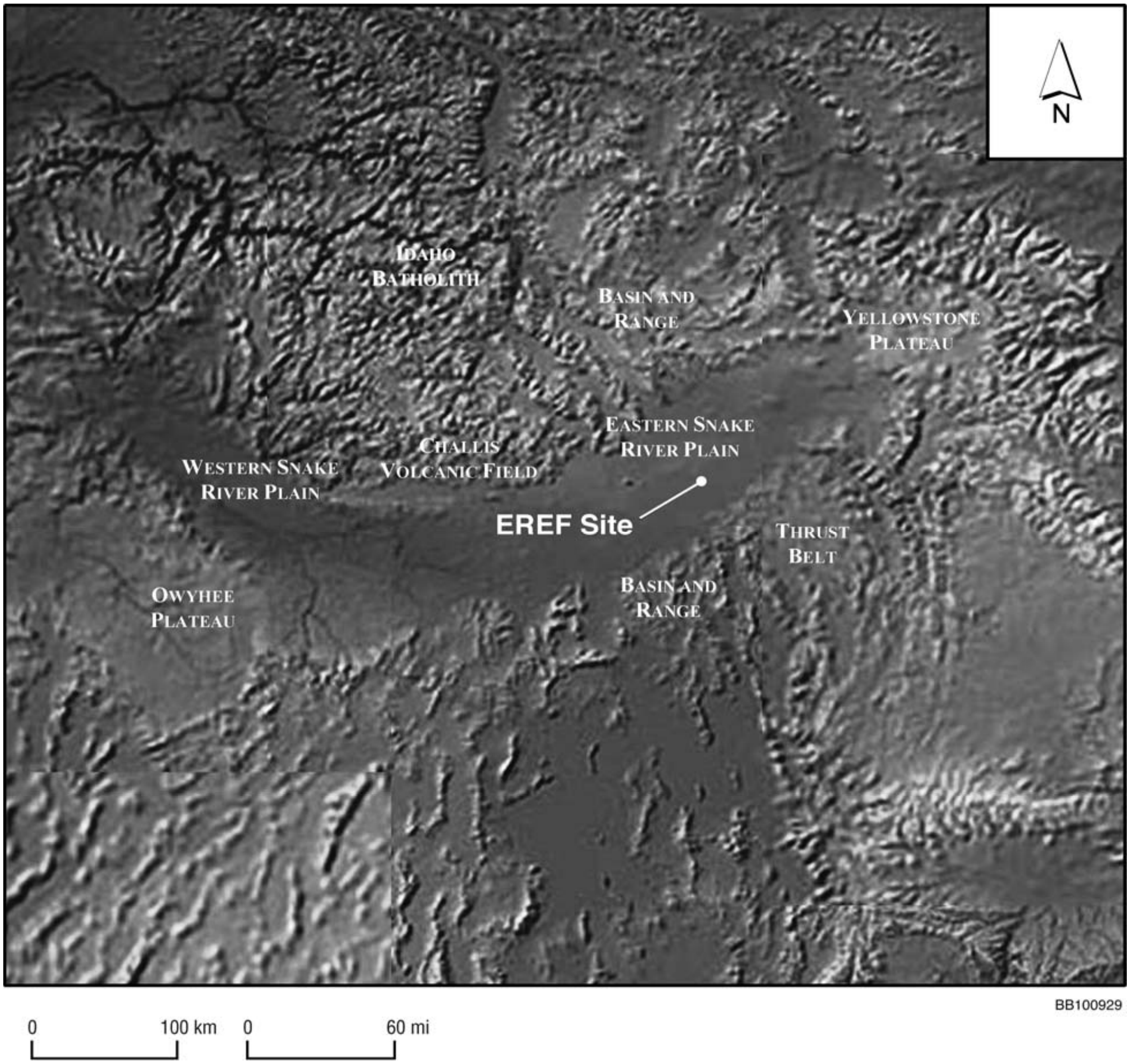

Figure 3-14 Regional Physiography (AES, 2010)

During the late Pleistocene to late Holocene (recent), surficial processes such as glacial outburst flooding, range fires, and eolian erosion and deposition have contributed significantly to the appearance of the ESRP landscape. Extensive eolian deposition has produced thick blankets of loess across the ESRP and the areas to the southeast. These processes continue to modify the landscape today.

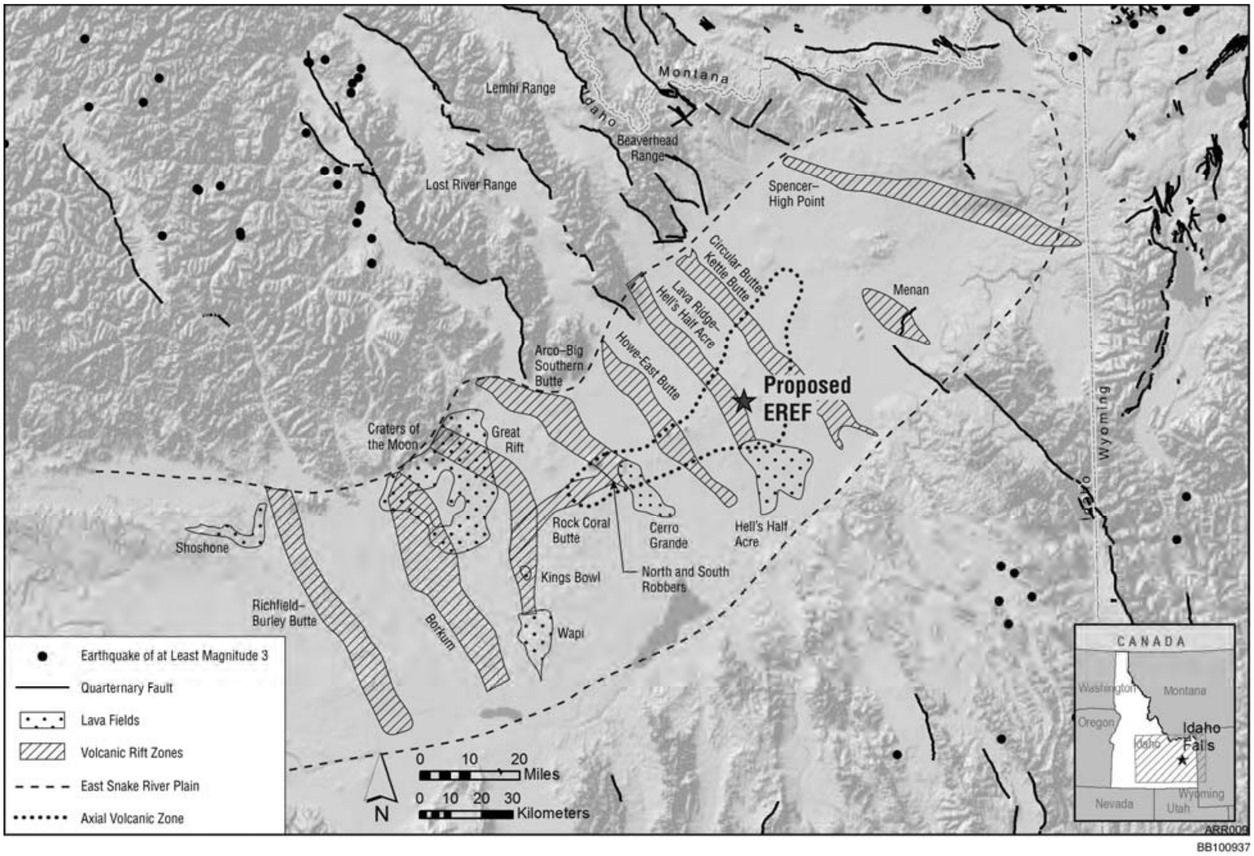

Figure 3-15 Lava Fields and Volcanic Rift Zones of the ESRP (modified from Payne, 2006; Quaternary fault and earthquake data from USGS and IGS, 2006)

3.6.1.1 Seismic Setting, Earthquakes, and Volcanic Activity

Seismic Setting

The proposed EREF site is situated on the axial volcanic zone, a northeast-to-southwest trending volcanic ridge that stretches across the middle of the ESRP (Figure 3-15). The ESRP is thought to mark the track of the Yellowstone hotspot, which is currently located beneath Yellowstone National Park in Wyoming. The hotspot was centered near the proposed EREF site about 4 to 10 million years ago (Smith, 2004).

Earthquakes

Most earthquakes with the potential to affect the proposed EREF occur along the normal faults in the Basin and Range province north of the ESRP (Figure 3-15). These faults are capable of magnitudes of 7 or greater on the Richter scale and have recurrence intervals on the order of thousands or tens of thousands of years. Earthquakes within the Basin and Range province indicate extension in a predominantly northeast-southwest direction. Crustal extension began in this area in the Middle Miocene, about 16 million years ago. The ESRP itself is less seismically active, although very low level seismic activity is common. Seismic history and geologic conditions indicate that earthquakes with a magnitude of more than 5.5 and the associated

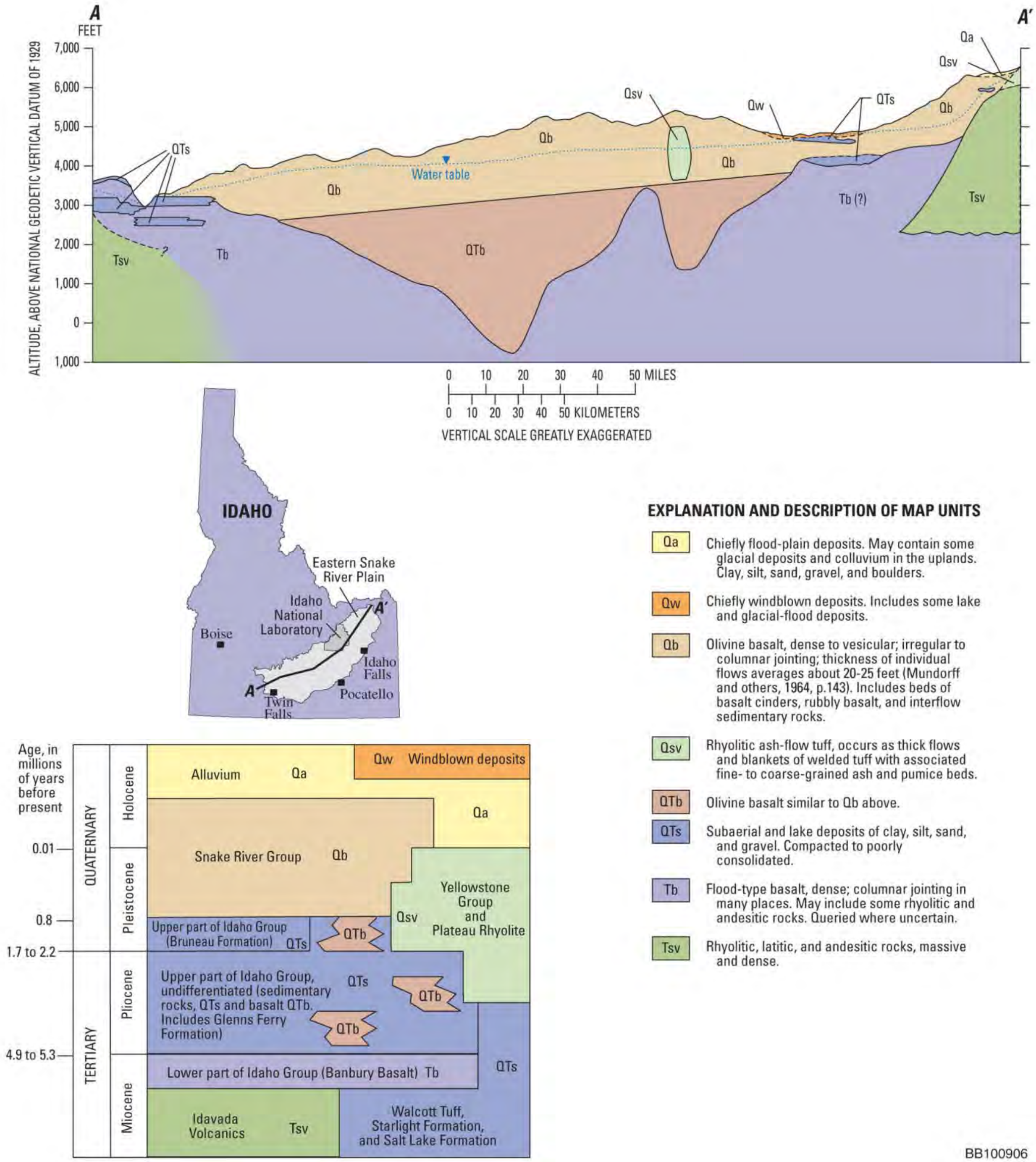

Figure 3-16 General Stratigraphy of the ESRP (adapted from Ackerman et al., 2006)

strong ground shaking and surface rupture would probably not occur within the ESRP; however, moderate to strong ground shaking from earthquakes in the Basin and Range province could be felt at the proposed EREF site (DOE, 1996; Hughes et al., 1999; Weston Geophysical Engineers, 2008).

Figure 3-17 shows the peak horizontal acceleration in the ESRP region as a percentage of the acceleration of gravity, g, which has a 10 percent probability of being exceeded over a 50-year period. The peak horizontal acceleration ranges from 0 g (insignificant ground-shaking) to 1 g (strong ground-shaking). The highest ground-shaking hazard in the region occurs to the north of the ESRP and along the Intermountain Seismic Belt to the west, with the highest probable peak acceleration (greater than 0.30, or 30 percent of g) occurring in western Wyoming. In the region of the proposed EREF property on the ESRP, the probable peak acceleration is low, in the range of 0.05 g to 0.07 g (equal to or less than 7 percent of g), because the region is underlain by hard rock and seismically active areas are at some distance away.[10]

A probabilistic seismic hazard study conducted by Weston Geophysical Engineers (2008) determined that the peak horizontal accelerations for annual probabilities of once in 1000 (10^{-3}), 10,000 (10^{-4}), and 100,000 (10^{-5}) years would be 0.063g, 0.15g, and 0.30g, respectively.[11] These estimates are in agreement with similar studies conducted at INL by DOE (1996) and Payne et al. (2000). Similar levels are now part of the seismic design criteria for new facilities at INL (Payne, 2008). Additional information on seismic hazards is provided in the SER (NRC, 2010).

<u>Volcanic Activity</u>

Early volcanism associated with the Yellowstone hotspot produced large-volume silicic eruptions that were followed by predominantly basaltic volcanism. Currently, basaltic volcanism occurs within the several northwest-trending volcanic rift zones and the axial volcanic zone (Figure 3-15). The most recent and closest volcanic eruption occurred at Craters of the Moon National Monument, 43.5 kilometers (27 miles) southwest of the proposed site, about 2000 years ago (Payne, 2006).

Using the probabilistic approach of Hackett et al. (2002), a recent volcanic hazard analysis determined that the major volcanic hazard at the site of the proposed EREF is the inundation and burning of facilities by basaltic lava flows in the event of an eruption within the volcanic rift zones of the ESRP (Figure 3-15). Hazards associated with basalt flows are listed in Table 3-15. The mean annual probability of a basaltic eruption that could impact the proposed EREF is

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[10] Seismic waves during an earthquake cause ground-shaking that radiates outward from the rupturing fault. Shaking intensity is mainly a function of an earthquake's magnitude and the distance from the fault, but can be amplified by other factors, such as the softness of the ground (soft rocks and sediments versus hard rock) and the total thickness of sediments below the area. Shaking tends to be stronger in soft rocks and sediments and increases with increasing thickness of underlying sediments (Field et al., 2001).

[11] Peak horizontal acceleration is expressed as a percentage of gravity (g), a common value of acceleration equal to 9.8 m/s^2, the acceleration due to gravity at the earth's surface. Peak horizontal acceleration values range from 0 (insignificant ground shaking) to 1.0 (very strong ground shaking).

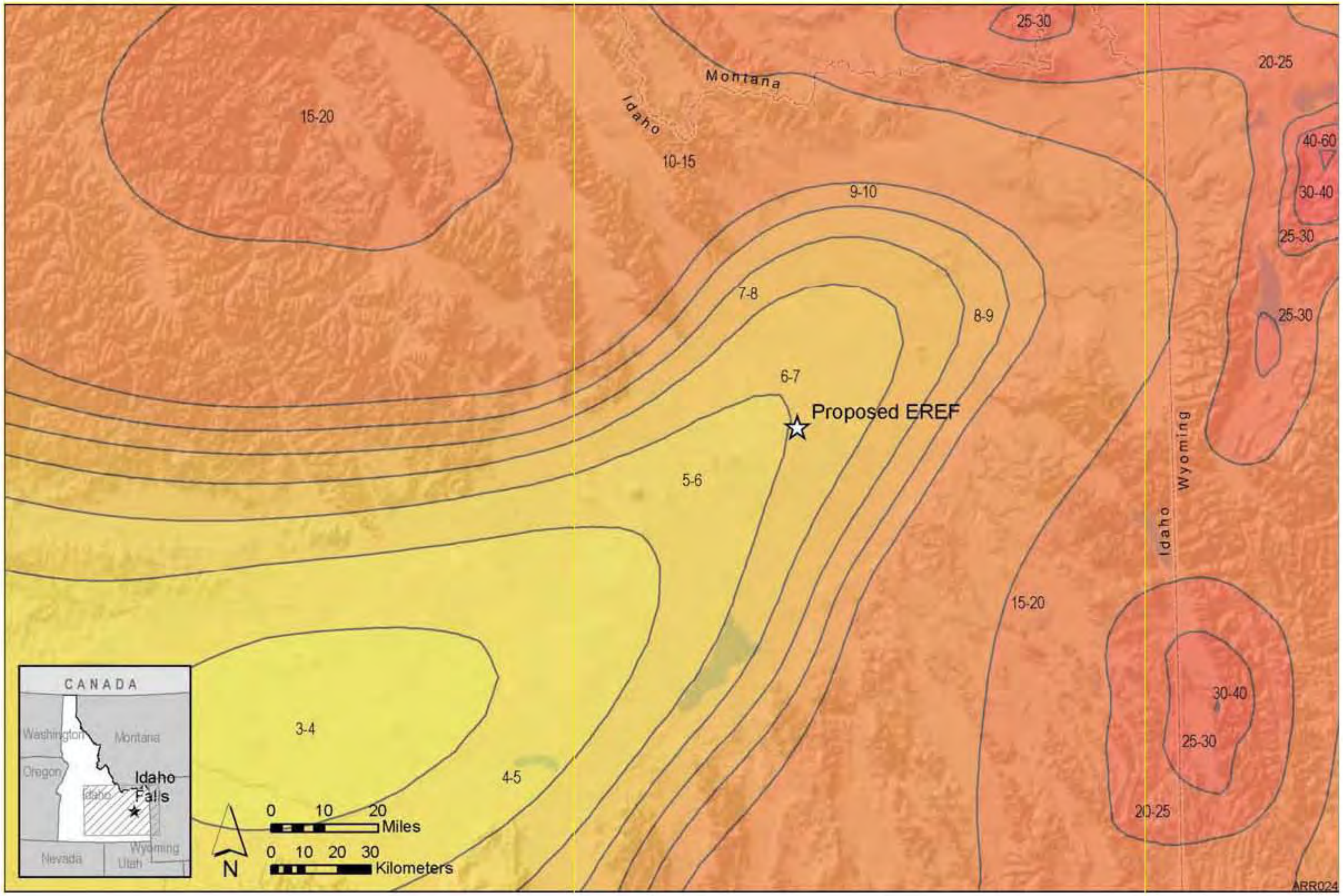

Figure 3-17 Peak Horizontal Acceleration (as a percent of g) near the ESRP (USGS, 2008a)

about 3.7×10^{-6} (with estimated upper and lower bounds ranging from 10^{-5} to 10^{-7}). The proposed EREF site lies within a shallow topographic basin with an area of about 230 square kilometers (89 square miles). The basin is larger than the median and mean areas of lava flows measured within the INL site (to the northwest), and it is estimated that 70 percent of lava flows erupted from a vent within the basin would reach the proposed EREF site. Eruptions along the axial volcanic zone, however, would likely inundate the entire topographic basin, including the proposed EREF site (AES, 2010).

Sources of more explosive silicic volcanism include: the potentially new or reactivated caldera volcanoes on the ESRP; the Yellowstone Plateau volcanic field, about 230 kilometers (143 miles) to the northeast; and ash-fall deposits from the volcanoes of the Cascade range, more than 700 kilometers (435 miles) west. The estimated recurrence of silicic volcanism within the volcanic axial zone is 4.5×10^{-6} per year. Hazards associated with silicic volcanism are considered to be less important than for basaltic volcanism in the area of the proposed EREF since the spatial distribution of Quaternary rhyolite flows in the area (e.g., at INL) generally impacts smaller areas than basalt flows. Pyroclastic flows and ash-fall deposits are also considered to pose no significant hazard in the area of the proposed EREF (AES, 2010). The annual probabilities calculated for the proposed EREF site are consistent with those made by Hackett et al. (2002) for facilities in the southwestern portion of INL. Additional information on volcanic hazards is provided in the SER (NRC, 2010).

3.6.1.2 Mineral and Energy Resources

AES has not found any abandoned drill holes or former or existing production wells to indicate petroleum was drilled for or produced within the site of the proposed EREF. The NRC staff verified during a site visit that there are no current mining operations at the proposed EREF site. According to information collected by the Idaho Geological Survey (IGS) and U.S. Geological Survey (USGS), the top nonfuel minerals in Idaho are, in descending order of value, molybdenum concentrates, construction sand and gravel, phosphate rock, silver, crushed stone, lead, and portland cement. These minerals accounted for more than 96 percent of the State's total nonfuel mineral production in 2006 (USGS, 2008b). Figure 3-18 shows the potential mineral resources in Idaho. According to the USGS survey (USGS, 2008b), suitable mineral resources exist in Bonneville County for the extraction of construction sand and gravel, pumice and pumicite, and crushed stone for aggregate. The nearest quarrying operations for sand and gravel, pumice, and crushed stone are those at INL.

Idaho has limited petroleum resources; however, there is interest in the production potential of the Overthrust Belt in southeastern Idaho and the Tertiary basin sediments in the far western portion of the Snake River Plain. An oil and gas well was recently drilled on private land near Gray's Lake in southeastern Idaho, about 100 kilometers (62 miles) from the proposed EREF site. Geothermal potential is high in Idaho. The first geothermal power plant, located at the Raft River site about 150 kilometers (93 miles) southwest of the proposed EREF site, began commercial operation in November 2007, with a 25-year, 13-megawatt full output purchase agreement with Idaho Power. Further exploration at Raft River is planned (Gillerman and Bennett, 2008).

Table 3-15 Hazards Associated with Basaltic Volcanism on the ESRP

Phenomenon	Relative Frequency	Size or Area of Influence	Hazard Level
Lava flow	Common	0.1 to 400 km^2 (0.039 to 154 mi^2) in area; up to 32 km (20 mi) in length based on sizes of ESRP lava flows of the past 400,000 years	Significant hazard; typical basaltic phenomenon; lava from fissures or shield volcanoes may inundate large areas downslope of vents and burn structures in its path
Ground deformation: fissuring, faulting, and uplift	Common; associated with virtually all shallow magma intrusion and eruption	Fissuring could affect areas of 10 km^2 (3.9 mi^2); minor tilting and broad uplift in areas to 40 km^2 (15 mi^2)	Significant hazard due to shallow dike intrusion; “dry” intrusion may occur without lava flows, affecting smaller areas than for lava inundation
Volcanic earthquakes	Common; associated with magma intrusion before and during eruption	Maximum Richter scale magnitude of 5.5, with most events less than 3.0; ground vibration may affect facilities within 25 km (16 mi)	Low to moderate hazard; swarms of shallow earthquakes (less than 4-km [2.5-mi] focal depth) occur as dikes propagate underground
Gas release (toxic and corrosive vapors)	Common; associated with fissuring and lava eruption	Restricted to near-vent areas; may affect areas of several square kilometers downwind	Low hazard; local plume of corrosive vapor downwind from eruptive vent or fissure; cooled vapor may collect in local topographic depressions
Tephra fall (volcanic ash and bombs)	Common	Restricted to near-vent areas; may affect areas of several square kilometers downwind	Low hazard; basaltic eruptions are inherently nonexplosive and may form small tephra cones but little fine ash to be carried downwind
Base surge (ground-hugging blast of steam and tephra)	Rare	Effects limited to radius of several kilometers from vent; less than 10 km^2 (3.9 mi^2)	Low hazard due to depth of water table (greater than 200 m [656 ft]); steam explosions due to interaction between ascending magma and shallow groundwater
Pyroclastic flow (ground-hugging flow of hot, pyroclastic material)	Extremely rare	Near vent; affected area less than 1 km^2 (0.39 mi^2)	Very low hazard; as per tephra fall but affecting even smaller areas

Source: modified from Hackett et al., 2002.

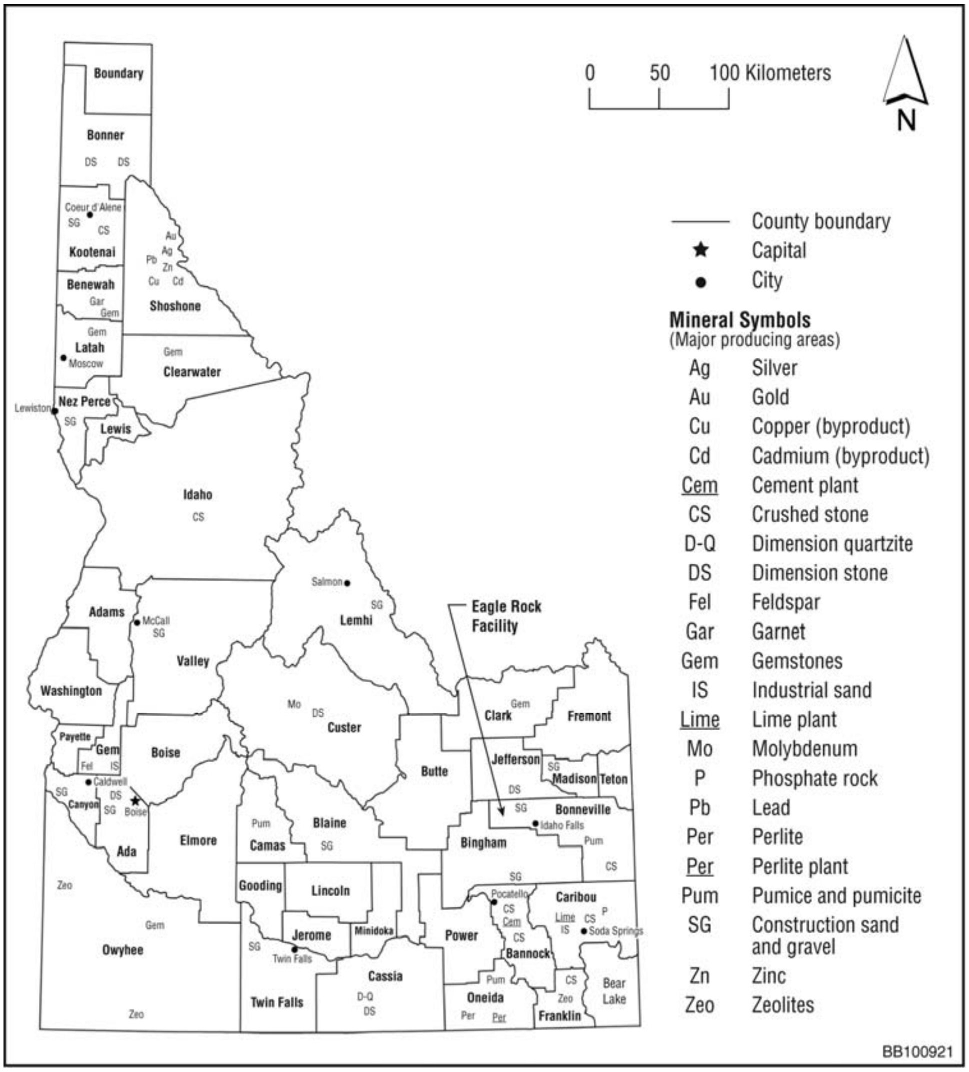

Figure 3-18 Idaho Mineral Resources (modified from USGS, 2008b)

3.6.2 Site Geology

The proposed EREF site is located in a shallow topographic depression within the axial volcanic zone between the Lava Ridge-Hells Half Acre and the Circular Butte-Kettle Butte rift zones (Figure 3-15). The surface is relatively flat and gently sloping, with small ridges and areas of rock outcrop. Elevations range from about 1556 meters (5105 feet) to about 1600 meters (5250 feet).

The axial volcanic zone is underlain by numerous basalt lava flows erupted from fissures and small shield volcanoes over the past 4 million years. Basaltic rock outcrops of the Quaternary age Snake River Group cover a portion of the proposed site (especially in the northwestern and southern parts) and occur as low irregular ridges, small areas of blocky rubble with thin soils, and erosional surfaces in intermittent stream drainages. The basalts are strongly vesicular and show a range of oxidation and secondary mineral formation; some show columnar jointing.

Geologic mapping in the area suggests that the basalt flows at the proposed site originated from the volcanic vent at Kettle Butte (AES, 2010; Kuntz et al., 1994).

Rock cores drilled at the proposed site identify numerous basalt flows, ranging in thickness from less than 0.6 to 15 meters (less than 2 to 50 feet). Rock cores sampled across the proposed EREF site indicate the depth to bedrock (basalt) ranges from 0 (at outcrop locations) to 6.6 meters (0 to 21.5 feet) (Figure 3-19). In one core (GW-1), thin, vesicular pahoehoe flows occur at depths of 95, 131, 152, 157, and 209 meters (310, 430, 500, 515, and 685 feet). The tops of these flows are generally characterized by the presence of black, fine-grained to glassy crusts a few centimeters thick, with stretched vesicles, pervasive matrix oxidation, and olivine phenocrysts. Within a few meters of the lava-flow tops is a highly vesicular zone with closely spaced, vertically oriented cooling fractures. In thicker flows, the fractured lava grades downward into finely vesicular and nonvesicular (massive) lava of the flow interior (AES, 2010).

3.6.3 Site Soils

Figure 3-20 presents a soil map of the proposed EREF site. Unconsolidated surficial material at the proposed site consists mainly of Pleistocene age loess deposits rather than soil developed *in situ*. The loess, composed of silt and sandy silt, is massive or faintly bedded and moderately to well-sorted. Small angular to subrounded basalt gravel is sparsely present (Scott, 1982).

The U.S. Department of Agriculture soil survey for Bonneville County categorizes most of the soils at the proposed EREF site as Pancheri silt loam, with slopes ranging from 0 to 8 percent. The Pancheri series consists of deep to very deep, well-drained soils that formed in loess-covered lava plains where the mean annual precipitation is about 25 centimeters (10 inches). Other soils at the proposed site include the Pancheri- and Polatis-rock outcrop complexes, which are moderately deep, well-drained, silt loams occurring on steeper slopes (up to 25 percent) of basalt outcrops. Basalt outcrops occur as low irregular ridges of blocky rubble that cover about 28 percent of the total area of the proposed EREF site and as erosional surfaces within intermittent stream drainages (NRCS, 2009).

Soils of the Pacheri silt loam (0 to 4 percent slope), which cover about 63 percent of the proposed EREF site, are classified as prime farmland (if irrigated) by the U.S. Natural Resources Conservation Service (NRCS) (NRCS, 2009).

3.6.4 Soil Radiological and Chemical Characteristics

3.6.4.1 Soil Radiological Characteristics

Ten surface soil samples were collected from various locations across the proposed EREF site as part of the initial characterization of soils (Figure 3-21). Samples were analyzed for uranium, thorium, and their daughter products. Potassium-40, a naturally occurring radionuclide, and cesium-137, produced by past weapons testing, were also measured. Table 3-16 presents the results of these measurements. The measured radionuclides are all naturally occurring, except for cesium-137, which is ubiquitous in the environment. Cesium-137 concentrations fall within the low end of the concentration range reported by the IDEQ for soil monitoring by *in situ* gamma spectrometry in and around the INL in 2006 and 2007 and well below the IDEQ action level of 6.8 picocuries per gram (IDEQ, 2006a, 2007c).

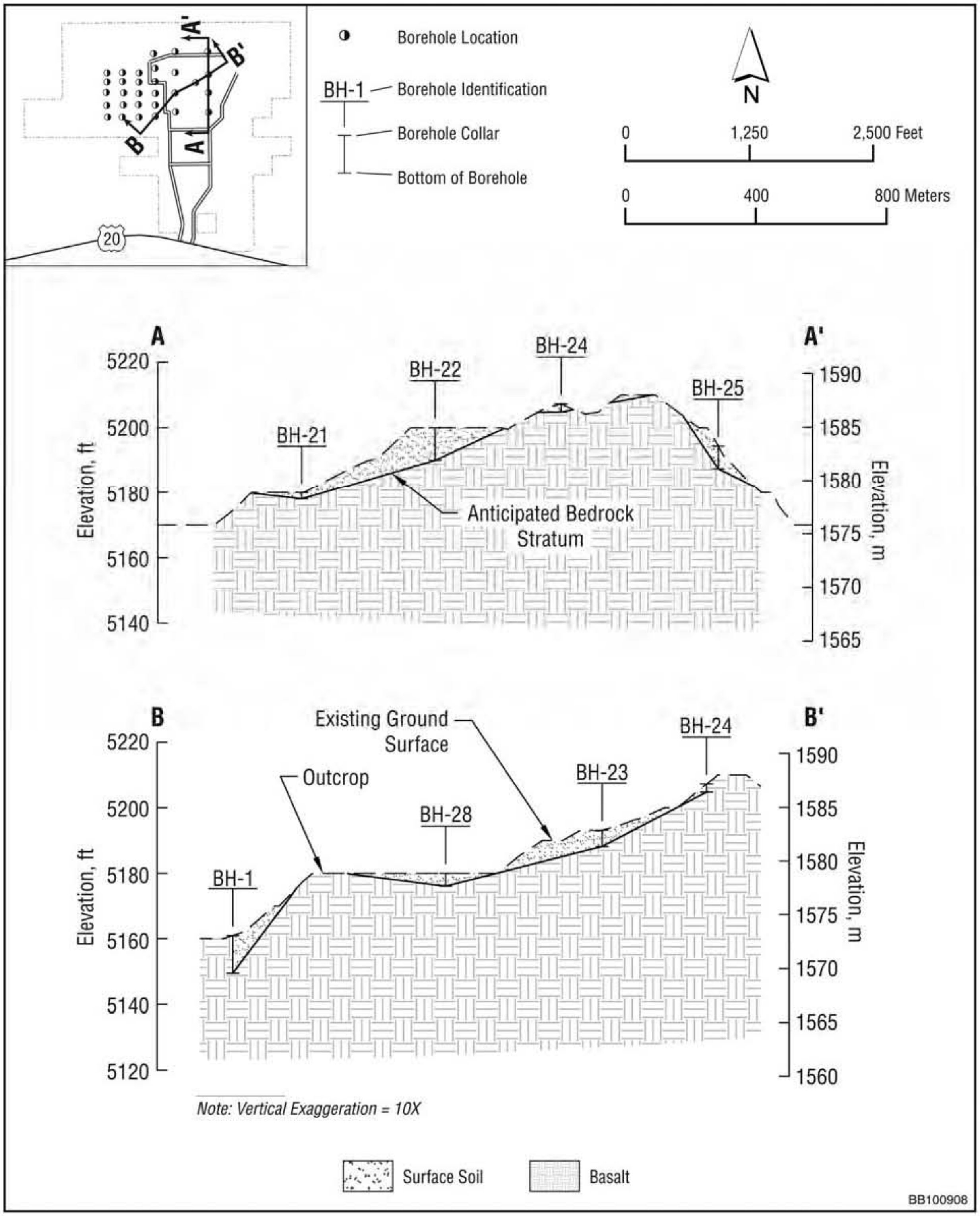

Figure 3-19 Cross Sections Showing Depth to Basalt at the Proposed EREF Site (AES, 2010)

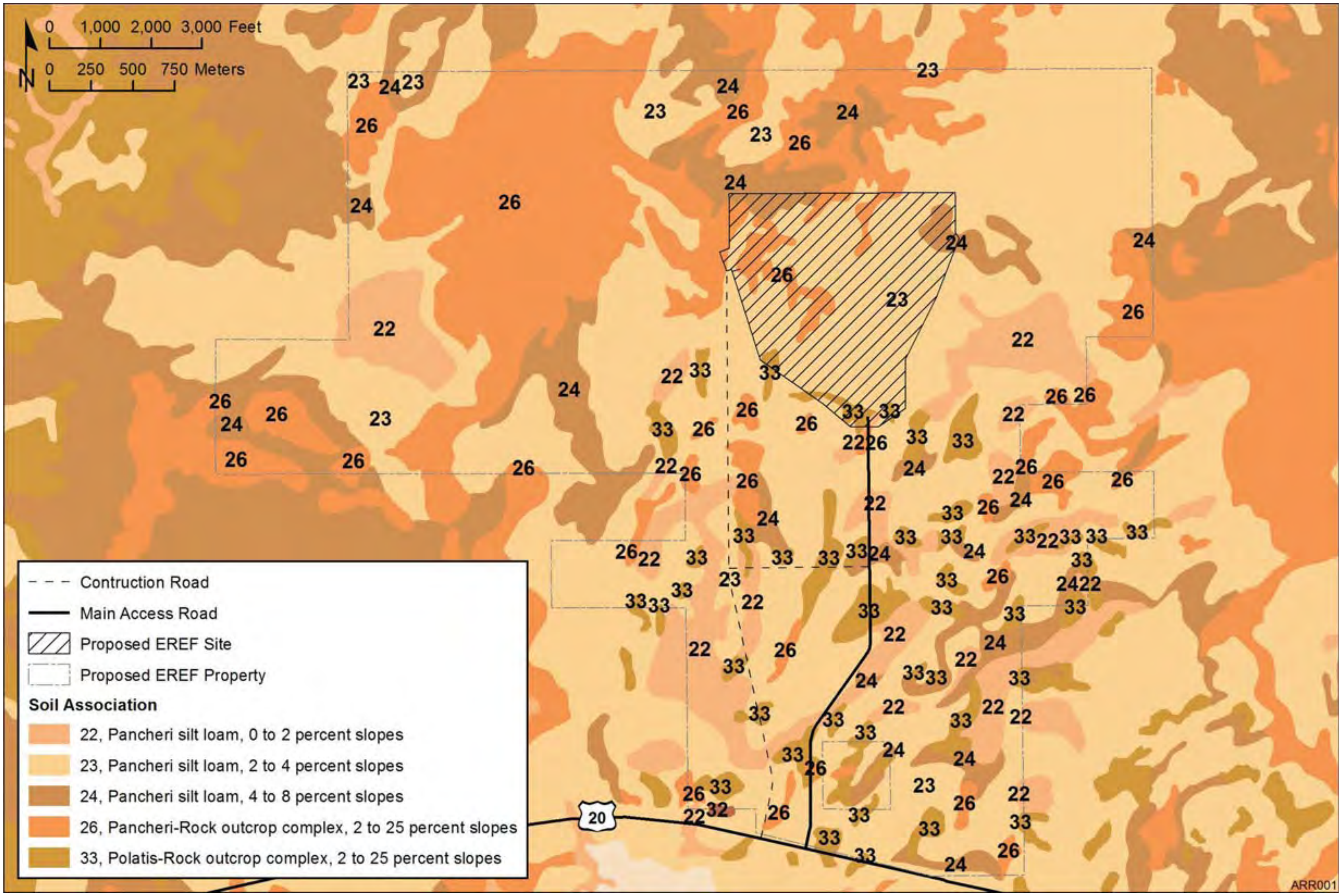

Figure 3-20 Soil Map of the Proposed EREF Site and Surrounding Area (based on data from NRCS, 2009)

3.6.4.2 Soil Chemical Characteristics

The surface soil samples collected at the proposed EREF site were also analyzed for nonradiological constituents, including metals, pesticides, herbicides, phosphorous, fluoride, VOCs, and semivolatile organic compounds (SVOCs) (AES, 2010). Samples were also tested for percent moisture content. The results of the analyses for metals, fluoride, and moisture content in soils are summarized in Table 3-17. All metals fall within the range of background concentrations in surface soils reported for INL. Mercury was not detected in any of the samples. Moisture content varied from 9.1 to 16.5 percent.

VOCs were detected in only one of the 10 samples analyzed. Sample SS1, located within one of the crop circles in the northeastern portion of the proposed EREF property (Figure 3-21), had detectable levels of three VOCs: 1,3,5-trimethylbenzene, 1,3-dichlorobenzene, and tetrachloroethene (Table 3-18). The compound 1,3-dichlorobenzene has applications as a fumigant and insecticide/pesticide; its presence is likely related to the farming activities at the proposed site. The compounds 1,3,5-trimethylbenzene and tetrachloroethene are typically used as solvents; the source of these two VOCs is not clear. All compounds were detected at levels well below EPA's regional screening levels for industrial soils (EPA, 2009a).

Three SVOCs were detected in four soil samples (SS2, SS4, SS9, and SS10) from the north-central and south-central portions of the proposed property (Figure 3-21). These samples had detectable levels of benzo(a)pyrene, dibenzo(a,h)anthracene, and ideno(1,2,3-cd)pyrene (Table 3-18). These are a few of the many polycyclic aromatic hydrocarbons (PAHs) that are found in the environment, usually as a result of the incomplete combustion or pyrolysis of organic matter, such as fossil fuels (IPCS, 2009). All compounds were detected at levels well below EPA's regional screening levels for industrial soils (EPA, 2009a).

Of all the pesticides and herbicides tested, only chlorpropham (a pesticide) was detected in four samples from the north-central portion of the proposed property (Table 3-18; Figure 3-21). Concentrations of chlorpropham were well below EPA's regional screening levels for industrial soils (EPA, 2009a).

3.7 Water Resources

3.7.1 Surface Water Features

3.7.1.1 Rivers, Streams, and Lakes

The proposed EREF site is located in the American Falls sub-basin (HUC 17040206), immediately west of the Idaho Falls sub-basin (HUC 17040201), on the easternmost edge of the Snake River Plain in southeast Idaho (USGS, 2009b; IDEQ, 2006b; Shumar, 2004) (Figure 3-22). These sub-basins encompass a portion of the South Fork Snake River from Heise (about 32 kilometers [20 miles] northeast of Idaho Falls) to Henry's Fork and a section of the Snake River from the Henry's Fork confluence through the diversion dams south of Idaho Falls to the American Falls Reservoir. The Snake River is about 32 kilometers (20 miles) to the east of the proposed EREF site; it generally flows from the northeast to the southwest. The largest surface water bodies downgradient of the proposed site are on the Snake River – the American Falls Reservoir and Lake Wolcott, about 79 kilometers (49 miles) and 127 kilometers

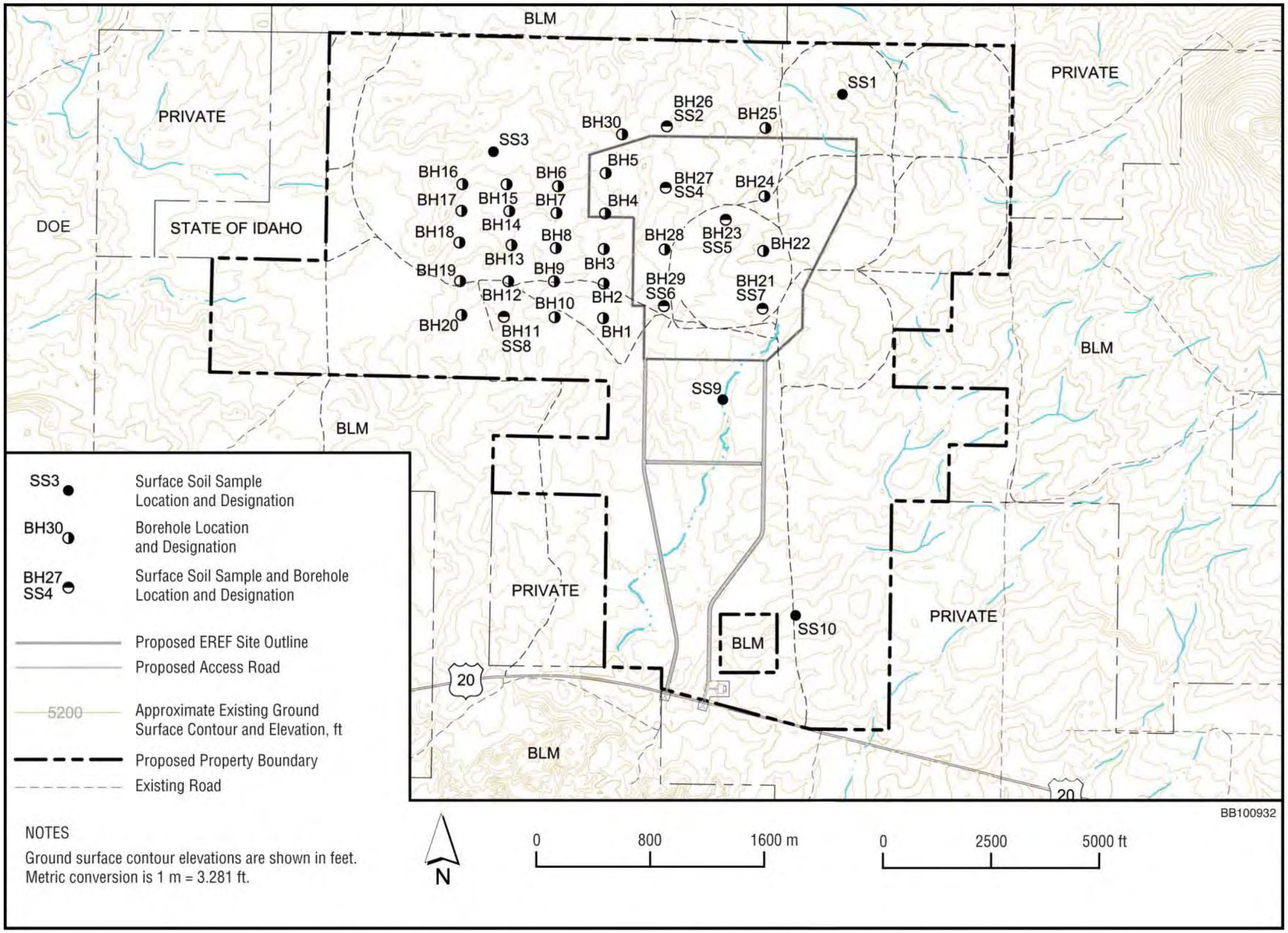

Figure 3-21 Surface Soil and Borehole Sample Locations (AES, 2010)

Table 3-16 Radiochemical Analyses of Proposed EREF Property Surface Soil

	Measured Concentrations[a]		Representative Soil Concentrations[b]	
Radionuclides	Bq/kg	pCi/kg	Bq/kg	pCi/kg
Actinium-228 Thorium-228	38 ± 3.2	1020 ± 87.8	–[c]	–
Cesium-137	10 ± 4.4	288 ± 118	252[d]	6800[d]
Potassium-40	660 ± 57	17,900 ± 1540	400	10,800
Thorium-228	47 ± 4.8	1270 ± 131	–	–
Thorium-230	46 ± 5.0	1250 ± 136	–	–
Thorium-232	44 ± 3.5	1190 ± 92.0	37	999
Uranium-234	29 ± 2.5	784 ± 68.3	–	–
Uranium-235	3.3 ± 1.8	90.1 ± 48.9	–	–
Uranium-238	30 ± 2.7	805 ± 73.0	66	1782

[a] Concentrations noted as mean ± standard deviation; n=10 for all radionuclides but cesium-137 for which n=9. Source: AES, 2010.
[b] Representative soil concentrations are taken from Table 4.3 of the National Council on Radiation Protection (NRCP) Report No. 94 (NCRP, 1998).
[c] A dash indicates value is not available from NRCP, 1998.
[d] Value from the IDEQ INL Oversight Program (Jones, 2009).

(79 miles), respectively, to the southwest of the proposed EREF site (Figure 3-22). There is an extensive network of canal systems that conveys water to agricultural areas near Idaho Falls.

Major land uses within the American Falls sub-basin are dryland and irrigated agriculture and livestock grazing. All water bodies within the sub-basin support cold water aquatic life; water supplies for domestic, agricultural, and industrial use; wildlife habitat; and recreation. The American Falls Reservoir provides water for irrigation and electricity generation. The Snake River and the American Falls Reservoir are designated sources of domestic water supply (IDEQ, 2006b). The EPA has classified 17 waters within the sub-basin as impaired, mainly because of sedimentation and siltation problems (EPA, 2010a).

There are no rivers, streams, or lakes within the proposed EREF property; however, a few small drainage features occur in the northeastern corner and in the southern portion of the proposed site (Figure 3-23). None of these features are regulated under Section 404 of the *Clean Water Act* (Joyner 2008). The drainage features in the northeastern corner are less visible in the field because they occur within the irrigated crop circles where the natural topography has been smoothed for crop production. Ephemeral drainage features in the southern portion of the proposed property were formed from natural erosional processes during snowmelt or episodic rain events, and they also drain water from irrigated agricultural areas. Most of these drainages lose water to infiltration and evapotranspiration; the potential for ponding of water is low

Table 3-17 Metals, Soluble Fluoride, and Percent Moisture in Proposed EREF Property Surface Soil

Analyte	Soil Concentrations (mg/kg)[a]										Detection Limit (mg/kg)	Background[b] (mg/kg)
	SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	SS9	SS10		
Arsenic	5.5	7.7	5.5	7.1	6.6	7.3	6.7	7.1	6.9	6.5	1.3–1.8	3.7–24.4
Barium	160	180	180	200	170	170	200	170	170	190	0.50	87−255
Cadmium	0.56	0.61	ND[c]	0.69	0.59	0.58	0.74	0.57	0.6	0.55	0.50	1.3−2.8
Chromium (III)	21	20	20	25	23	21	23	21	22	25	0.50	14−27
Lead	15	16	14	18	16	16	17	16	16	18	0.60–0.81	9−28
Selenium	0.26	0.19	0.15	0.17	0.42	0.2	0.15	0.16	0.16	0.13	0.05	0.3−16.7
Silver	ND	ND	ND	0.7	ND	ND	ND	0.7	ND	ND	0.5–0.8	2.7−2.8
Total mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	0.05−0.06
Soluble fluoride	12	ND	ND	ND	10	ND	10	ND	ND	ND	5	–[d]
Percent moisture	15.9	12.2	9.1	12.2	15.7	11.1	15.7	11.8	16.5	10.5	0.1	–

[a] Source: AES, 2010.
[b] Background values from ranges of mean background levels compiled by Westinghouse Idaho Nuclear Company, Inc. (1994) for surface soils at INL.
[c] ND = not detected (the detection limit, i.e., the lowest measurable level, is reported in far right column).
[d] Dash indicates no data were reported.

(NRCS, 2009). One drainage feature conveys water offsite. It starts in the south-central part of the proposed property within the footprint of the proposed EREF and runs southward toward US 20 (Figure 3-22). A series of small ponds to the north of US 20 were used at one time to collect and store water from this drainage for agricultural uses, but they are no longer in use and are currently dry. The NRC staff confirmed that a culvert at US 20 conveys water from this drainage to the south away from the roadway but does not connect to offsite resources or larger drainages.

3.7.1.2 Wetlands

There are no wetlands on the proposed EREF property (Joyner, 2008). The closest wetland is the Market Lake WMA, near Roberts, about 32 kilometers (20 miles) to the northeast. No commercial or sport fisheries are located on the proposed property; the nearest fisheries (trout) are on the Upper Snake River (Idaho Fish and Game Fisheries Region 7) along Henry's Fork (in Bonneville County) and the South Fork (IDFG, 2009c).

3.7.1.3 Floodplains

The proposed EREF property is not located within any 100-year or 500-year floodplains (FEMA, 2010). There are no reservoirs, levees, or surface water that could cause flooding of the proposed EREF. The Snake River is the closest river to the proposed EREF site. It is located about 32 kilometers (20 miles) to the east. Its headwater is a spring near the southern boundary of Yellowstone National Park in the northwestern corner of Wyoming. The USGS

Table 3-18 VOCs, SVOCs, and Pesticides Detected in Proposed EREF Property Surface Soil

Analyte	Soil Concentrations (mg/kg)										Regional Screening Level (mg/kg)[a]
	SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	SS9	SS10	
VOCs											
1,3,5-Trimethylbenzene	0.0067	ND[b]	ND	ND	ND	ND	ND	ND	ND	ND	200
1,3-Dichlorobenzene	0.0082	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000[c]
Tetrachloroethene	0.0086	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.7
SVOCs											
Benzo(a)pyrene	ND	0.014	ND	0.035	ND	ND	ND	ND	0.059	0.014	0.21
Dibenzo(a,h)anthracene	ND	0.012	ND	0.024	ND	ND	ND	ND	0.038	0.0099	0.21
Ideno(1,2,3-cd)pyrene	ND	0.025	ND	0.081	ND	ND	ND	ND	0.146	0.024	2.1
Pesticide											
Chlorpropham	ND	ND	ND	0.0074	ND	0.0055	ND	0.0110	ND	ND	120,000

[a] Regional screening levels (RSLs) based on carcinogenic target risk for industrial soils, except for 1,3,5-trimethylbenzene and chlorpropham which are based on a noncancerous hazard index. Source: EPA, 2009a.

[b] ND = not detected.

[c] RSL not available for 1,3-dichlorobenzene; value provided is for 1,2-dichlorobenzene.

Source: AES, 2010.

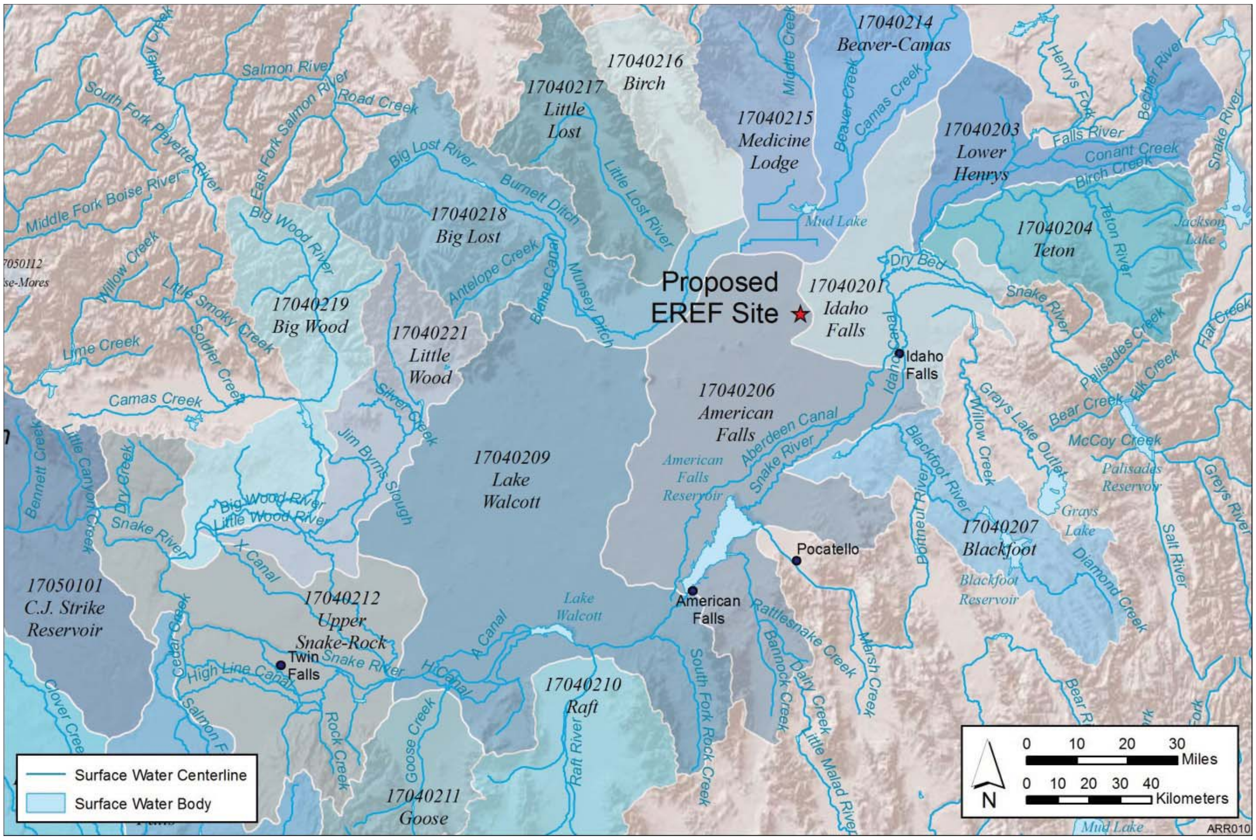

Figure 3-22 USGS-Designated Sub-basins within the Eastern Snake River Plain (adapted from Seaber et al., 2007)

station (13057155) on the Snake River above Eagle Rock (about 13 kilometers [8 miles] upstream of Idaho Falls) has an average daily flow of 162 cubic meters per second (5738 cubic feet per second), as measured between water years 1987 and 2008 (USGS, 2009c). During this period, monthly averages ranged from 87 cubic meters per second (3070 cubic feet per second) in December to 337 cubic meters per second (11,900 cubic feet per second) in June (USGS, 2009d). Annual average and peak flows at the Snake River above Eagle Rock station are shown in Figure 3-24. Annual peak flows tend to be about two to three times the average flow rates. The maximum flow rate at this site, 1376 cubic meters per second (48,600 cubic feet per second), occurred during a storm on June 16, 1997 (USGS, 2009e).

According to the NCDC, southeastern Idaho has been in a drought since 2000. From 1988 through 2000, the average annual flow recorded at the Snake River above Eagle Rock station was 164 cubic meters per second (5793 cubic feet per second); since 2000, the average annual flow at the station has been reduced to 127 cubic meters per second (4501 cubic feet per

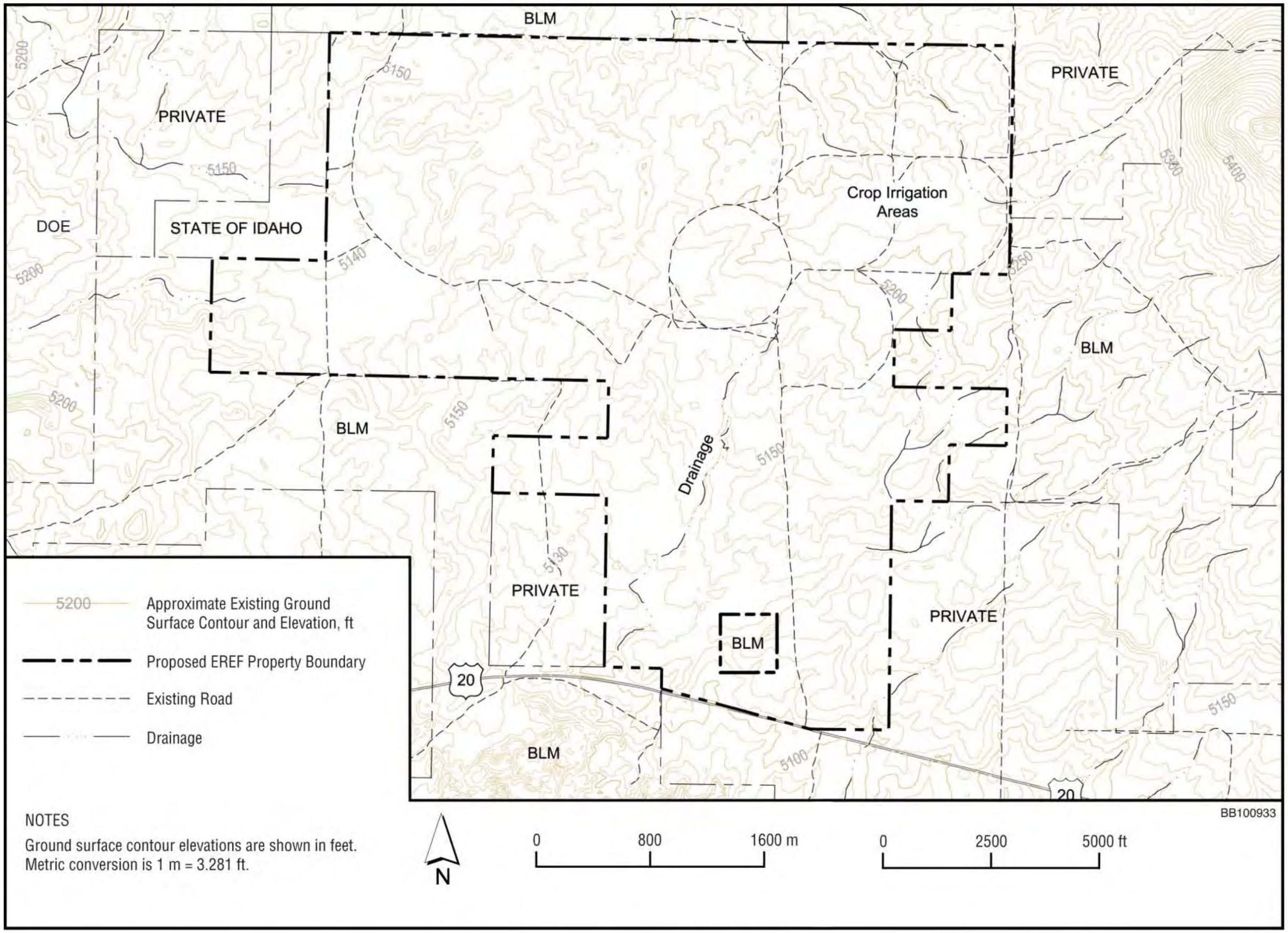

Figure 3-23 Drainage Features in the Vicinity of the Proposed EREF Site (AES, 2010)

second) (USGS, 2009e). Recent data from NCDC (2009c) indicate some improvement in the region's drought conditions.[12]

3.7.2 Groundwater Resources

3.7.2.1 Regional Hydrogeology

Because the climate in southeastern Idaho is cold and semiarid, natural soil development due to the growth and decomposition of vegetation is minimal on the ESRP. Surface soils are predominantly of eolian (wind) origin; soil cover is variable, ranging from nonexistent in areas of recent volcanism to tens of meters thick in areas of loess (wind-blown silt) accumulation. Thin soils and basalt outcrops are common in many areas along ridge lines and wind-swept areas (Hughes et al., 1999; Lindholm, 1996; Whitehead, 1994).

Soil types on the ESRP fall into six orders of lightly weathered soils typical of arid climates: alfisols, aridisols, entisols, inceptisols, mollisols, and vertisols (based on the taxonomy of USDA, 2010a). Most of these soils fall into the silt-loam textural class: 0 to 27 percent clay, 55 to 80 percent silt, and 10 to 35 percent sand. The mineralogy of soils at the INL reported by Nimmo et al. (2004) includes quartz, plagioclase, olivine, calcite, dolomite, and clay minerals; these are likely typical of the soils on the ESRP. Data summarized for INL by Nimmo et al. (2004) indicate that saturated hydraulic conductivities range from about 5.0×10^{-4} centimeters per second (1.6×10^{-5} feet per second) to 1.0×10^{-2} centimeters per second (3.3×10^{-4} feet per second), although reported ranges in the literature span over six orders of magnitude from 1.1×10^{-8} centimeters per second (3.6×10^{-10} feet per second) to 1.2×10^{-2} centimeters per second (3.9×10^{-4} feet per second). Porosities ranged from 0.42 to 0.55, and moisture contents from about 5 percent to 30 percent were also reported.

The vadose zone below the ESRP is spatially heterogeneous, ranging in thickness from 60 meters (197 feet) to 300 meters (984 feet). It is made up of unconsolidated alluvium and basalts of the Snake River Group (Section 3.6.1). Perched water zones are common throughout the ESRP, especially near rivers, canals, or other sources of surface water. Water within the vadose zone moves (1) by diffusion that is predominantly vertical and driven by gravity and (2) by preferential flow that is both vertical and horizontal and influenced by the presence and orientation of pores and fractures within the basalts and by the interlayers of sediment between basalt flows (Nimmo et al., 2004; Smith, 2004).

The groundwater system underlying the Snake River Plain in the vicinity of the proposed EREF site (and the source of its potable and process water supply) is the ESRP aquifer. The ESRP aquifer underlies an area of 26,000 square kilometers (10,040 square miles) and is up to 400 meters (1312 feet) thick, but it is most productive in the upper 90 to 150 meters (300 to 500 feet). Water volume in the ESRP aquifer is about 100 billion cubic meters (81 million acre-feet). The aquifer is largely unconfined; groundwater flows southwestwardly

[12] The NCDC uses the Palmer Drought Severity Index (PDSI) as a measure of long-term drought conditions. The PDSI takes into account precipitation, temperature, and soil moisture. Numbers range between –6.0 and +6.0, with negative numbers representing drier-than-normal conditions and positive numbers representing wetter-than-normal conditions (zero is normal). For the week ending February 20, 2010, the ESRP had a near-normal PDSI between –1.9 and +1.9 (NOAA, 2010).

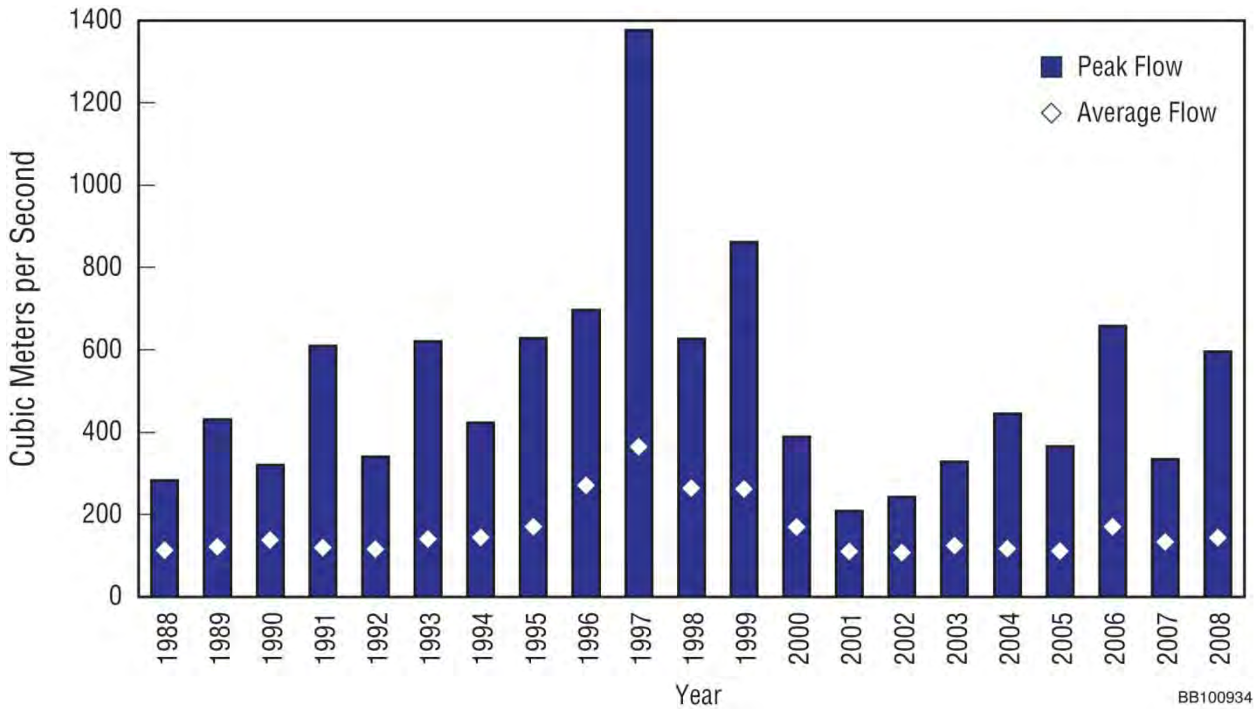

Figure 3-24 Annual Average and Peak Flows at the Snake River above Eagle Rock Station (Source: based on data from USGS, 2009e,f)

from recharge areas on the Yellowstone Plateau (and from precipitation- and surface-water-irrigated areas on the Snake River Plain) at an average gradient of 1.9 meters per kilometer (or 0.0019) and discharges to the Snake River through a series of springs between Twin Falls and King Hill. Flow velocities average about 3 meters per day (10 feet per day) (Smith, 2004; Wood and Low, 1988; Lindholm, 1996). Figure 3-25 shows groundwater flow contours for the ESRP aquifer based on data from the Idaho Department of Water Resources' (IDWR's) map service (IDWR, 2010).

3.7.2.2 Site Hydrogeology

Well logs show that most of the basalt bedrock below the proposed EREF site is fractured to some degree, although massive zones with few or no fractures (indicating basalt flow interiors) are also present. Flow interiors typically contain narrow vertical fractures; flow tops and bottoms have large vertical and horizontal fractures and are also marked by the presence of scoria, cinder, red oxidation, and increased vesicles. Massive zones in wells GW-1 and GW-4 (shown in Figure 3-26) are up to 3 meters (10 feet) in thickness. Three well-developed sedimentary interbeds, with thicknesses ranging from 1.2 to 2.4 meters (4.0 to 8.0 feet), were observed in GW-1 at depths of 18.3 meters, 59.4 meters, and 122.5 meters (60 feet, 195 feet, and 402 feet) (AES, 2010).

Field tests indicate that the aquifer is unconfined or semi-confined. Estimates of hydraulic conductivity (flow velocity) range from 0.007 meter per second (0.023 foot per second) to 0.015 meter per second (0.05 foot per second). Hydraulic conductivities are highest in the fractured basalt and lowest in sedimentary interbeds and massive zones within the basalt flow

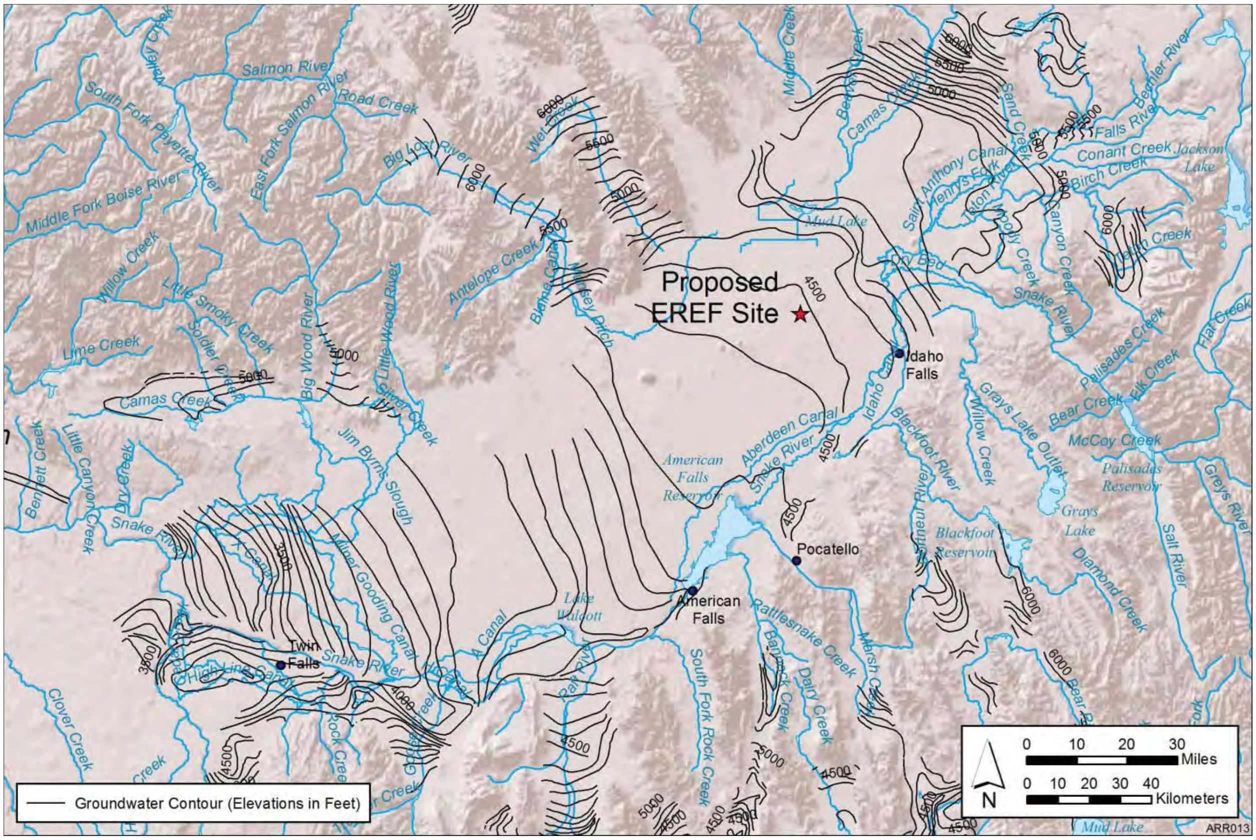

Figure 3-25 Groundwater Flow Contours for the ESRP Aquifer (IDWR, 2010)

interiors. Sedimentary interbeds and massive basalt zones, therefore, significantly impede the downward movement of water and may cause perching above the water table or lateral flow (AES, 2010).

About 60 percent of the ESRP aquifer recharge comes from irrigation water; other sources of recharge include small aquifers in valleys along the plain's edge (about 18 percent), infiltration from rivers and canals (about 13 percent), and precipitation (rain and snow) (about 9 percent) (IWRB, 2009). Although low-permeability layers are present in the vadose zone, little or no perching of groundwater has been observed below the proposed site. Depth to groundwater in onsite wells ranges from 201.5 meters (661 feet) to 220.0 meters (722 feet) below the ground surface. Groundwater flow below the proposed EREF site is consistent with the regional groundwater flow, from the northeast to the southwest, with a hydraulic gradient that drops 1.3 meters (4.3 feet) over a distance of 2260 meters (7460 feet) between wells GW-5 and GW-1 (about 0.0006) (Figure 3-26).

3.7.2.3 Groundwater Use

Snake River Plain Aquifers

The aquifers of the Snake River Plain are located in the basalt flows that formed the 40,404-square-kilometer (15,600-square-mile), crescent-shaped lobe in southern Idaho

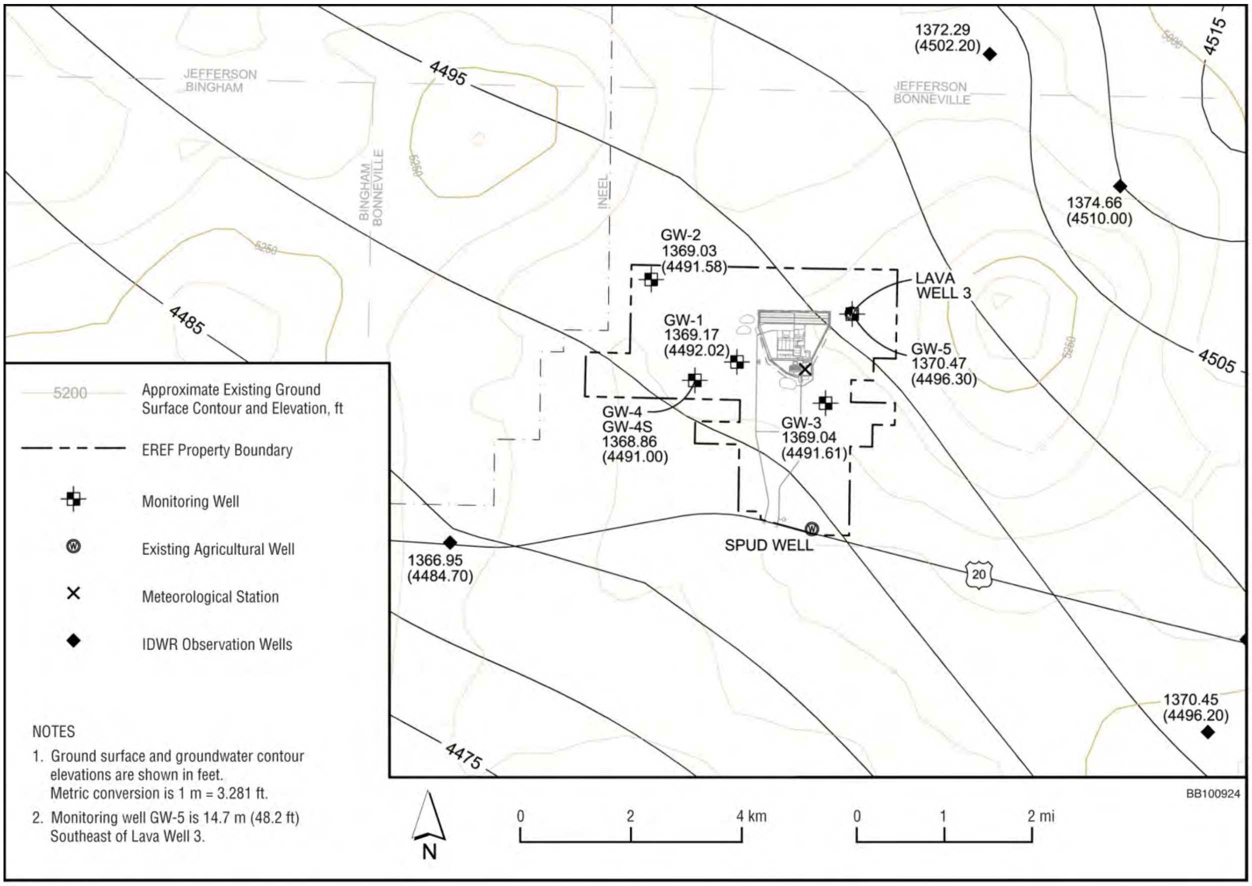

Figure 3-26 Groundwater Potentiometric Surface Map for the Proposed EREF Property (AES, 2010)

(Figure 3-27). The eastern half of the plain (the ESRP aquifer) consists of basalt flows with thicknesses up to 610 meters (2000 feet) that are overlain by and interbedded with unconsolidated sedimentary deposits. The western half is composed predominantly of unconsolidated sedimentary deposits with some basalt flows that are less thick than those making up the eastern half. The saturated thickness of the eastern half is much greater than that of the western half (Maupin and Barber, 2005). About 86 percent of the groundwater flowing through the Snake River Plain aquifers eventually discharges to the Snake River. The balance (about 14 percent) is withdrawn for irrigation, drinking water, and commercial and livestock use (IDEQ, 2005). In 2005, total water withdrawals – of both surface water and groundwater – in Bonneville County were 3.3 million cubic meters (882 million gallons per day or 988 thousand acre-feet per year). Groundwater withdrawn from the ESRP aquifer was about 19 percent of the total water withdrawn that year (USGS, 2010). The largest usage of groundwater in 2005 was for crop irrigation (at 96 percent). The second largest usage was for the public and domestic water supply (at 3.5 percent).

Public Water Supply and Water Rights

The ESRP aquifer was designated a sole source aquifer in 1991. A sole source aquifer is defined as one that supplies at least 50 percent of the drinking water in the petitioned area and

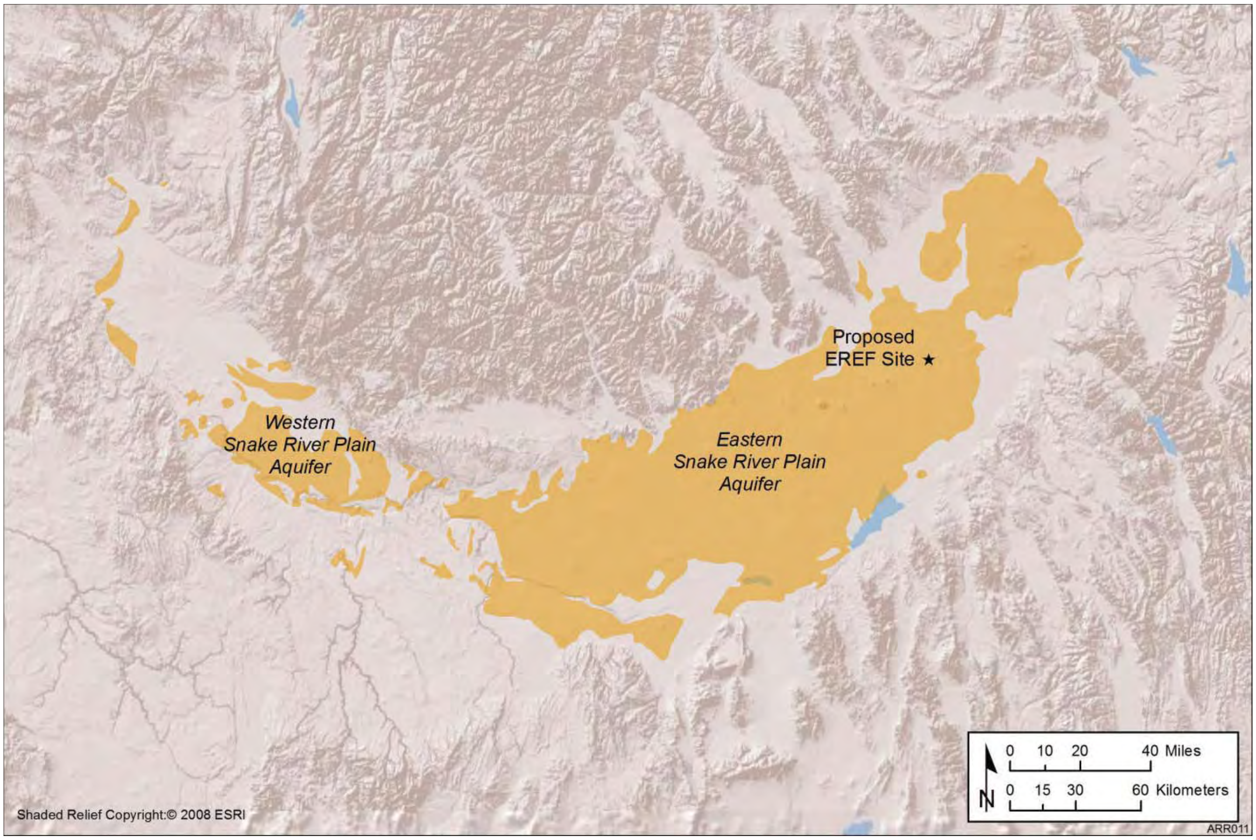

Figure 3-27 Snake River Plain Aquifers (modified from Maupin and Barber, 2005)

for which there is not a reasonably available alternative source to supply drinking water to all those who depend on the aquifer (EPA, 2009c). Currently, the ESRP aquifer is the sole source of drinking water for populations in southeast and south-central Idaho. The largest municipalities on the ESRP are Idaho Falls (Bonneville County) and Pocatello (Bannock County). The City of Idaho Falls operates a system of groundwater wells that meet an average daily usage of about 76,000 cubic meters (20 million gallons), with a maximum daily usage of about 220,000 cubic meters (58 million gallons). The City of Pocatello obtains its drinking water from the ESRP and Portneuf aquifers. Its municipal system meets an average daily usage of about 49,160 cubic meters (13 million gallons), with a maximum daily usage of about 130,700 cubic meters (34 million gallons) (IDC, 2009).

The proposed EREF would use groundwater appropriated by a 1961 water right that would transfer to AES with the purchase of the proposed EREF property. The transfer approval notice (for Water Right No. 35-2642) specifies an annual industrial diversion rate of 1713 cubic meters per day (452,527 gallons per day) and an annual irrigation diversion rate (from April 1 to October 31) of 147 cubic meters per day (38,833 gallons per day) (Carlsen, 2009). The primary point of diversion would be the existing onsite agricultural well (Lava Well; Figure 3-25) and an additional well installed to supply potable water.

3.7.2.4 Groundwater Quality

The upper portion of the ESRP aquifer has a predominantly calcium bicarbonate composition and is of high quality when compared with drinking water standards. The concentrations of minor elements and metals in the aquifer are generally low due to its neutral to slightly alkaline pH and moderately reducing conditions (Lindholm, 1996; Wood and Low, 1988).

Currently, there are two agricultural wells (Lava Well 3 and Spud Well), five deep aquifer monitoring wells (GW-1 through GW-5), and one shallow perched water well (GW-4S) at the proposed EREF site (Figure 3-25). Well GW-4S has been dry since it was installed. Water from monitoring wells GW-1 through GW-5 were sampled following their completion in May and July 2008 and then again in October 2008. The agricultural wells were sampled in March, May, and October 2008. Samples from all wells were analyzed for metals (dissolved and total[13]), total organic carbon, VOCs, SVOCs, PCBs, total petroleum hydrocarbons, pesticides, and herbicides (AES, 2010). Analytes were compared to the EPA's maximum contaminant levels (MCLs) and secondary MCLs (SMCLs),[14] since these represent stringent limits for potable water supplies (EPA, 2010b).

Total dissolved solids in onsite well samples were found in the range of 200 to 260 milligrams per liter, less than the EPA MCL of 500 milligrams per liter. Dissolved metal concentrations were also detected at levels below their corresponding MCL. Except for aluminum and iron, which were found in samples from the agricultural wells, total metal concentrations were below the EPA MCLs. Aluminum and iron concentrations likely resulted from the presence of suspended particles, which do not dissolve in the slightly alkaline pH of the aquifer.

No VOCs, SVOCs, PCBs, pesticides, or herbicides were detected in groundwater samples collected in March, May, and July 2008. October 2008 samples from some monitoring wells contained low levels of plasticizers (bis[2-ethylhexyl]phthalate and diethylphthalate) and trace amounts of chloroform. Low levels of lubricating oil were also detected in samples from some wells. These concentrations likely resulted from contamination introduced by sample handling (e.g., collecting or laboratory analysis) and drilling (in the case of the lubricating oil) and do not represent contamination within the aquifer.

Radiological analyses (gamma spectroscopy, gross alpha and beta, and tritium) were also performed on groundwater samples collected in 2008. Radium-224 and -228 and uranium-234, -235, and -238 were detected in some monitoring wells. Radium-228 and uranium-234, -235, and -238 were all below their respective EPA MCLs (5 picocuries per liter and 20 picocuries per liter). Detectable levels of gross beta were found in some monitoring wells, but in each case, they were less than the EPA MCL of 15 picocuries per liter. Tritium was detected in one well (GW-3) at a concentration of 530 picocuries per liter in May 2008. The EPA MCL for beta particle and photon radioactivity from radionuclides (like tritium) in drinking water is 4 millirem

[13] Total metals in groundwater consist of those metals that are dissolved as free ions and metal complexes and those that are suspended (and filterable) as adsorbed or precipitated particles.

[14] The *Safe Drinking Water Act* defines primary drinking water standards or MCLs as the maximum permissible level of a contaminant in public drinking water. Secondary drinking water standards or SMCLs are for contaminants that are not threatening to health but could give rise to undesirable aesthetic (e.g., taste or odor), cosmetic (e.g., skin discoloration), or technical (e.g., corrosivity) effects.

per year; the average concentration of tritium that would yield this level of radioactivity is about 20,000 picocuries per liter (EPA, 2002). The concentration of tritium (530 picocuries per liter) detected in well GW-3 represents about 3 percent of that concentration.

3.8 Ecological Resources

This section describes the ecological resources, including plant communities; wildlife; rare, threatened, and endangered species; wetlands; and environmentally sensitive areas, of the proposed EREF site and property and surrounding areas. Surveys were conducted by AES in June and October 2008 for vegetation on the property and in May, June, and October 2008, January and April 2009, and April 2010 for wildlife. Ecological surveys also have been conducted at INL, a 2305-square-kilometer (890-square-mile) DOE laboratory about 1.6 kilometers (1 mile) west of the property, for more than 50 years.

3.8.1 Plant Communities

The EPA through its Western Ecology Region has developed, in cooperation with the U.S. Forest Service and the National Resource Conservation Service (formerly the Soil Conservation Service), a common framework for describing, classifying, and mapping ecological regions of the United States. The ecological regions mapped are typically geographically large.

These geographically distinct areas are associated with clearly observable groupings of plant and animals that live there under specific environmental conditions. The EREF property is located in what is called the Snake River Plain (Ecological Region 12), an area that covers about 51,023 square kilometers (19,700 square miles) (McGrath et al., 2002). The region is further divided into ten sub-regions, three of which are associated with the area ecology and/or the EREF property. These sub-regions are the: (1) 12b Lava Fields, (2) 12g East Snake River Basalt Plain, and (3) 12e Upper Snake River Plain. The approximate size of the sub-regions is 1100, 6400 and 1500 square miles, respectively. The Snake River Plain is also referred to as the Sagebrush Steppe, and in its more native state (12g) is characterized by large expanses of sagebrush and a variety of native grasses with saltbush and shad scale found in the saltier soils. The major difference between the 12g and 12e types is that the latter typically has deeper soils and where irrigation is available is used for the production of pastures and small grains such as wheat, potatoes, sugar beets, beans, and alfalfa. Type 12b is the lava field and can be found at the Craters of the Moon National Monument and Preserve.

A fairly large part of this ecological region is located in within the BLM's Upper Snake land unit managed out of its field office in Idaho Falls, Idaho. The boundaries of the Upper Snake unit total about 11,100 square miles or 7.1 million acres and roughly correspond to the same ecological sub-regions described under the EPA mapping system for the sagebrush steppe region. About 4000 square miles or 2.6 million acres (36.1 percent) are privately held lands, about 2800 square miles or 1.8 million acres (25.3 percent) are managed by BLM, about 2600 square miles or 1.7 million acres (23.4 percent) are managed by the U.S. Forest Service, and about 600 square miles or 0.4 million acres (5.3 percent) are owned by the State of Idaho. The nearby INL contains about 900 square miles or 0.6 million acres (8.0 percent). Together these land groupings total over 90 percent of the 7.1-million-acre BLM land management unit.

The BLM is tasked with the management of the rangeland under its control for multiple uses. Principal activities managed include grazing, wildlife habitat, hunting, and recreation, and this is performed under a comprehensive range management plan (RMP). Periodically the BLM reevaluates its current management plan and revises it. Revising an RMP is considered to be a major Federal action and requires that the BLM prepare an EIS. On February 28, 2008, the BLM published in the *Federal Register* a Notice of Intent to prepare an EIS to revise the Upper Snake RMP (73 FR 10802) and has completed a Final Public Scoping Report. The RMP planning process is a cooperative effort involving, in part, the DOE, EPA, U.S. Forest Service, the FWS, and a number of Idaho government agencies including the Department of Fish and Game, Department of Agriculture, and Department of Parks and Recreation.

The BLM Field Office estimates that 98 percent of the RMP area consists of sagebrush steppe and that the largest single land use for the public lands is livestock grazing. The BLM received 684 comments that were then grouped into seven planning issues. The seven planning issues identified are now being used to develop alternatives to be evaluated in the EIS. Two of the seven issues listed relate directly to the scope of the AES EIS and include impacts to the long-range health of the Sagebrush Steppe and its wildlife and plant communities and the resolution of conflicts over livestock grazing.

In 1995, the National Biological Service listed the Sagebrush Steppe ecosystem as a critically endangered ecosystem across its entire range (BLM/DOE, 2004) and has experienced more than a 98 percent decline since European settlement. The INL Sagebrush Steppe Ecosystem Reserve was established in 1999. This reserve is significant in many respects, not the least of which is the fact that it is currently the largest non-grazed reserve of sagebrush steppe in the region with approximately 40 percent of the area not having been grazed for over 50 years, and is the closest example of what the sagebrush steppe looked like before European settlement. The site maintains a long-term management plan that is jointly implemented and administered by DOE and the BLM in consultation with the FWS and the Idaho Department of Fish and Game. The most recent management plan was finalized in May 2004 (Final Management Plan EA ID-074-02-067 Finding of No Significant Impact) with a preferred alternative of multiple land use with a continued emphasis on natural resource protection and controlled livestock grazing principally on the BLM land within the boundaries of INL.

Large areas of the INL site support high-quality, relatively undisturbed sagebrush steppe habitat, and are included in the INL Sagebrush Steppe Ecosystem Reserve (BLM/DOE, 2004). Species diversity is high because of the reduced level of disturbances, such as grazing. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) are the dominant shrubs in this habitat; other frequently occurring shrubs include green rabbitbrush (*Chrysothamnus viscidiflorus*), winterfat (*Krascheninnikovia lanata*), prickly phlox (*Leptodactylon pungens*), and spiny hopsage (*Grayia spinosa*) (BLM/DOE, 2004). Perennial grasses commonly occurring in this habitat include thick-spiked wheatgrass (*Elymus lanceolatus*), Indian ricegrass (*Achnatherum hymenoides*), needle-and-thread (*Hesperostipa comata*), and Sandburg bluegrass (*Poa secunda*), while fernleaf biscuitroot (*Lomatium dissectum*), threadstock milkvetch (*Astragalus filipes*), Hoods phlox (*Phlox hoodii*), and hoary aster (*Machaeranthera canescens*) are commonly occurring forbs. Some areas of former sagebrush habitat on INL have been converted to grassland due to wildfire.

The EREF property is located within both the 12g East Snake River Basalt Plain and the 12e Upper Snake River Plain or Sagebrush Steppe ecoregions. Figure 3-28 shows the land cover types in the region around the EREF property, while Figure 3-29 provides cover types on the EREF property and immediate vicinity (Landscape Dynamics Lab, 1999). The property is transitional in that the western part of the property (Figure 3-30); 429 hectares (1060 acres) is sagebrush steppe whereas the remainder of the property managed as either nonirrigated pasture (882 hectares [2180 acres]) or as irrigated cropland (389 hectares [962 acres]) (AES, 2010). Immediately to the east of the property, the land is intensively managed as agricultural lands and falls within the 12g East Snake River Basalt Plain ecoregion.

As shown in Table 3-19, 34 plant species were identified within the sagebrush steppe community. The dominant species in this community on the EREF property are the shrubs Wyoming big sagebrush (approximately 16 percent areal cover), dwarf goldenbush (*Ericameria nana*) (approximately 17 percent areal cover), and Sandberg bluegrass (*Poa secunda*), a native perennial bunchgrass (approximately 11 percent areal cover) (AES, 2010). Only 8 of the 14 commonly occurring species in high-quality INL sagebrush steppe habitats were found on the EREF property. The total areal cover of all plants, excluding mosses, is about 60 percent. The total areal cover of shrubs is about 34 percent, of grasses about 20 percent, and forbs about 6 percent. The sagebrush steppe community has been impacted for many years by grazing, resulting in soil disturbance and reduced cover of herbaceous species. Four of the 34 species (12 percent) identified in this community were non-native, including cheatgrass, a highly invasive annual species which currently covers about 4 percent of the sagebrush steppe habitat. The density of Wyoming big sagebrush ranges from 6000 plants per hectare (2428 per acre) for short shrubs, those less than 40 centimeters (15.7 inches) in height, to 6900 plants per hectare (2792 per acre) for taller shrubs, those at least 40 centimeters (15.7 inches) in height.

The other predominant plant community type at the EREF property is nonirrigated pasture, which represents the remnant of sagebrush steppe that was mechanically modified to develop improved grazing (AES, 2010). Modification included the removal of shrubs from most of the area composing this community; grasses, such as crested wheatgrass (*Agropyron cristatum*), a non-native perennial bunchgrass, were planted. The remaining shrubs are primarily located at rock outcrops. The dominant species in the pasture community on the property are crested wheatgrass (about 34 percent areal cover) and cheatgrass (approximately 12 percent areal cover) (AES, 2010), both non-native species. This community has much lower species diversity than the native sagebrush steppe community. A total of only 17 plant species have been identified within this community. The total areal cover of all plants is about 55 percent. The total areal cover of grasses is about 47.5 percent, of forbs about 7 percent, and shrubs about 0.5 percent. Seven of the 17 species (41 percent) identified in this community are non-native. Bur buttercup (*Ranunculus testiculatus*), a non-native forb, occurs frequently in this community (about 5 percent areal cover). Other non-native species include alfalfa (*Medicago sativa*), tansymustard (*Descurainia sophia*), goats beard (*Tragopogon dubius*), and Canada thistle (*Cirsium arvense*), all at less than 1 percent cover.

3.8.2 Wildlife

The wildlife species observed or determined to be present, based on evidence observed, on the EREF property are presented in Table 3-20. A total of 27 wildlife species were identified in the sagebrush steppe community. Sagebrush obligate species, which depend on sagebrush during

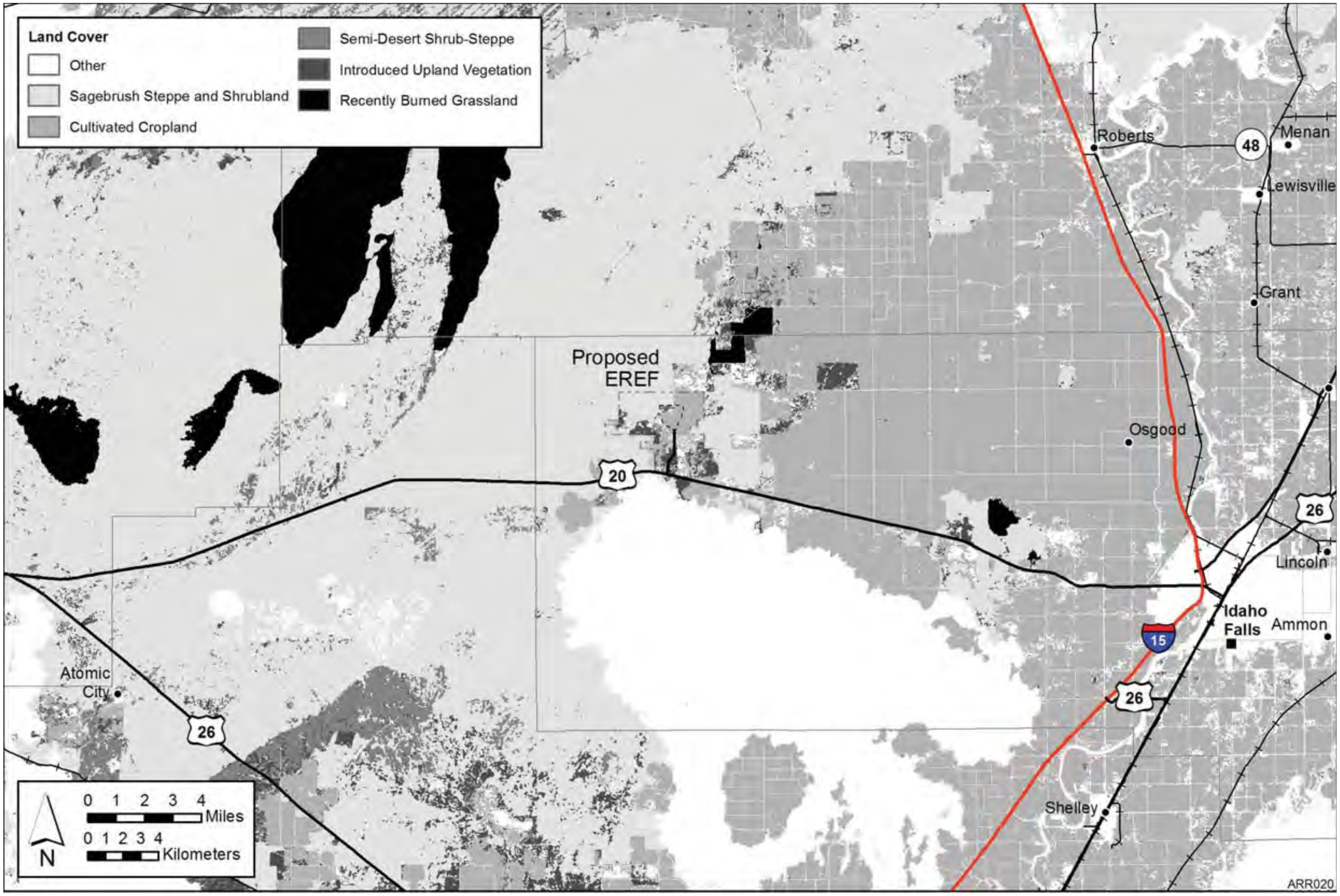

Figure 3-28 Land Cover Types of the Region (data from Landscape Dynamics Lab, 1999)

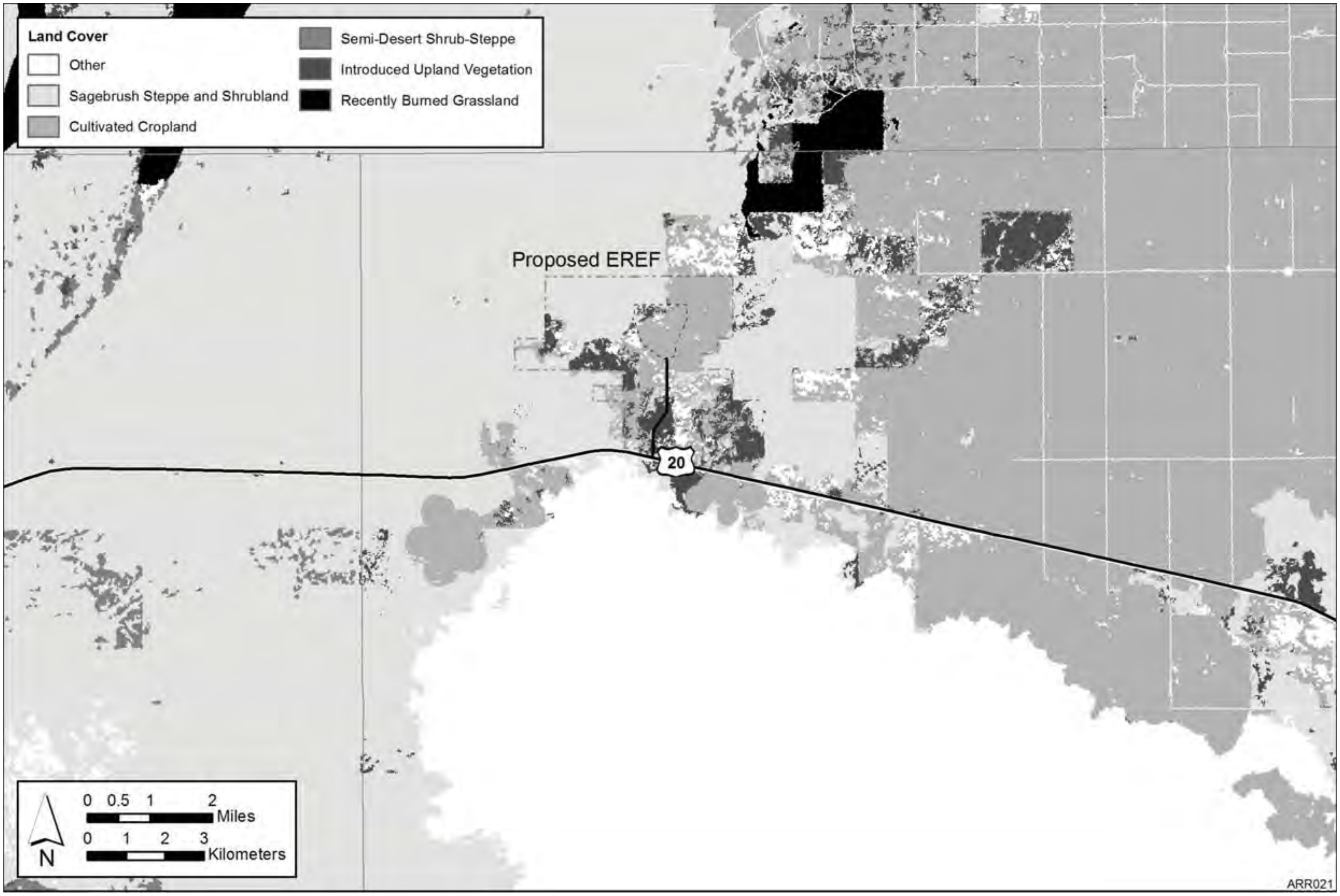

Figure 3-29 Land Cover Types of the Proposed EREF Property (data from Landscape Dynamics Lab, 1999)

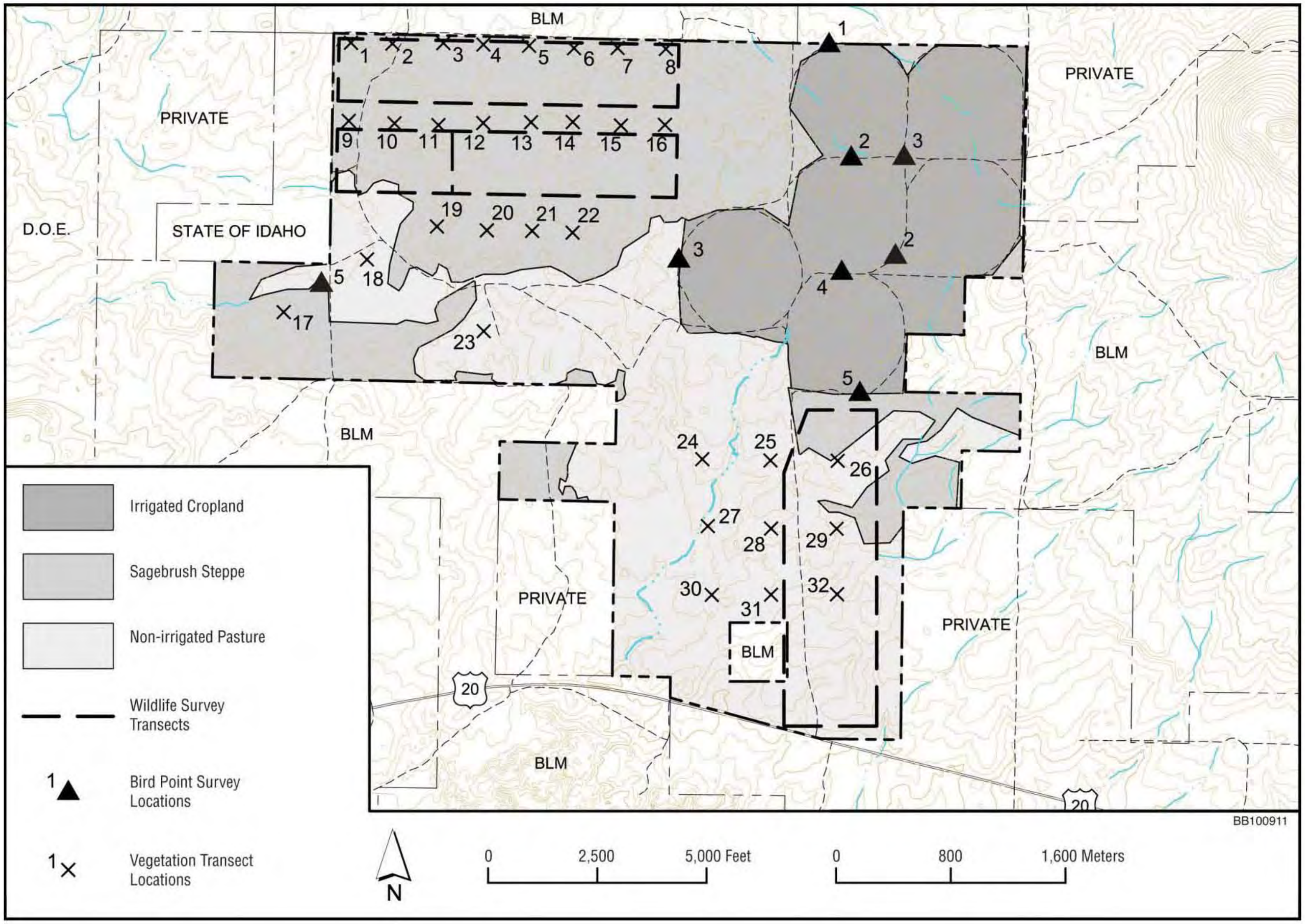

Figure 3-30 Vegetation Types of the Proposed EREF Property (AES, 2010)

Table 3-19 Plant Species Identified on the Proposed EREF Property and Percent Areal Cover

Scientific Name[a]	Common Name	Plant Community: Sagebrush Steppe	Plant Community: Nonirrigated Pasture
Shrubs			
Artemisia tridentata ssp. *wyomingensis*	Wyoming big sagebrush	16.00	0.18
Artemisia tripartita	Threetip sagebrush	0.30	–[b]
Atriplex nuttallii	Nuttall's saltbush	0.10	–
Ericameria nauseosa	Rubber rabbitbrush	–	0.18
Ericameria nana	Dwarf goldenbush	17.00	0.18
Krascheninnikovia lanata	Winterfat	0.09	–
Grasses			
*Agropyron cristatum**	Crested wheatgrass	0.60	33.60
*Bromus tectorum**	Cheatgrass	4.00	11.90
Elymus elymoides	Squirreltail	0.09	–
Elymus lanceolatus	Thick-spike wheatgrass	1.00	–
Hesperostipa comata	Needle-and-thread	0.02	–
Hordeum jubatum	Foxtail barley	3.00	0.05
Achnatherum hymenoides	Indian ricegrass	0.04	–
Poa secunda	Sandberg bluegrass	11.00	1.90
Forbs			
Agoseris glauca	False dandelion	–	0.80
Allium textile	Textile onion	0.10	–
Arabis lignifera	Desert rockcress	0.20	–
Astragalus curvicarpus	Curvepod milkvetch	0.20	–
Castilleja sp.	Indian paintbrush	0.07	–
Chenopodium leptophyllum	Slimleaf goosefoot	0.04	–
*Cirsium arvense**	Canada thistle	–	0.05
Crepis acuminata	Hawksbeard	0.10	–
Cryptantha interrupta	Bristly cryptantha	0.10	–
Delphinium andersonii	Anderson's larkspur	0.02	–
*Descurainia sophia**	Tansymustard	1.00	0.14
Erigeron pumilus	Shaggy fleabane	0.40	0.41

Table 3-19 Plant Species Identified on the Proposed EREF Property and Percent Areal Cover (Cont.)

		Plant Community	
Scientific Name	**Common Name**	**Sagebrush Steppe**	**Nonirrigated Pasture**
Lappula occidentalis	Flatspine stickseed	0.50	0.05
Lepidium sp.	Pepperwort	0.09	–
Lomatium dissectum	Fernleaf biscuitroot	0.30	–
Medicago sativa[a]	Alfalfa	–	0.14
Oenothera caespitosa	Desert evening primrose	0.02	–
Packera cana	Woolly groundsel	0.02	0.05
Phlox hoodii	Hood's phlox	0.60	0.05
Phlox longifolia	Longleaf phlox	2.00	–
Ranunculus testiculatus[a]	Bur buttercup	0.02	5.00
Schoenocrambe linifolia	Flaxleaf plainsmustard	0.30	–
Sphaeralcea munroana	Orange globemallow	0.02	–
Tragopogon dubius[a]	Goat's beard	–	0.09
Cacti			
Opuntia polyacantha	Prickly pear	0.20	–

[a] Non-native species.

[b] Dash = not observed.

Source: AES, 2010; native status from USDA, 2010b.

at least some portion of the year for survival, that are known to occur on the property include greater sage-grouse (*Centrocercus urophasianus*), sage thrasher (*Oreoscoptes montanus*), Brewer's sparrow (Spizella breweri), sage sparrow (*Amphispiza belli*), and pronghorn antelope (*Antiliocapra americana*).

Fifteen wildlife species were observed in the nonirrigated pasture habitat and 10 in the irrigated crops area. No small-mammal trapping was conducted on the property; however, small mammals common in similar habitats at INL include black-tailed jack rabbit (*Lepus californicus*), mountain cottontail (*Sylvilagus nattallii*), pygmy rabbit (*Brachylagus idahoensis*), Townsend's ground squirrel (*Spermophilus townsendii*), least chipmunk (*Tamias minimus*), Great Basin pocket mouse (*Perognathus parvus*), Ord's kangaroo rat (*Dipodomys ordii*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), bushy-tailed woodrat (*Neotoma cinerea*), and montane vole (*Microtus montanus*) (S.M. Stoller Corporation, 2001).

Table 3-20 Wildlife Species Occurring on the Proposed EREF Property[a]

Scientific Name	Common Name	Sagebrush Steppe	Nonirrigated Pasture	Irrigated Cropland
Amphibians				
Ambystoma tigrinum	Tiger salamander	–[b]	X	–
Reptiles				
Phrynosoma douglassi	Short-horned lizard	X	–	–
Birds				
Ammodramus savannarum	Grasshopper sparrow	X	–	–
Amphispiza belli	Sage sparrow	X	–	–
Asio flammeus	Short-eared owl	X	–	–
Buteo jamaicensis	Red-tailed hawk	–	–	–
Centrocercus urophasianus	Greater sage-grouse	X	–	–
Charadrius vociferus	Kildeer	–	X	–
Circus cyaneus	Northern harrier	X	X	X
Corvus brachyrhynchos	American crow	X	X	X
Eremophila alpestris	Horned lark	X	X	X
Euphagus cyanocephalus	Brewer's blackbird	X	–	–
Falco mexicanus	Prairie falcon	X	–	–
Molothrus ater	Brown-headed cowbird	X	X	–
Numenius americanus	Long-billed curlew	–	–	X
Oreoscoptes montanus	Sage thrasher	X	X	–
Pica hudsonia	Black-billed magpie	X	X	X
Pooecetes gramineus	Vesper sparrow	X	X	–
Spizella breweri	Brewer's sparrow	X	X	–
Spizella passerina	Chipping sparrow	–	–	–
Sturnella neglecta	Western meadowlark	X	X	X
Zenaida macroura	Mourning dove	X	X	X
Mammals				
Taxidea taxis	Badger	X	–	–
Canis latrans	Coyote	X	X	–
Antiliocapra americana	Pronghorn	X	X	–
Microtus montanus	Montane vole	X	–	–
Odocoileus virginianus	White-tailed deer	X	–	–
Lepus californicus	Black-tailed jack rabbit	X	–	–

Table 3-20 Wildlife Species Occurring on the Proposed EREF Property[a] (Cont.)

Scientific Name	Common Name	Sagebrush Steppe	Nonirrigated Pasture	Irrigated Cropland
Spermophilus townsendii	Townsend's ground squirrel	X	–	–
Tamias minimus	Least chipmunk	X	X	–
Peromyscus maniculatus	Deer mouse	X	–	–

[a] Species that were identified as present on the property based on visual observation, calls, or evidence of recent presence are indicated with an "X".
[b] Dash = not observed.
Source: AES, 2010; MWH, 2008a,b,c; MWH, 2009.

Pronghorn have been observed on the EREF property. Pronghorn use the property throughout the year, and the property is located within important winter-spring pronghorn habitat. Mule deer (*Odocoileus hemionus*) and elk (*Cervus canadensis*) occur in the region during summer and winter and migrate through the INL area between summer and winter use areas (BLM/DOE, 2004). There are no indications that mule deer, elk, or pronghorn populations are declining in the region; elk and pronghorn populations may be slightly increasing (IDFG, 2009b).

3.8.3 Rare, Threatened, and Endangered Species

No Federally listed threatened or endangered species are known to occur, or are expected to occur, on the EREF property (FWS, 2009a), and none were identified on the property during field surveys. The following Federally listed species are known to occur in Bonneville County and adjacent Jefferson and Bingham Counties, and are found in stream, forest, wetland, and riparian habitats: the Utah valvata snail (*Valvata utahensis*), endangered; Canada lynx (*Lynx canadensis*), threatened; Ute ladies'-tresses (*Spiranthes diluvialis*), threatened; grizzly bear (*Ursus arctos*), threatened; and yellow-billed cuckoo (*Coccyzus americanus*), a candidate for listing (FWS, 2009b). None of their habitat types are found on the EREF property nor within an 8-kilometer (5-mile) radius of the property.

The Utah valvata snail is a freshwater aquatic snail that occurs in the mainstem of the Snake River (FWS, 2010a). The Snake River is about 32 kilometers (20 miles) from the property, and there are no freshwater habitats on or in the vicinity of the property. Therefore, this species would not occur on or near the property.

The Canada lynx (*Lynx canadensis*) is typically associated with forested habitats and may use riparian habitat along rivers as travel corridors. Ute ladies'-tresses (*Spiranthes diluvialis*), a plant primarily of wetland and riparian habitats, occurs in the Snake River floodplain (IDFG, 2009a). The yellow-billed cuckoo (*Coccyzus americanus*) is typically associated with riparian woodlands and shrubs and occurs along the Snake River. The grizzly bear occurs in a variety of habitats within portions of the Greater Yellowstone Area (FWS, 2010b).

The bald eagle (*Haliaeetus leucocephalus*) is listed as a threatened species by the State of Idaho, but is no longer a Federally listed species. It nests in trees along the Snake River northeast and southeast of the proposed EREF site and winters near open water (IDFG, 2005; FWS, 2007). Foraging is generally near rivers, lakes, or other water bodies. Bald eagles do not nest in the vicinity of the proposed EREF, and winter habitat does not occur in the vicinity.

Species of concern that were observed on the EREF property include the long-billed curlew (*Numenius americanus*), ranked as an imperiled breeding population in the State and BLM watch list; Brewer's sparrow (*Spizella breweri*), ranked as a vulnerable breeding population in the State and BLM regional/State imperiled; grasshopper sparrow (*Ammodramus savannarum*), ranked as an imperiled breeding population in the State and BLM watch list, which are all species of conservation concern (FWS, 2008) and BLM species of special concern.

Greater sage-grouse (*Centrocercus urophasianus*) was added to the Federal list of candidate species by the U.S. Fish and Wildlife Service (FWS) on March 5, 2010. The FWS determined that listing the sage-grouse as a protected species under the *Endangered Species Act* was warranted but precluded by the need to list higher priority species. Sage-grouse is also a species of conservation concern in Idaho and ranked as imperiled in the State and BLM rangewide/globally imperiled. The proposed EREF property appears to be located within the annual range of a local sage-grouse population, and sage-grouse evidently use the site. Sage-grouse were observed, and male sage-grouse were heard just north of the EREF property during surveys in 2008 (MWH, 2008a), and evidence of the presence of sage-grouse was observed on the property in 2008 and 2009 (MWH, 2008b, 2009). In June 2008, sage-grouse pellets (droppings), feathers, and a roost used by sage-grouse were found in sagebrush habitat on the property (MWH, 2008b). In January 2009, sage-grouse tracks were found in the sagebrush habitat on the property and the irrigated crops area of the property; in April 2009, sage-grouse feathers were found at three locations in sagebrush habitat on the property (MWH, 2009). In April 2010, old sage-grouse pellets were found in sagebrush habitat on the property (North Wind, 2010). No greater sage-grouse leks (breeding areas) were found during surveys of the proposed property on May 6–7, 2008 (MWH, 2008a) and April 28–29, 2010 (North Wind, 2010). Recommended survey dates are early March to early May (Connelly et al., 2003); specifically, lek surveys should be conducted March 25 through April 30 for low elevation areas and April 5 through May 10 for higher elevations (ISAC, 2006). At approximately 5200 feet (1600 meters) MSL, the EREF property could be considered a high elevation site. The nearest known breeding ground (lek) is 5.6 kilometers (3.5 miles) from the EREF site, and numerous leks are located within 16 kilometers (10 miles) (IDFG, 2009b). Key sage-grouse habitat occurs in the vicinity of the EREF property (IDFG, 2009b; ISAC, 2006).

Sage-grouse have experienced long-term declines throughout their range, which includes much of the western United States. These declines are associated in large part with the loss and degradation of sagebrush habitat. Sagebrush is an important component of sage-grouse breeding, nesting, and winter habitat. The Idaho populations of sage-grouse declined at an average rate of 3.0 percent per year from 1965 to 1984, but declines from 1985 to 2003 averaged only 0.1 percent per year (Connelly et al., 2004).

The proposed EREF property is located within the Upper Snake Local Working Group Planning Area, which is within sage-grouse Management Zone IV. Since 1996, sage-grouse populations in the Upper Snake Local Working Group Planning Area appear to be stable (USSLWG, 2009).

Male lek attendance was up slightly in 2009 from 2008. In the Upper Snake Planning Area, the average males per lek in 2009 was 15, a drop from 19 in 2008 and 24 in 2007. Total males counted on leks in the Upper Snake Planning Area (on leks counted each year) was 1465 in 2009, 1366 in 2008, and 2052 in 2007.

Productivity measured as chicks per hen (chicks alive in September and October) is strongly influenced by weather. Idaho sage-grouse productivity in 2008 was 1.48 chicks per hen, which was slightly lower than the previous 5-year average of 1.93 (ISACTAT, 2010). However, in 2009, productivity was 2.0, slightly higher than previous 5-year average of 1.88 (ISACTAT, 2010). In the Upper Snake Planning Area, productivity is increasing with a chick/hen ratio of 2.17 in 2009, 1.84 in 2008, and 1.16 in 2007 (ISACTAT, 2010). A chicks/hen ratio of 2.25 or more generally results in a stable to increasing population.

The major threats to sage-grouse in Idaho are the loss, degradation, and fragmentation of sagebrush habitat (Connelly et al., 2004). Alteration of historical fire regimes, conversion of land to farming or intensive forage production for livestock, water developments, herbicide and pesticide use, establishment of invasive species, urbanization, energy development, mineral extraction, and recreation are all factors that contribute to sagebrush habitat degradation (Connelly et al., 2004). Restoration of disturbed areas should include sagebrush, native forbs (especially legumes), and native bunchgrasses to provide suitable breeding habitat for sage-grouse (USSLWG, 2009). Fences may be a source of sage-grouse mortality unless visibility is increased by flagging or other means (USSLWG, 2009). Noxious weeds invade sagebrush steppe plant communities and displace desirable species, change fire frequencies, and reduce the value of the habitat for sage-grouse (USSLWG, 2009).

Many sage-grouse populations in Idaho are migratory. Sage-grouse occur year-round on the INL site and migrate between leks, nesting areas, late brood-rearing habitat (June to early November), and winter habitat (BLM/DOE, 2004). Nesting sites have been known to be up to 18 kilometers (11 miles) from leks. Important characteristics for winter habitat include topographic diversity and a diversity of sagebrush heights. DOE, the BLM, and the Idaho Department of Fish and Game all participate in and follow the Idaho Sage-Grouse Advisory Committee's *Conservation Plan for the Greater Sage-Grouse in Idaho* (ISAC, 2006) and will continue to follow this document.

Species of conservation concern that occur in the region and are likely to occur on the EREF property include Townsend's big-eared bat (*Corynorhinus townsendii*), ranked as vulnerable in the State and BLM regional/State imperiled. Lava tube caves approximately 8 kilometers (5 miles) from the property are used by Townsend's big-eared bat as roosts and hibernacula (IDFG, 2009c). The bats likely forage for insects above the sagebrush steppe habitat. The ferruginous hawk (*Buteo regalis*), a migratory species, is ranked as a vulnerable breeding population in the State and BLM regional/State imperiled. Ferruginous hawks, including a nest, have been observed within 8 kilometers (5 miles) of the proposed site (IDFG, 2009c). The prey species in western shrubsteppe habitats primarily include black-tailed jackrabbit, ground squirrels, and pocket gophers. Ferruginous hawk nests tend to be located on the ground or in relatively isolated trees (Dechant et al., 1999). The pygmy rabbit (*Brachylagus idahoensis*) is ranked as imperiled in the State and BLM rangewide/globally imperiled. This burrowing species has been frequently observed on the INL site (S.M. Stoller Corporation, 2001). The sharp-tailed grouse (*Tympanuchus phasianellus*) is known to occur in the vicinity of the proposed EREF site

(IDFG, 2010) and occupies shrub and grass habitats (IDFG, 2005). The sharp-tailed grouse does not occur throughout the Upper Snake River Plain, and its distribution in the proposed EREF site area is somewhat limited (IDFG, 2005).

3.8.4 Wetlands

Wetlands are “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (USACE, 1987). No wetlands occur on or adjacent to the EREF property (FWS, undated; Joyner, 2008). No aquatic habitats, such as streams, rivers, lakes, or ponds, are present on or adjacent to the property. Surface water on and near the property consists of intermittent and ephemeral drainages that carry flows following storms and typically dissipate due to infiltration and evapotranspiration (USGS, 1964; NRCS, 2009). A drainage in the southwestern corner of the property may occasionally convey surface water off the property. A small impoundment on this drainage occasionally contains surface water following storms. Small wet areas in the irrigated cropland and near the potato shed occasionally receive water from agricultural operations and support such species as cattail (*Typha* sp.) and spikerush (*Eleocharis* sp.), as well as providing potential breeding areas for the tiger salamander (*Ambystoma trigrinum*). Permanent surface waters nearest to the property are the Snake River, about 32 kilometers (20 miles) to the east, Mud Lake and Market Lake, about 32 kilometers (20 miles) to the northeast, and the Big Lost River, about 32 kilometers (20 miles) to the west.

3.8.5 Environmentally Sensitive Areas

Three State wildlife management areas are located about 32 kilometers (20 miles) north-northeast of the EREF property. Market Lake State Wildlife Management Area is managed primarily to provide habitat for waterfowl; the North Lake State Wildlife Management Area and Mud Lake Wildlife Management Area are managed for fish and wildlife resources. Hell’s Half Acre WSA (BLM), immediately south of US 20, is a 26,790-hectare (66,200-acre) area of lava flows with sparse vegetation (BLM, 2008). Camas National Wildlife Refuge, about 32 kilometers (20 miles) north, includes lakes, ponds, and marshes.

3.9 Noise

This section describes the existing conditions at the proposed EREF site with respect to anthropogenic sources of noise, characterizes the geography and land cover with respect to noise propagation and attenuation, and identifies receptors that may be impacted by noise generated during preconstruction, construction, operation, or decommissioning of the proposed EREF. Existing noise regulatory controls and their respective enforcement authorities are also discussed.

Sound is a physical phenomenon and form of energy that can be described and measured and represented with precise mathematical expressions. Noise, on the other hand, is defined generally as any unwanted sound. Recognition of sound is based on the receptor’s objective and reproducible response to sound’s primary physical attributes: intensity (perceived by a receptor as loudness), frequency (perceived as pitch), frequency distribution and variation over time, and duration (continuous, sporadic [rhythmic], or impulsive). Perception of sound, however, is subjective and circumstantial. Sounds that are soothing to some are annoying to others, and sounds barely noticed and generally ignored in one circumstance may be considered highly objectionable in another. Sound levels that are acceptable during daytime hours are often unacceptable during nighttime hours.

3.9.1 Expected Sound Propagation Characteristics at the Proposed EREF Site

Sound propagation follows the inverse square law: the intensity of a sound wave decreases inversely with the square of the distance between the source and the receptor. Thus, doubling the distance between a receptor and a sound source reduces the intensity of the sound to one-fourth of its initial value, and tripling the distance results in one-ninth the original intensity, etc.

Throughout much of the continental United States, land cover results in attenuation of sound originating at or near ground level at a rate of 6 decibels for every doubling of distance between source and receptor. At a typical semiarid steppe with sparse vegetation and exposed, hard surface soils or rock, the ground surface would be expected to act primarily as a reflective surface rather than an absorptive surface, resulting in minimal attenuation of sound as it propagates from its source. However, the land surface composition around the proposed EREF does not represent a typical semiarid desert steppe. Native vegetation, primarily sage and cacti, exists in natural areas. However, crested wheatgrass, which had been introduced into the area some years ago, has spread throughout the area to a great extent, and, with the exception of small areas of basalt outcropping, the entire land surface of natural areas is now covered with a natural or introduced vegetative cover throughout the growing season. Other land areas surrounding the proposed EREF site that are currently in agricultural cultivation for potatoes or barley and that would continue to be used for those purposes after the proposed EREF becomes operational are also nearly fully covered with vegetation during much of the crop-growing cycle. Thus, given these circumstances and current and future surrounding land uses, it is reasonable to expect that the ground surface would be relatively sound-absorptive and that SPL attenuations would be at the average of 6 decibels with every doubling of distance from the source.

3.9.2 Existing Sound Sources and Potential Receptors at the Proposed EREF Property

Current activities at the proposed EREF property and on the surrounding land parcels are primarily agricultural. Noise sources related to current land use include an irrigation pump located in the approximate center of the site, the only identified significant anthropogenic point source, and machinery and equipment used seasonally to prepare the fields and to plant and harvest the crops. Truck transport of harvested crops to area processing plants represents another seasonal source.

The southern border of the proposed EREF property is defined by US 20, the only major transportation corridor in the immediate vicinity of the site. In addition to being used for commerce, US 20 is currently used by many employees of INL, located immediately west of the proposed EREF property, to commute between the laboratory and their homes in Idaho Falls. It is expected that US 20 will also be the primary route for the majority of employees of the proposed EREF once it becomes operational. Section 3.10 provides additional information about existing traffic patterns for US 20. No other significant anthropogenic sound sources exist in the immediate vicinity of the proposed EREF site.

The nearest human receptors are farm workers who may periodically be in agricultural fields bordering the proposed property (presumably only during daylight hours), hikers who may frequent a trail located on the BLM WSA about 0.5 kilometer (0.3 mile) southwest of the proposed property, and residents; the nearest residence was estimated to be located 7.7 kilometers (4.8 miles) east of the site on a parcel bordering US 20. No sensitive human receptors were identified. Individuals traveling on US 20 are not considered to be human receptors because of the short time during which they would be within a critical distance of any EREF sound source. The nearest community was identified as Idaho Falls, approximately 32 kilometers (20 miles) east of the site. Archeological sites at the Wasden Complex were identified at a distance of 1 kilometer (0.6 mile) from the proposed property. It is also presumed that indigenous wildlife would use the site and the vicinity throughout construction and operation and that cattle grazing would continue to occur on adjacent land parcels that are not involved in crop production. Cattle grazing may also be allowed on fallow portions of the proposed EREF property (excluding the industrial portion of the site) once construction is completed. AES identified one irrigation pump as the only anthropogenic point source of any significance and identified traffic on US 20 (which borders the site on its south boundary) as the only anthropogenic line source of note within the vicinity of the proposed site. Once construction of the proposed facility starts, the irrigation pump's operation will be discontinued. However, that same groundwater source is likely to be fitted with a different pump to provide water for construction-related activities.

3.9.3 Noise Regulatory Controls

Regulations addressing sound, or more precisely what society considers noise, exist for noise sources that originate or propagate on or above the ground surface. Federal noise standards have been established under the *Noise Control Act of 1972* for transportation and construction activities as well as for a variety of products. The *Noise Control Act* and subsequent Federal legislation (*Quiet Communities Act of 1978*, 42 U.S.C. 2901-4918) delegate the authority to regulate noise to State and local governments. Although there has been no formal noise control program functional at the Federal level since 1981, Federal noise standards have served as the basis for State and local regulations and ordinances addressing noise. Such State and local controls initially focused on construction or industrial noise but have evolved to also include noise control strategies in building codes to protect occupants from both exterior noise and noise generated within the structure. State and local regulations are typically enforced at the municipal or county level under broadly written nuisance statutes.

In addition to technical standards, the EPA has also published numerous guidance manuals for conducting community noise surveys, establishing acceptable levels of noise control at the community level, and enforcing those noise limits (e.g., EPA, 1980). Because of the increased sensitivity of most individuals to sound at night, a 10-decibel weighting factor is often added to the measured nighttime sound level to establish an equivalent sound level, or L_{eq}, that is then compared with the established standards. A day-night maximum average sound level (represented as L_{dn} or DNL) of 55 A-weighted decibels has been established as sufficient to protect the public from the effects of broadband environmental noise in quiet settings and residential neighborhoods (EPA, 1974). EPA guidelines also recommend that the L_{eq} (a sound level maintained continuously over a 24-hour period) be limited to 70 dBA or less over a 40-year period to protect the general population against hearing loss from nonimpulsive noise.

In addition to the EPA, other Federal agencies have issued circumstantially specific noise standards. The Federal Aviation Administration, in conjunction with the Federal Interagency Committee on Urban Noise, has issued land-use compatibility guidelines indicating that a yearly L_{dn} of less than 65 A-weighted decibels is compatible with residential land uses and that, if a community determines it is necessary, levels up to 75 dBA may be compatible with residential uses and transient lodgings if such structures also incorporate noise-reduction construction technologies (see 14 CFR Part 150, Appendix A). The U.S. Department of Housing and Urban Development (HUD) has also published noise guidance: levels of 65 L_{dn} or less (measured at the outside of an occupied residence) are acceptable under all circumstances, levels between 65 and 75 dBA are normally unacceptable but could become acceptable with the introduction of appropriate sound attenuation measures, and levels above 75 dBA are always unacceptable (Table 3-21). HUD has also promulgated standards (see 24 CFR Part 51, Subpart B) for residential noise that apply only to activities for which HUD provides assistance.[15] Finally, regulations governing the amount of noise to which workers can be exposed in the workplace are promulgated and enforced by the Occupational Safety and Health Administration (OSHA) (see 29 CFR Part 1910, Subpart G).

Noise limits in the ordinances are generally applied at the exterior of the nearest resident or sensitive receptor, such as a school or hospital, within a minimum distance, typically less than 2 kilometers (less than 1 mile). Limits on broadband noise in the various ordinances range from 45 to 65 dBA, with levels of about 50 dBA being the most frequently cited. Separate limits on low-frequency noises, which range up to 75 decibels, are included in many of the ordinances. A number of penalties, usually 5 dBA, are applied to these basic values to reduce impacts from annoyances such as evening operations, steady pure tones, or repetitive impulse sounds. There are no quantitative noise-limit regulations at the city, county, or State levels in Idaho; however, complaints about obtrusive noise that are made to local law enforcement authorities can be addressed under general nuisance ordinances.

3.9.4 Noise Analyses Performed for the Proposed EREF

Measurements of extant sound levels at various locations along the proposed property boundary of the proposed EREF site were performed by AES (AES, 2010). Background noise levels were established by using an A-weighted sound meter and data collected over six 24-hour periods at six locations from June 1 through 7, 2008 (see Figure 3-31). Data were collected and managed in accordance with applicable American Society of Testing and Materials (ASTM) standards (see ASTM Standard E-1686-03; ASTM, 2003). Average background noise levels ranged from 30.4 to 78.2 dBA; they are displayed in Table 3-22. The majority of measured levels met both the HUD and EPA standards. Levels exceeding 50 dBA were measured near US 20 during periods of heavy truck traffic, within the vicinity of the irrigation pump, and in the northeast corner of the proposed property during a windy (more than 40 kilometers or 25 miles per hour) period. As a contextual reference, Figure 3-32 presents levels representative of common everyday sounds.

Measurements of background noise levels conducted by AES are consistent with previously published measurements and estimates for the nearby INL (DOE, 2005) and are therefore considered to be an accurate representation of extant conditions at the site. For the general

[15] For additional details, consult the HUD Web site: http://www.hudnoise.com/.

Table 3-21 HUD Land Use Compatibility Guidelines

Land Use Category	Day-Night Sound Pressure Level or L_{dn} (dBA)			
	Clearly Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	<60	60–65	65–75	>75
Livestock farming	<60	60–75	75–80	>80
Office buildings	<65	65–75	75–80	>80
Wholesale, industrial, manufacturing, and utilities	<70	70–80	80–85	>85

Source: HUD, 2009.

area surrounding the INL site (which would include the proposed EREF property), the county-wide L_{dn}, based on population density, was estimated to be the highest – at 39 dBA – in Bonneville County. It was estimated to be 35 dBA in Bingham and Jefferson Counties, a level representative of typical rural areas, and 30 dBA in Butte County, a level representative of the natural background noise level of a wilderness area. Noise measurement data obtained from locations within 15 meters (50 feet) of US 20 showed traffic noise ranged from 64 to 86 dBA, with buses identified as the primary source, contributing from 71 to 80 dBA.

3.10 Transportation

This section describes the existing transportation infrastructure at and in the region of the proposed EREF site. The proposed EREF site is served directly and exclusively by road. There are no plans for rail access to the site. AES has stated that local roads and highways would be the sole means for conveying workers and materials to and from the site and region (AES, 2010). Nearby rail and air transportation routes also serve the region, but there are no viable water transportation routes. Figure 1-1 shows transportation routes near the proposed EREF site.

3.10.1 Roads

The site lies immediately north of US 20, approximately 32 kilometers (20 miles) west of Idaho Falls (and the junction of US 20 and I-15). US 20 is predominantly a two-lane highway traversing east-west between Idaho Falls to the east and the junction with US 26 to the northwest of Atomic City. Access to the proposed EREF site would be from one or two planned access roads to US 20. Control and public access to the access road(s) have yet to be specified. All traffic traveling to and from the proposed EREF (construction workers, employees, and shipments) would use one of these access roads (AES, 2010).

US 20 intersects I-15 at Idaho Falls, and I-15 and US 20 (north of Idaho Falls) would serve as the main routes between the proposed EREF (via US 20 West) and population centers to the north and south of Idaho Falls. I-15 is the major north-south artery in the region and would serve as the primary route for all incoming and outgoing truck shipments. The nearest interstate access to the west is I-84, approximately 296 kilometers (184 miles) away at its closest point by way of US 20. Idaho Falls is also served by US 26 and US 91.

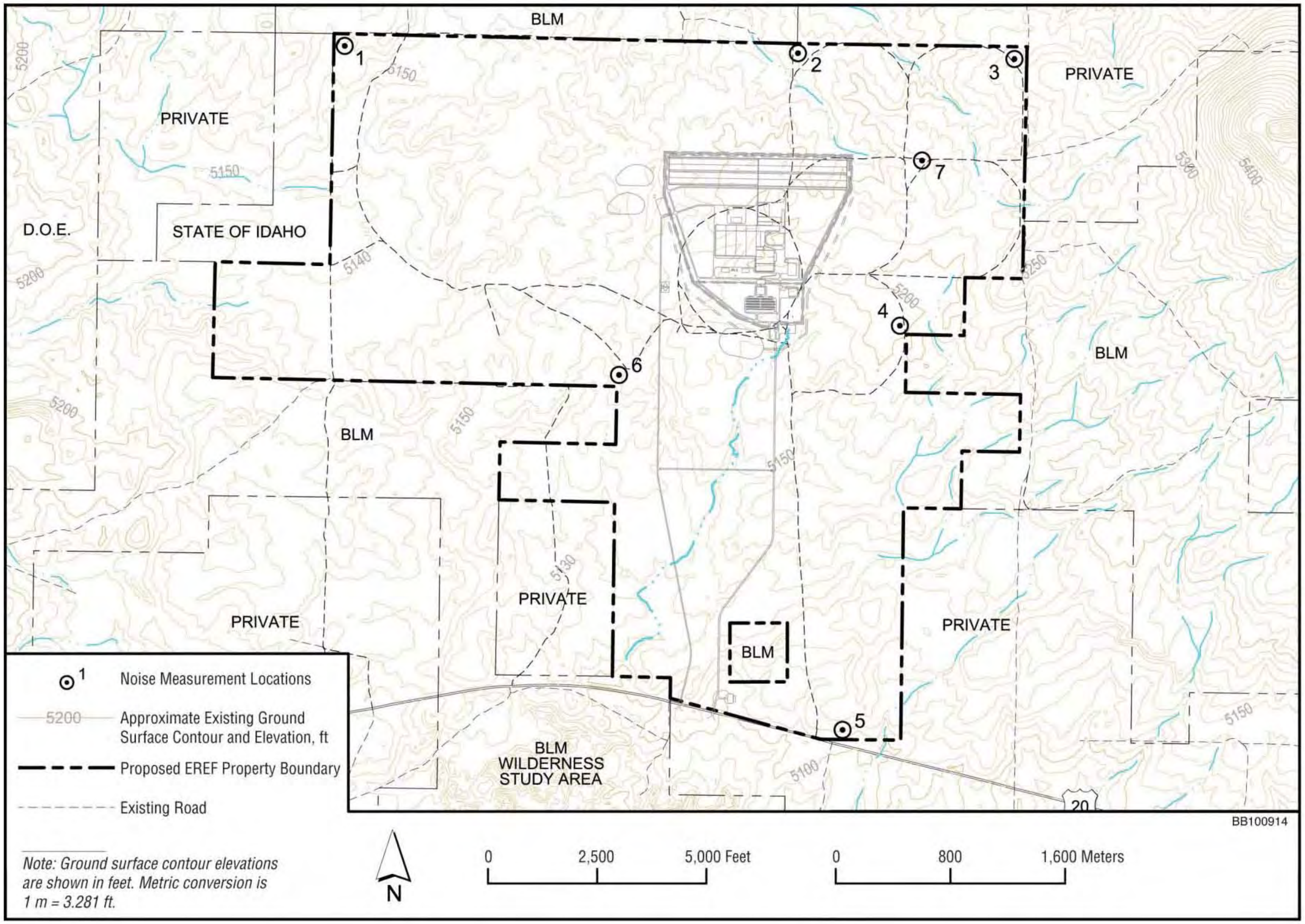

Figure 3-31 Noise Measurement Locations at the Proposed EREF Property (modified from AES, 2010)

Table 3-22 Extant Sound Levels at the Proposed EREF Property as Measured by AES

Measurement Location	Location Description	Average Sound Level (L_{eq})
Location 1	Northwest corner of proposed property	30.4 dBA
Location 2	North-central boundary of proposed property	39.8 dBA
Location 3	Northeast corner of proposed property (high wind conditions)	54.7 dBA
Location 4	Southeast corner nearest to proposed facility	37.1 dBA
Location 5	South boundary of proposed property next to US 20	57.5 dBA
Location 6	Southwest corner nearest to proposed facility	31.1 dBA
Location 7	Irrigation well pump in northeast portion of proposed property	78.2 dBA

Source: AES, 2010.

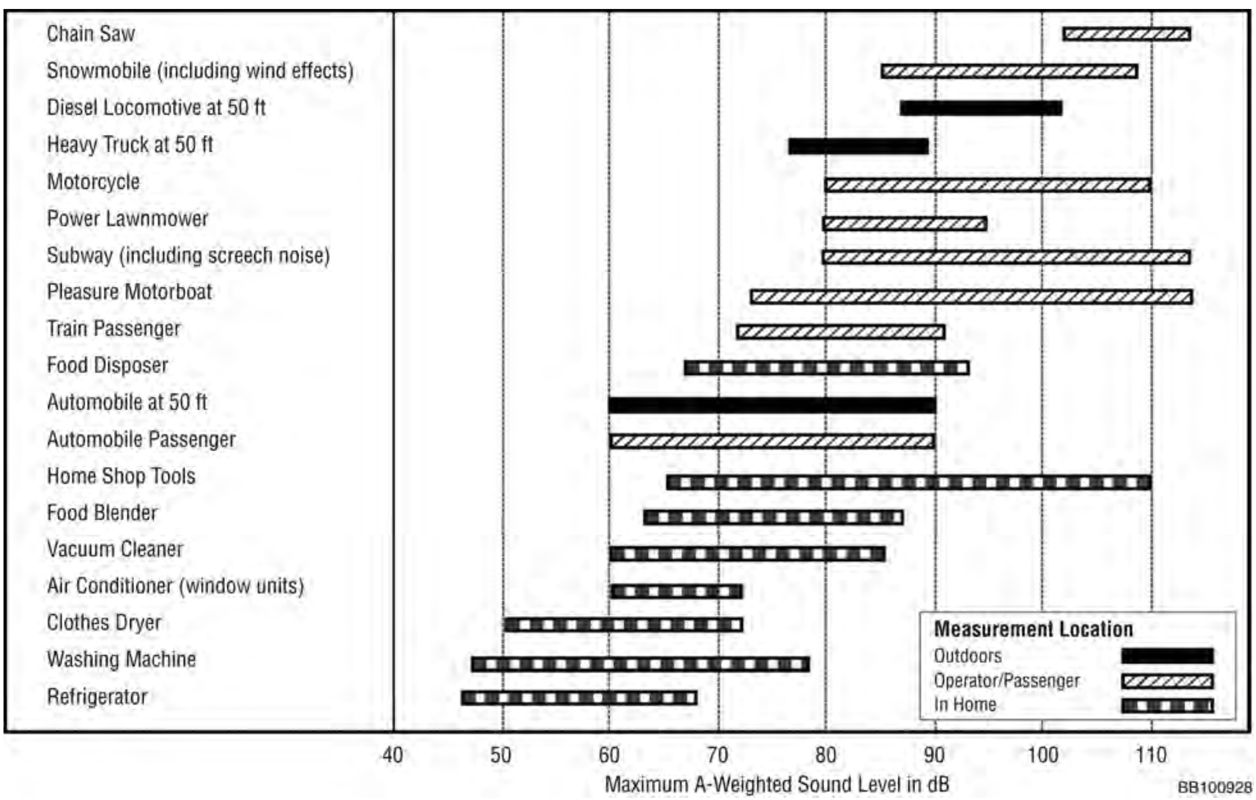

Figure 3-32 Sound Pressure Levels (dB) of Common Sources (All data reflect sound propagation in air and imply a human receptor.) (EPA, 1978)

As shown in Table 3-23, US 20 has an average daily traffic volume of 2210 vehicles in the vicinity of the proposed EREF site (mean monthly average from July 2008 to June 2009). A significant portion of this traffic is morning and afternoon commuting to and from INL (NRC, 2009; ITD, 2010e). This volume could increase if the INL park-and-ride bus system is discontinued.[16] The speed limit on US 20 in the vicinity of the proposed EREF site is 104.6 kilometers per hour (65 miles per hour); the average vehicle speed for all of 2009 was 103.8 kilometers per hour (64.5 miles per hour) (ITD, 2010b).

The relationship between the current/anticipated traffic volume on US 20 (in the vicinity of the proposed EREF site) and the road's design capacity is unknown, because the road was established before it became a major commuter route to INL. The Idaho Transportation Department (ITD) notes that the road was not designed for a specific level of service (LOS)[17] and is not engineered to accommodate the current traffic flow. However, the LOS is considered high for a two-lane road (NRC, 2009). Based on average traffic volumes, average traffic speeds, and the highly directional nature of peak flow (largely consisting of INL commuters), the LOS on US 20 is estimated to be high density but stable flow during peak periods and free flow at all other times (AASHTO, 1994; ITD, 2010b,c,e).

There is a local perception that US 20 between Idaho Falls and INL is unsafe (likely due to a history of high-profile accidents) and would get worse if the proposed EREF is licensed (NRC, 2009). However, ITD notes that the accident rate on the affected stretch of US 20 is actually lower than the statewide average and base area rates (ITD, 2005; NRC, 2009). In 2005, ITD performed an internal study of potential safety improvements for US 20 (i.e., widening and/or passing lanes) in the vicinity of the proposed EREF site (ITD, 2005, 2010c). At that time, funding was not available to implement the studied improvements (primarily selective passing lanes), and ITD does not anticipate a funding allocation in the foreseeable future (NRC, 2009).

According to ITD, US 20 is overbuilt (i.e., engineered to accommodate a higher LOS than presented by current traffic levels) to a distance of 8 kilometers (5 miles) west of Idaho Falls to accommodate growth at INL that was anticipated but did not materialize (NRC, 2009). This likely improves capacity and LOS for approximately 25 percent of the segment between Idaho Falls and the proposed EREF site. There are currently no plans to expand US 20 between Idaho Falls and the proposed EREF site, and no large projects are anticipated near the proposed site (NRC, 2009). However, the 18-mile stretch of US 20 from Idaho Falls to the Bonneville-Butte county line (west of the proposed EREF site) was resurfaced during the summer of 2010. ITD also noted that the need to upgrade or rebuild the interchange of US 20 and I-15 (through which all shipping to and from the proposed EREF would flow) may be accelerated by increased traffic from the proposed EREF, since the geometry of the interchange is not favorable and the right-of-way is limited (NRC, 2009). Currently, there are no funded plans for this work.

US 20 between Idaho Falls and the proposed EREF site is subject to chronic weather-related closure, primarily in winter months because of unfavorable road conditions, snow drifts, and low visibility (NRC, 2009; ITD, 2010d). The section of US 20 subject to closure extends from approximately 5 miles west of Idaho Falls to the junction of US 20 and US 26 near INL

[16] During a consultation meeting in June 2009, the Idaho Transportation Department noted that INL has discussed discontinuing the bus system as a cost-saving measure, but that no decisions had been made (NRC, 2009).

[17] LOS is a measure used by traffic engineers to assess the service quality of road infrastructure, taking into account factors such as traffic volume, road capacity, traffic speed, freedom to pass, and driver comfort and convenience.

Table 3-23 Annual Average Daily Traffic (AADT) on Major Roads near the Proposed EREF Site

Road	Direction	Location	AADT
US 20	E-W	At US 26 near Atomic City	1900
US 20	E-W	Near proposed EREF site	2210[a]
US 20	E-W	Idaho Falls west city limit	9900
US 20	E-W	Immediately east of I-15	29,733[a]
US 20	N-S	Idaho Falls north city limit	16,000
I-15	N-S	North of Idaho Falls	5400
I-15	N-S	At US 20	18,000
I-15	N-S	South of Idaho Falls (65th Street)	20,000
US 26	E-W	Atomic City	1100

[a] Average July 2008–June 2009. Source: ITD, 2009b.
Source: ITD, 2009a.

(mileposts 264 to 301), encompassing the proposed EREF site. These closure points are the most convenient for ITD, include the stretches of US 20 that are the most problematic, and include few access points via intersecting county roads. Road closures typically last from 6 hours to 1 day, with the maximum closure occurring only once or twice in the last 5 years. About five closures of US 20 are anticipated in a typical snow year. ITD is currently working with INL to install snow fencing to the west of the proposed EREF site (and is considering locations east of the proposed site), but this work will be gradual, subject to private landowner approval, and dependent on the annual ITD District 6 operating budget. Where snow fencing is not an option (and landowners approve), trenching can be an effective method of snow drift reduction. ITD has worked with the local school system to provide a plow escort and maintain access (i.e., for school buses) during road closures; ITD would likely work with the proposed EREF to facilitate shift changes that occur during road closures (ITD, 2010c,d).

Fire-related closures of US 20 are possible, but are less frequent and shorter in duration than weather-related closures. Most fire-related closures occur near INL; ITD has observed few fires to the east of the proposed EREF site. Dust storms occurring after fires (in the spring) can create localized drifting problems (ITD, 2010d).

Load limits on US 20 (between Idaho Falls and the proposed EREF site) and I-15 are controlled by ITD. The three-axle gross vehicle weight limits are 29,257 kilograms (64,500 pounds) on US 20 and 31,979 kilograms (70,500 pounds) on I-15 (AES, 2010; ITD, 2010a). Overweight permits can be issued for vehicles and/or loads exceeding this limit (ITD, 2007).

The current traffic volume on I-15 in the vicinity of Idaho Falls (and the junction with US 20) is approximately 18,000 vehicles per day (see Table 3-23). Design capacities for highways are not typically calculated, as capacities are considered high by default. However, the LOS on I-15 in the vicinity of Idaho Falls has been described as free flow (typically), with the LOS south of the city dropping to reasonably free flow or stable during peak periods (ITD, 2010c). Currently there are no plans to make any upgrades to I-15 in the vicinity of Idaho Falls.

There is currently no road or parking infrastructure at the proposed EREF site.

3.10.2 Rail

There is no direct rail access to the proposed EREF site, and there are no plans to perform any shipping operations by rail (AES, 2010). Nevertheless, Union Pacific provides three branches of freight rail service through Idaho Falls (Montana Main, Yellowstone, and Aberdeen), with the nearest access being approximately 32 kilometers (20 miles) to the east (AES, 2010; ITD, 1996).

In addition, a DOE-owned spur that connects at the Scoville Siding provides active freight service to the nearby INL, approximately 40 kilometers (25 miles) to the west of the proposed EREF site. A regional short line carrier, Eastern Idaho Railroad, connects areas north and east of Idaho Falls to Union Pacific lines (AES, 2010).

3.10.3 Air

Two airports serve the region of the proposed EREF site. The Idaho Falls Regional Airport, approximately 32 kilometers (20 miles) east of the proposed site, is operated by the City of Idaho Falls. It provides regularly scheduled regional passenger service to Denver, Salt Lake City, Boise, Seattle, and Las Vegas. The airport has two runways that are different sizes to accommodate commercial and private aviation. Approximately 32 kilometers (20 miles) to the west of the proposed EREF site is Midway Airport in Atomic City. This airport is used exclusively by private planes (AES, 2010).

In addition to these small regional airports that serve eastern Idaho is the Salt Lake City International Airport, which is approximately 336 kilometers (210 miles) south of Idaho Falls.

3.10.4 Water

Although the Snake River flows through Idaho Falls east of the proposed EREF site, there are no ports or viable water transportation routes that serve the region.

3.11 Public and Occupational Health

This section describes background radiation exposure in general and potential local influences near the proposed EREF. Potential health effects from exposure to radiation and to chemicals relevant to the proposed EREF are discussed as well. Several different media in and around the proposed EREF site contain radionuclides and chemicals that are both naturally occurring and anthropogenic (i.e., human-made) from historical and current operations at the nearby INL and from atomic bomb testing fallout. These media include soil, surface water, sediment, groundwater, and air. This section describes these radiological and chemical background and anthropogenic levels in terms of public and occupational exposure and health. It also summarizes the cancer incidence and death rates in the region, which were sufficient to establish baseline information for the analysis in Chapter 4 of the impacts on public and worker health that may be a result of preconstruction and the proposed action.

3.11.1 Background Radiological Exposure

Section 3.11.1.1 discusses the exposure from general background radiation that includes naturally occurring sources and man-made sources, except the exposure from INL operations. Offsite radiological exposures from the operation of INL are discussed in Section 3.11.1.2.

3.11.1.1 General Background Radiation

Humans are exposed to ionizing radiation from many sources in the environment, as shown below. Radioactivity from naturally occurring elements in the environment is present in soil, rocks, and living organisms. A major proportion (68 percent) of natural background radiation comes from naturally occurring radon. Together, these natural radiation sources contribute approximately 3.1 millisieverts (310 millirem) per year to the average total radiation dose that members of the general public annually receive (NCRP, 2009).

Ubiquitous background radiation contributes 50 percent of the average total radiation doses members of the general public receive. The remaining 50 percent of the average total radiation dose is associated with medical (48 percent) and industrial (2 percent) sources. As shown in Figure 3-33, approximately 48 percent of the annual background radiation dose (corresponding

Radiation Dose and Dose Equivalent

The exposure to radioactive material results in a radiation dose to the body. Radiation dose can result from external (outside the body) exposures such as gamma radiation emanating from the soil as well as internal exposures resulting from ingestion, such as potassium-40 (^{40}K) that resides naturally in bananas. The amount of energy deposited in matter is called the radiation dose and has SI units of gray (Gy)

In order to account for the damage done by different types of radiation, the term “dose equivalent” was developed. This allows different radiation doses from different radiation types to be compared. The radiation dose equivalent has SI units of sieverts (Sv).

Depending on its chemical form, radioactive material may transport to different parts of the body and reside in different organs when it is either ingested or inhaled. Each of these organs has different sensitivity to radiation. In addition, the radioactive material may reside in the body for many years. Therefore, to derive a whole body radiation dose equivalent, one must combine the effects of different radiation types with different organ sensitivities and consider the amount of time the radioactive material remains in the body. The term committed dose equivalent is used to describe the radiation dose equivalent a person will receive due to the radioactive material residing in the body after inhaling or ingesting radioactive material. This whole body dose equivalent has SI units of sieverts (Sv).

For brevity, it is common to refer to the whole body radiation dose equivalent as just the radiation dose. When the term radiation dose is used in this EIS, it refers to the total whole body committed radiation dose equivalent and will be expressed in SI units of Sv and parenthetically in conventional units of rem where 100 rem = 1 Sv.

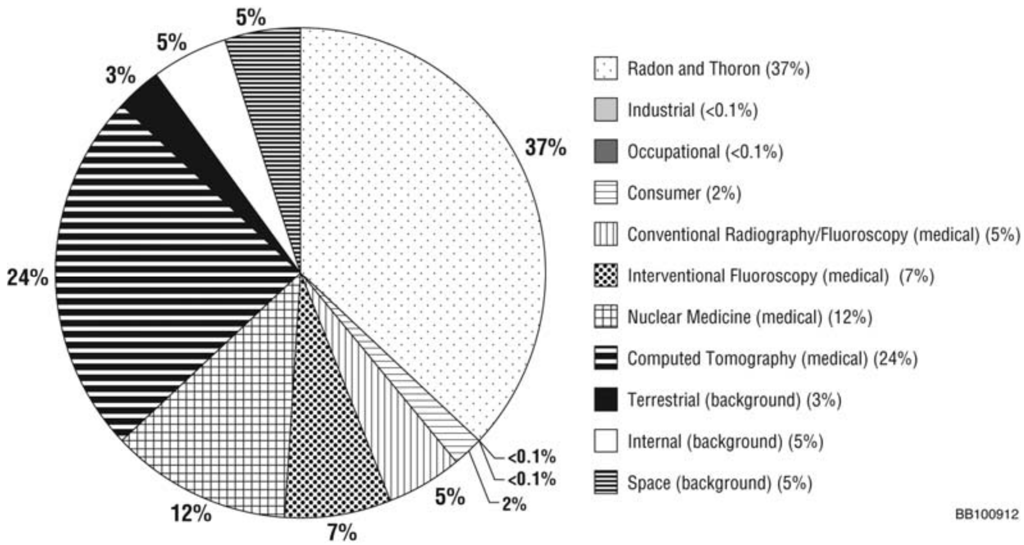

Figure 3-33 Percentage Contribution to the Effective Dose from All Sources of Radiation in the U.S. Population for 2006 (NCRP, 2009) (Reprinted with permission of the NCRP, http://NCRPonline.org.)

to 3.0 millisieverts [300 millirem]) is associated with medical sources, including computer tomography (24 percent), nuclear medicine (12 percent), interventional fluoroscopy (7 percent), and conventional radiograph/ fluoroscopy (5 percent). Consumer products and industrial and occupational sources of radiation comprise the remaining 2 percent (0.1 millisievert [10 millirem]) (NCRP, 2009).

3.11.1.2 Idaho National Laboratory

The location of the proposed EREF is within 8 kilometers (5 miles) of INL, a DOE laboratory in eastern Idaho. INL prepares an annual site environmental report for DOE summarizing environmental monitoring programs and other environmental activities at INL (DOE, 2007). Since the INL site is in such close proximity, the routine release of radioactive material from the INL would be considered part of the affected environment.

The radiological dose to the public surrounding the INL site is too small to be measured by available monitoring techniques. To show compliance with Federal regulations established to ensure public safety, the dose from INL site operations was calculated by using the amounts of radionuclides released during the year from INL site facilities that were reported and appropriate air dispersion computer codes. The noble gas krypton-85 (^{85}Kr) accounted for approximately 58 percent of the total release, followed by tritium (^{3}H) with 25 percent and argon-41 (^{41}Ar) with 16 percent of the total. The noble gas xenon-135 (^{135}Xe) contributed 1 percent. However, because these are noble gases, they contribute very little to the cumulative dose (affecting immersion only). Other than ^{41}Ar and ^{3}H, the radionuclides contributing to the overall dose were 0.01 percent of the total radionuclides released (DOE, 2007).

According to the 2007 INL site environmental report (DOE, 2007), the calculated maximum individual dose was 0.93 microsievert (0.093 millirem). The radionuclides contributing the most to this calculated dose were strontium-90 (^{90}Sr), which contributed 47 percent; isotopes of plutonium (plutonium-238 [^{238}Pu], plutonium-239 [^{239}Pu], and plutonium-240 [^{240}Pu]), which contributed 27 percent; isotopes of americium (americium-241 [^{241}Am] and americium-243 [^{243}Am]), which contributed 15 percent; cesium-137 (^{137}Cs), which contributed 9 percent; and iodine-129 (^{129}I), which contributed 1 percent. For comparison, the calculated maximum individual doses for 2003, 2004, 2005, and 2006 were 0.04, 0.04, 0.08, 0.04 millirem, respectively (DOE, 2007).

As part of an oversight program for the INL, the State of Idaho maintains 12 high-pressure ion chambers (HPICs) that provide real-time radiation exposure rates. Data are collected by the Idaho Department of Environmental Quality via radiotelemetry and are available to the public on the World Wide Web. The HPIC closest to the proposed EREF site (Rover Met Tower) has recorded an average exposure rate of $3.55 \times 10^{-9} \pm 0.24 \times 10^{-9}$ coulombs per kilogram per hour (13.75 ± 0.92 microroentgen per hour) over the last 3.5 years (AES, 2010). These recorded values are comparable with exposure measurements obtained from background locations (IDEQ, 2008).

3.11.2 Background Chemical Exposure

The location for the proposed EREF is on a site currently operated as a farm in an area characterized by farming and public lands. There are no known major sources of chemical exposure at this site that might impact the public. From the fall of 2007 to spring 2008, as part of soil characterization, AES collected 10 surface soil samples across the proposed site. The results of this sampling are presented in Section 3.6.4.2 and are summarized here. The samples were analyzed for metals, fluoride, pesticides, VOCs, and SVOCs (AES, 2010). All eight metals analyzed were within the range of local background areas. Only sporadic hits of trace levels of a few VOCs and SVOCs were found; they were mainly polycyclic aromatic hydrocarbons (PAHs) attributable to vehicle exhaust and other combustion sources. The only detection of a pesticide or herbicide compound in the samples was of trace levels (maximum 0.0110 milligram per kilogram) of the substance chlorpropham, which is used to inhibit sprouting of potatoes in storage.

Regarding other media, regional air quality in Bonneville County is classified as “good” 95.7 percent of the time and “moderate” 4.3 percent of the time, as discussed in Section 3.5.3. No surface water resources exist on the proposed site, as indicated in Section 3.7.1.1. Site groundwater has been tested for and found to be unimpacted by chemical contamination, including organic compounds, PCBs, pesticides, and metals, as discussed in Section 3.7.2.4.

3.11.3 Public Health Studies

3.11.3.1 Regulatory Requirements for Public and Occupational Exposure

NRC regulations in 10 CFR Part 20 identify maximum allowable concentrations of radionuclides in air and water above background at the boundary of unrestricted areas to control radiation exposures of the public and releases of radioactivity. The most restrictive maximum allowable concentration in air and water for uranium isotopes is 5×10^{-14} and 3×10^{-7} microcuries per cubic centimeter, respectively. Other 10 CFR Part 20 requirements are that the sum of the external and internal doses (Total Effective Dose Equivalent [TEDE]) for a member of the public may not exceed 1 millisievert per year (100 millirem per year), and the radiation levels at any unrestricted area should not exceed 0.02 millisievert (2 millirem) in any 1 hour and 0.5 millisievert (50 millirem) in a single year.

In addition to keeping within NRC requirements, releases to the environment must comply with EPA standards in 40 CFR Part 190, Subpart B. These standards specify limits on the annual dose equivalent from normal operations of uranium fuel-cycle facilities (except mining, waste disposal operations, transportation, and reuse of recovered special nuclear and byproduct materials). The public dose limit for annual whole body and any organ is 0.25 millisievert (25 millirem), and for the thyroid it is 0.75 millisievert (75 millirem).

10 CFR 20.1201 limits the TEDE of workers to ionizing radiation. Table 3-24 provides occupational dose limits for radiation workers who work at nuclear facilities.

3.11.3.2 Health Effects from Radiological Exposure

Radiation interacts with the atoms that form cells. There are two mechanisms by which radiation affects cells: direct action and indirect action. In a direct action, the radiation interacts directly with the atoms of the DNA molecule or some other component critical to the survival of the cell. Since the DNA molecules make up a small part of the cell, the probability of direct action is small. Because most of the cell is made up of water, there is a much higher probability that radiation would interact with water. In an indirect action, radiation interacts with water and breaks the bonds that hold water molecules together and produces reactive free radicals that are chemically toxic and destroy the cell. The body has mechanisms to repair damage caused by radiation. Consequently, the biological effects of radiation on living cells may result in one of three outcomes: (1) injured or damaged cells repair themselves, resulting in no residual damage; (2) cells die, much like millions of body cells do every day, being replaced through normal biological processes and causing no health effects; or (3) cells incorrectly repair themselves, which results in damaging or changing the genetic code (DNA) of the irradiated cell. Stochastic effects, that is, effects that may or may not occur based on chance, may occur when an irradiated cell is modified rather than killed. The most significant stochastic effect of radiation exposure is that a modified cell may, after a prolonged delay, develop into a cancer cell.

The biological effects on the whole body from exposure to radiation depend on many factors, such as the type of radiation, total dose, time interval over which the dose is received, and part of the body that is exposed. Not all organs are equally sensitive to radiation. The blood-forming organs are most sensitive to radiation; muscle and nerve cells are relatively insensitive to radiation. Health effects may be characterized according to two types of radiation exposure: (1) a single accidental exposure to high doses of radiation for a short period of time (acute exposure), which may produce biological effects within a short time after exposure, and (2) long-term, low-level overexposure, commonly called continuous or chronic exposure. High doses of radiation can cause death. Other possible effects of a high radiation dose include erythema, dry desquamation, moist desquamation, hair loss, sterility, cataracts, and acute radiation syndromes. Currently there are no data to unequivocally establish the occurrence of cancer following exposure to low doses and dose rates – below about 100 millisieverts (10,000 millirem) (NRC, 2004).

Table 3-24 Occupational Dose Limits for Adults Established by 10 CFR Part 20

Tissue	Dose Limit
Whole body or any individual organ or tissue other than the lens of the eye	More limiting of 0.05 Sv/yr (5 rem/yr) TEDE to whole body or 0.5 Sv/yr (50 rem/yr) sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye
Lens of the eye	0.15 Sv/yr (15 rem/yr) dose equivalent
Extremities, including skin	0.50 Sv/yr (50 rem/yr) shallow dose equivalent

In estimating the health impacts from low dose or low dose rate exposure to occupational workers and the general public, the probability of a fatal cancer per unit of radiation exposure recommended by the EPA was used. The estimated probability for both workers and the public is 6×10^{-2} $sievert^{-1}$ (EPA, 1999).

The National Program of Cancer Registries (NPCR) is the Centers of Disease Control and Prevention (CDC) State-based cancer control program. Under this program, States collect, manage, and analyze data about cancer incidence and mortality. The CDC and the National Cancer Institute release U.S. cancer statistics annually. Table 3-25 lists the cancer incidence and death rates for all cancers for 2002 to 2006 for Idaho and the United States.

3.11.3.3 Health Effects from Chemical Exposure

The primary hazardous chemicals of interest associated with the proposed EREF are uranium and hydrofluoric acid (HF). The latter is produced in the reaction of UF_6, the form of uranium used in the enrichment process, with moisture in air. HF is an irritant gas that causes eye, nose, and skin irritation. Breathing high levels can also harm the lungs and heart (ATSDR, 2003). Irritant effects in humans, including respiratory track inflammation, begin to be observed in the 1 to 10 ppm range, similar to occupational exposure limits. Low-level exposure effects are reversible once the exposure is terminated. Members of the public are generally not exposed to levels that have observable health effects from routine industrial emissions. There are no known background sources of HF exposure in the vicinity of the proposed EREF.

Uranium in various chemical forms exerts heavy metal toxicity, primarily to the kidneys (ATSDR, 1999). Exposure to UF_6 or any other uranium compounds that might be released from the proposed EREF or present within the proposed facility may be via inhalation or ingestion. The degree of absorption of inhaled uranium from the lung or ingested uranium into the bloodstream is greater for more soluble forms of uranium, such as UO_2F_2, which is formed from the reaction of UF_6 and water along with HF. Little direct toxicological data are available on chemical toxicity in humans at low inhalation exposures. Standards are based mainly on tests in mammals, which show low-level systemic health effects beginning at inhalation exposures in the 0.1 to 1 milligram per cubic meter range for chronic exposures. As for HF, there are no known background sources of uranium exposure in the vicinity of the proposed EREF, except from the very low levels occurring naturally in soils.

Table 3-25 Cancer Incidence and Death Rates for All Cancers for 2002 to 2006[a]

Area	All Cancer Incidence Rate	All Cancer Death Rate
United States	471.3	186.9
Idaho	461.7	171.6

[a] Per 100,000 persons and are age adjusted to the 2000 U.S. standard population.
Source: CDC, 2010.

3.12 Socioeconomics

This section describes current socioeconomic conditions and local community services within the region of influence (ROI) surrounding the site of the proposed EREF. Although the data used (BEA 2010) to estimate the impacts of the proposed EREF project comprised an 11-county ROI in Idaho – including Bannock, Bingham, Blaine, Bonneville, Butte, Caribou, Clark, Fremont, Jefferson, Madison, and Power Counties – the majority of the economic impacts of the proposed facility are expected to occur in two of these counties, Bingham and Bonneville Counties. These two counties (i.e., the two-county ROI) are expected to encompass the area in which the majority of EREF workers are expected to spend most of their wages and salaries, and which are expected to be the primary source of labor for each phase of the proposed EREF. It is also the area in which a significant portion of site purchases and non-payroll expenditures from the construction, manufacturing, operation, and decommissioning phases of the proposed facility are expected to occur. As it is anticipated that a number of workers will move into the area during each phase of the proposed project, with the majority of the demographic and social impacts associated with population in-migration likely to occur in Bingham and Bonneville Counties, the impacts of the proposed EREF on population, housing, and community services are assessed for a two-county ROI, consisting of Bingham and Bonneville Counties.

3.12.1 Population Characteristics

The population in the two-county ROI is characterized in terms of the major population centers around the proposed site, population growth trends, and significant transient and special populations. Minority and low-income populations are discussed in the environmental justice discussion in Section 3.13.

3.12.1.1 Major Population Centers

One city, Idaho Falls (estimated 2006 population 52,786), is located in Bonneville County, and several small towns are located in the remainder of the ROI, including Pocatello (53,932 residents in 2006), Blackfoot (11,007) and Shelley (4195) (U.S. Census Bureau, 2009a).

Estimated population density in the two-county ROI is highest in Bingham County, with 34.4 persons per square kilometer (89.1 per square mile) in 2008. Bonneville County has more land area than Bingham County and has a smaller population, with a population density of 9.1 persons per square kilometer (23.5 per square mile) (U.S. Census Bureau, 2009b).

3.12.1.2 Population Growth Trends

Table 3-26 presents recent and projected populations for the two-county ROI and Idaho. As shown, estimated population in the ROI stood at 143,038 in 2008, having grown at an average annual rate of 1.8 percent since 2000. This growth was lower than the 2.1 percent annual average growth rate for Idaho as a whole of over the same period.

The population has grown in both counties in the two-county ROI since 2000. Bonneville County recorded an annual average population growth of 2.3 percent between 2000 and 2008, while Bingham County grew by 0.6 percent during the same period. The estimated ROI population is expected to increase to 156,491 by 2013 and to 168,331 by 2017. Both counties in the ROI are projected to experience positive population growth between 2008 and 2017.

3.12.1.3 Transient and Special Populations

In addition to the residential population, institutional, transient, and seasonal populations occur in the two-county ROI. Institutional populations include school populations, which are described in Section 3.12.3.2. The transient population consists of visitors participating in various seasonal, social, and recreational activities within the local area. The region also has a large number of seasonal farm workers, as well as a number of seasonal workers in the construction and hospitality industries. Although U.S. Census and other Federal data may include transient and special population groups that were present when the Census was taken, data on the education level, ethnicity, and income characteristics of specific transient and special populations are not available.

3.12.2 Economic Trends and Characteristics

3.12.2.1 Employment

Employment in the two-county ROI stood at 62,608 in 2006 (Table 3-27). Over the past decade, employment within the two-county ROI has shifted slightly from government, construction, and farm sectors toward service, wholesale and retail trade, and manufacturing sectors. Currently, the service sector provides the highest percentage of employment in the region at 51.2 percent, followed by the wholesale and retail trade at 19.2 percent. Smaller employment shares are held by transportation and public utilities (10.4 percent) and agriculture (9.2 percent). The distribution of employment across sectors within the ROI is similar to that of the ROI as a whole, with a slightly higher percentage of employment in agriculture (12.6 percent), manufacturing (18.7 percent), and transportation and public utilities (21.1 percent) in Bonneville County. At 32.4 percent of total employment, Bonneville has less service employment than in the ROI as a whole.

3.12.2.2 Unemployment

Unemployment rates have varied across the two counties in the ROI (Table 3-28). Over the 10-year period 1999–2008, the average rate in Bingham County was 4.0 percent, with a lower

Table 3-26 Population in the Two-County ROI and Idaho

Location	2000	2008	Average Annual Growth (%) 2000–2008	2013	2017
Bingham County	41,735	43,903	0.6	45,315	46,477
Bonneville County	82,522	99,135	2.3	111,176	121,854
ROI	124,257	143,038	1.8	156,491	168,331
Idaho	1,293,953	1,523,816	2.1	1,687,782	1,831,569

Source: U.S. Census Bureau, 2009a; Argonne, 2010.

rate of 3.1 percent in Bonneville County. The average rate in the ROI as a whole over this period was 3.4 percent, which was lower than the average rate for the State of 4.4 percent. Unemployment rates for the first three months of 2009 contrast markedly with rates for 2008 as a whole; in Bonneville County, the unemployment rate increased to 6.1 percent, while in Bingham County the rate reached 5.6 percent. The average rate for the two-county ROI (5.7 percent) and the State (7.0 percent) during this period were also higher than the corresponding average rates for 2008.

3.12.2.3 Income

Total personal income in the two-county ROI stood at $4.5 billion in 2007 and had grown at an annual average rate of 3.1 percent over the period 1998 to 2007 (Table 3-29). ROI personal income per capita also rose over the same period, but at a slower rate of 1.7 percent, increasing from $27,023 to $31,973. Per capita incomes were higher in Bonneville County ($34,630) in 2007 than in Bingham County ($26,068). Although personal income and per capita income growth rates in the two-county ROI have been higher than for the State as a whole, personal income per capita was slightly higher in the State ($32,908) in 2007 than in the ROI. Although no corresponding data are available for Bingham and Bonneville Counties, in Idaho as a whole in 2007, there were 74,152 single-parent families, 18.7 percent of the total number of families in the State (U.S. Census Bureau, 2009b). The median annual family income of a single female parent with children under the age of 18 was $22,369.

Median household income in the two-county ROI over the period 2006–2008 ranged from $44,232 in Bingham County to $51,232 in Bonneville County (Table 3-29). The average in the ROI as a whole was $47,732, slightly higher than the State average of $47,331.

3.12.3 Housing Resources and Community and Social Services

This section describes housing and social services in the two-county ROI, including schools, law enforcement, and firefighting.

Table 3-27 Two-County ROI Employment in 2006[a]

Industry	Bingham County	% of Total	Bonneville County	% of Total	ROI	% of Total	Idaho	% of Total
Agriculture[a]	4324	8.5	1456	12.6	5780	9.2	50,540	8.5
Mining	0	0.0	0	0.0	0	0.0	2202	0.4
Construction	3409	6.7	1093	9.4	4502	7.2	52,804	8.9
Manufacturing	2728	5.3	2173	18.7	4901	7.8	64,212	10.8
Transportation and public utilities	4079	8.0	2448	21.1	6527	10.4	80,257	13.5
Wholesale and retail trade	9461	18.5	2540	21.9	12,001	19.2	104,604	17.6
Finance, insurance, and real estate	1686	3.3	310	2.7	1996	3.7	30,576	5.2
Services	28,286	55.0	3759	32.4	32,045	51.2	268,527	45.3
Other	24	0.0	1	0.0	25	0.0	184	0.0
Total	51,007		11,601		62,608		593,185	

[a] Agricultural employment includes 2007 data for hired farm workers.

Source: U.S. Census Bureau, 2009c; USDA, 2009.

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Table 3-28 Two-County ROI Unemployment Rates (percent)

Location	1999–2008	2008	2009[a]
Bingham County	4.0	3.9	5.6
Bonneville County	3.1	3.4	6.1
ROI	3.4	3.5	5.7
Idaho	4.4	4.9	7.0

[a] Rates for 2009 are the average for January through March.
Source: DOL, 2009a–d.

Table 3-29 Two-County ROI and State Personal Income

Location	1998	2007	Annual Average Growth, 1998–2007 (%)
Bingham County			
Total income (billion 2008 $)	1.0	1.1	1.6
Per capita income ($)	23,303	26,068	1.1
Median household income[a]		44,232	
Bonneville County			
Total income (billion 2008 $)	2.3	3.3	3.6
Per capita income ($)	28,925	34,630	1.8
Median household income[a]		51,232	
Two-County ROI			
Total income (billion 2008 $)	3.3	4.5	3.1
Per capita income ($)	27,023	31,973	1.7
Median household income[a]		47,732	
Idaho			
Total income (billion 2008 $)	36.5	49.2	3.0
Per capita income ($)	29,120	32,908	1.2
Median household income[a]		47,331	

[a] 2006–2008, 3-year average.
Source: DOC, 2009; U.S. Census Bureau, 2009d.

3.12.3.1 Housing

Nearly 196,000 housing units were located in the two counties in 2007, with more than 70 percent of these located in Bonneville County (Table 3-30). The majority of housing units in the region are single-family structures (75 percent), but the number of multi-family structures is increasing as the region develops (U.S. Census Bureau, 2009b). Vacancy rates do not vary significantly between the two counties, with 9.2 percent of units vacant in Bingham County and 9.0 percent in Bonneville County. Owner-occupied units comprise 81 percent of the occupied units in Bingham County, but only 73 percent of the occupied units in Bonneville County. At the time of the 2000 Census, 480 seasonal-, recreational-, or occasional-use units were vacant.

Housing density in the two-county ROI was 6.8 units per square kilometer (17.7 per square mile), compared to 2.9 units per square kilometer (7.6 per square mile) for the State as a whole. There were 7.7 units per square kilometer (19.9 per square mile) in Bonneville County and 5.4 units per square kilometer (13.9 per square mile) in Bingham County (U.S. Census Bureau, 2009a).

Housing stock in the two-county ROI as a whole grew at an annual rate of 2.3 percent over the period 2000–2007, with 7872 new units added to the existing housing stock in the ROI (Table 3-30). With an overall vacancy rate of 9.1 percent, there were 4770 vacant housing units in the two-county ROI in 2007, of which 1073 (251 in Bingham County, 822 in Bonneville County) are expected to be rental units available to construction workers at the proposed EREF.

The median value of a home in Bonneville County of $93,500 was about 10.7 percent greater than the $84,400 in Bingham County. The median value of homes in both counties was somewhat lower than the $106,300 median value for the State of Idaho (U.S. Census Bureau, 2009a).

3.12.3.2 Schools

Seventy-four public and private elementary, middle, and high schools are located in the two-county ROI (NCES, 2009). Table 3-31 provides summary statistics for the school districts in the ROI, including enrollment, educational staffing, and two indices of educational quality – student-teacher ratios and levels of service (number of teachers per 1000 population). The student-teacher ratio in Bonneville County schools (19.8) is slightly higher than for schools in Bingham County (18.0), while the level of service is slightly higher in Bingham County. Five colleges and adult learning centers are located within 80.5 kilometers (50 miles) of the proposed EREF site, with a combined enrollment of 27,820 (NCES, 2009). The closest schools to the proposed EREF site are about 32 kilometers (20 miles) east in Idaho Falls.

3.12.3.3 Public Safety

Several State, county, and local police departments provide law enforcement in the two-county ROI. Bonneville County has 57 officers and would provide law enforcement services to the proposed EREF (Table 3-32); Bingham County has 30 officers (Table 3-32) (FBI, 2009). Currently there are 95 professional firefighters in Bonneville County and 39 in Bingham County (Table 3-32). The Idaho Falls Fire Department, the Ucon Volunteer Fire Department, and the Shelley Firth Rural Fire District all are located about 32 kilometers (20 miles) from the site of the

Table 3-30 Two-County ROI Housing Characteristics

Parameter	2000	2007[a]
Bingham County		
Owner occupied	10,564	11,290
Rental	2753	2735
Vacant units	986	1415
Seasonal and recreational use	103	NA[b]
Total units	14,303	15,540
Median value of owner-occupied units	$84,400	$121,400
Bonneville County		
Owner occupied	21,467	24,742
Rental	7286	9122
Vacant units	1731	3355
Seasonal and recreational use	377	NA
Total units	30,484	37,219
Median value of owner-occupied units	$93,500	$148,300
Two-County ROI Total		
Owner occupied	32,031	36,034
Rental	10,039	11,857
Vacant units	2717	4770
Seasonal and recreational use	480	NA
Total units	44,787	52,659
Median value of owner-occupied units	$88,950	$134,850

[a] 2006–2008, 3-year average.
[b] NA = not available.
Source: U.S. Census Bureau, 2009a,b,d.

Table 3-31 School District Data for the Two-County ROI in 2007

Location	Number of Students	Number of Teachers	Student-Teacher Ratio	Level of Service[a]
Bingham County	9902	550	18.0	12.7
Bonneville County	19,557	988	19.8	10.2
ROI	29,459	1538	19.2	11.0

[a] Number of teachers per 1000 population.
Source: NCES, 2009.

Table 3-32 Public Safety Employment in the Two-County ROI in 2009

Location	Number of Police Officers	Level of Service[a]	Number of Firefighters[b]	Level of Service[a]
Bingham County	30	0.7	39	0.9
Bonneville County	57	0.6	95	1.0
ROI	87	0.6	134	0.9

[a] Number per 1000 population.
[b] Number does not include volunteers.
Source: FBI, 2009; FireDepartments.Net, 2009.

proposed facility. Levels of service in police and fire protection in each county are similar to those for the two-county ROI as a whole (Table 3-32).

3.12.4 Tax Structure and Distribution

Tax revenue in Idaho comes from primarily personal and corporate income taxes, sales and use taxes, and property taxes. Personal income taxes range from 1.6 percent on the first $1198 of taxable income to 7.8 percent of taxable income above $23,963 for single filers and $47,926 for married couples filing jointly (ISTC, 2009). A 6 percent sales tax is applied to the sale, rental, or lease of tangible personal property, while rates on some services, including food, hotel, motel, and campground accommodations, vary from 8 percent to 12 percent. A use tax is applied to stored goods if sales taxes have not already been paid (ISTC, 2009). Property taxes are collected by the county in which the proposed EREF property is located. The property tax rates for Bonneville County were 1.6 percent on average for urban property and 1.01 percent on average in rural areas. In Bingham County, the average 2007 rates were 2.1 percent for urban property and 1.2 percent for rural property (ISTC, 2009).

3.13 Environmental Justice

On February 11, 1994, the President signed *Executive Order* 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” which directs all Federal agencies to develop strategies for considering environmental justice in their programs, policies, and activities. Environmental justice is described in the *Executive Order* as "identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

On December 10, 1997, the Council on Environmental Quality (CEQ) issued *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ, 1997). In addition to following general guidelines on the evaluation of environmental analyses set forth in the document *Environmental Review Guidance for Licensing Actions Associated with NMSS [Nuclear Material Safety and Safeguards] Programs* (NUREG-1748) (NRC, 2003a), the NRC has issued a final policy statement on the *Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions* (69 FR 52040) and environmental justice procedures to be followed in NEPA documents prepared by the NRC's Office of Nuclear Material Safety and Safeguards (NRC, 2003b).

Consistent with NRC guidelines and procedures set forth in Appendix C to NUREG-1748 (NRC, 2003a) and the NRC's *Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions* (NRC, 2004), this section describes data from the 2000 U.S. Census on minority and low-income populations within a 6.4-kilometer (4-mile) radius of the proposed EREF site (see Appendix G). This area includes a total of four Census block groups, including two in Bonneville County, the location of the proposed EREF, and one each in Bingham and Jefferson Counties (U.S. Census Bureau, 2009a).

3.13.1 Minority Populations

The CEQ guidelines define "minority" to include members of American Indian or Alaska Native, Asian or Pacific Islander, Black non-Hispanic, and Hispanic populations (CEQ, 1997).

Minority individuals are persons who identify themselves as members of the following population groups: Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, some other race, two or more races (meaning individuals who identified themselves on the 2000 Census form as being a member of two or more races, for example, White and Hispanic), and Hispanic or Latino. The 2000 Census allowed individuals the option of identifying themselves in one or more race categories, thereby creating the multiracial Census category of "two or more races." They are generally counted as part of the minority group they identified.

Minority populations can be determined by subtracting White, Not Hispanic or Latino populations from the total population.

There are no Census block groups in which the minority population either exceeds 50 percent of the total population and/or is more than 20 percentage points higher than the State or county percentage. Table 3-33 presents data for minority populations for the 6.4-kilometer (4-mile) area, for each county, and for the State.

Table 3-33 Minority and Low-Income Populations within a 6.4-kilometer (4-mile) Radius of the Proposed EREF Site

County	4-mile Radius			County Percent Minority	State Percent Minority
	Total Population[a]	Minority Population	Percent Minority		
Bingham County	1438	234	16.3	17.6	
Bonneville County	1777	244	13.7	7.2	9.0
Jefferson County	957	202	21.1	9.1	
County	**4-mile Radius**			**County Percent Low-Income**	**State Percent Low-Income**
	Total Population[b]	**Low-Income Population**	**Percent Low-Income**		
Bingham County	1384	162	11.7	12.4	
Bonneville County	1745	178	10.2	10.1	11.8
Jefferson County	957	223	23.3	10.4	

[a] 2000 data.
[b] 1999 data.
Source: U.S. Census Bureau, 2009a.

3.13.2 Low-Income Populations

Low-income populations are those that fall below the poverty level identified by the U.S. Census Bureau, including variations by family size and composition. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as being "below the poverty level." For example, in 1999, the most recent year for which Census block group data on poverty are available, the poverty threshold for a family of five with three children below the age of 18 was $19,882. For any given family below the poverty line, all family members are considered as being below the poverty line for the purposes of analysis.

There are no Census block groups in which the low-income population either exceeds 50 percent of the total population and/or is more than 20 percentage points higher than the State or county percentage. Table 3-33 presents data for low-income populations for the 6.4-kilometer (4-mile) area, for each county, and for the State.

3.13.3 Resource Dependencies and Vulnerabilities of Minority and Low-Income Populations

In some cases, minority and low-income groups may rely on natural resources for their subsistence and to support unique cultural practices. Differential patterns of consumption of natural resources should be considered (i.e., differences in rates and/or patterns of fish, vegetable, water, and/or wildlife consumption among groups defined by demographic factors such as socioeconomic status, race, ethnicity, and/or cultural attributes). In some circumstances, these groups could be unusually vulnerable to impacts from the proposed action. In particular, higher participation in outdoor recreation, home gardening, and subsistence fishing may increase exposure risk to low-income and minority groups through inhalation or ingestion through various environmental pathways.

Potential resource dependencies were sought in the course of public meetings and other information supplied by the Hispanic/Latino and African American/Black communities in meetings with the NRC staff. Letters were also sent to the Federally recognized Shoshone-Bannock Tribes to determine any potential resource dependencies. These letters solicited their concerns on the proposed project and inquired about whether they desired to participate in the Section 106 consultation process (see Appendix B). Currently, very few Native Americans live in the vicinity of the proposed EREF site (U.S. Census Bureau, 2009a).

In addition, the NRC staff examined data provided by the State of Idaho concerning the health status of the general population in Bingham and Bonneville Counties (Table 3-34). No exceptional health problems were found among residents in the two counties. It was not possible to identify any unusual incidences of birth defects, chronic diseases, or cancer clusters at the district level, the smallest area for which published health information is available. Age-adjusted cancer deaths are slightly lower in District 6, which includes Bingham County, than in District 7, which includes Bonneville County; rates in Districts 6 and 7 are lower than in Idaho as a whole. The income and ethnicity of individuals with chronic diseases are not available.

Table 3-34 Selected Health Statistics for Counties near the Proposed EREF, 2005–2007 (per 100,000 population)

	District 6 (includes Bingham County)	District 7 (includes Bonneville County)	Idaho
Annual average age-adjusted major causes of death			
Cancer	148.0	145.7	166.5
Heart disease	198.2	196.6	169.8
Lung cancer	32.0	30.0	42.7
Cerebrovascular disease	57.1	49.7	48.8
Chronic lower respiratory diseases	46.1	48.6	48.9

Source: Idaho Department of Health and Welfare, 2009.

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4 ENVIRONMENTAL IMPACTS

This chapter presents the potential environmental impacts associated with preconstruction, construction, operation, and decommissioning of the proposed AREVA Enrichment Services, LLC (AES) Eagle Rock Enrichment Facility (EREF).

4.1 Introduction

For the proposed action, this Environmental Impact Statement (EIS) considers impacts from construction activities, normal operations, credible accidents, terrorism, and decommissioning, as well as cumulative impacts and resource commitments. The impacts associated with preconstruction activities are also discussed, although, as discussed in Sections 1.2 and 4.2 of this EIS, preconstruction is not part of the proposed action. The chapter is organized by environmentally affected areas (i.e., land use, historic and cultural resources, visual and scenic resources, air quality, geology and soils, water resources, ecological resources, noise, transportation, public and occupational health, waste management, socioeconomics, and environmental justice) based on the descriptions of the preconstruction activities and the proposed action that are included in Section 2.1. The discussion of impacts on each environmentally affected area is divided into three categories – (1) preconstruction and construction, (2) operation, and (3) decontamination and decommissioning. Impacts from the intermediate time period during which both construction and operations take place are included in the sections on operations.

Within each resource area, those mitigation measures proposed by AES, including additional mitigation measures identified by the U.S. Nuclear Regulatory Commission (NRC) staff, are disclosed in this EIS. While the NRC cannot impose mitigation outside its regulatory authority under the *Atomic Energy Act*, mitigation measures have been identified within this chapter and in Chapter 5 that could potentially reduce the impacts of preconstruction and the proposed action. For the purposes of the *National Environmental Policy Act* of 1969, as amended (NEPA), per Title 10, “Energy,” of the U.S. *Code of Federal Regulations* (10 CFR) Part 51, the NRC is disclosing measures that could potentially reduce or avoid environmental impacts of preconstruction, construction, and operation of the proposed EFEF. Any mitigation measures identified by the applicant (AES) and proposed for implementation within the Environmental Report (ER) (AES, 2010a) are listed in Tables 5-1 and 5-2 in Chapter 5

Determination of the Significance of Potential Environmental Impacts

A standard of significance has been established for assessing environmental impacts. Based on the Council on Environmental Quality’s regulations, each impact is to be assigned one of the following three significance levels:

- ***Small:*** *The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.*
- ***Moderate:*** *The environmental effects are sufficient to noticeably alter but not destabilize important attributes of the resource.*
- ***Large:*** *The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.*

Source: NRC, 2003a.

and have been factored into the NRC staff's environmental impact analysis in Chapter 4. The additional mitigation measures identified by the NRC staff, which are listed in Tables 5-3 and 5-4 of Chapter 5, are not requirements being imposed upon the applicant.

Section 4.2 discusses potential environmental impacts of preconstruction and the proposed action under consideration in this EIS, namely the preconstruction, construction, and operation of the proposed EREF in Bonneville County, Idaho. The decontamination and decommissioning impacts discussed in Section 4.2.16 are preliminary, or estimated, for the proposed EREF. Detailed impacts from decontamination and decommissioning will be assessed by the staff at the end of the proposed EREF's operations and prior to NRC approval to begin such activities. Under 10 CFR 70.38, the NRC requires that AES file an application for decommissioning of the proposed EREF to be filed 12 months prior to the expiration of the license. This application would include a detailed Decommissioning Plan that would take into account the extent of radiological contamination at the site and would require a separate environmental review and NEPA document. Because decontamination and decommissioning would take place well in the future, advanced technology improving the decontamination and decommissioning process may be available. In addition, this chapter discusses the potential cumulative impacts (Section 4.3) and impacts of the no-action alternative (Section 4.4).

The proposed EREF, if licensed, will possess and use special nuclear material, source material, and byproduct material. Environmental impacts from the proposed EREF may be radiological or nonradiological. Radiological impacts from the proposed EREF could include radiation doses to workers and members of the public from the routine operations, transportation, potential accidents, potential terrorist activities, and decommissioning and environmental impacts from potential releases to the air, soil, or water. Nonradiological impacts could include chemical hazards, emissions (e.g., vehicle fumes), occupational accidents and injuries (e.g., vehicle collisions), and workplace accidents that could occur during preconstruction, construction, operation, and decommissioning.

4.2 Potential Impacts of Preconstruction and the Proposed Action

As described in Section 2.1 of this EIS, the proposed action is the construction, operation, and decommissioning of the proposed EREF near Idaho Falls in Bonneville County, Idaho. Under the proposed action, the NRC would issue a license to AES in accordance with the requirements of 10 CFR Parts 70, 40, and 30 to possess and use source, byproduct, and special nuclear material.

As described in Sections 1.4.1 and 2.1.4.1, the NRC has granted an exemption (NRC, 2010a) for AES to conduct certain preconstruction (e.g., site preparation) activities prior to granting the license for the proposed EREF. The NRC staff concluded that the request by AES to perform these activities is authorized by law, will not endanger life or property or common defense and security, and is in the public interest. No core production facilities would be constructed as part of the preconstruction activities. Because preconstruction and construction activities are closely related and their respective impacts are difficult to separate, Section 4.2 discusses the impacts of preconstruction and construction together for each resource area, in addition to the impacts of operation and decommissioning, although preconstruction activities are not part of the proposed action. Section 4.2.14 provides a summary of estimates regarding the apportionment of impacts between preconstruction (authorized under the exemption) and construction as defined by NRC (NRC, 2009a).

The potential environmental impacts are evaluated below for each of the potentially affected environmental resources. Sections 4.2.1 through 4.2.13 discuss impacts of preconstruction, construction, and operation. Section 4.2.14 discusses the relative contributions of preconstruction and construction activities to the impacts assessed in each environmentally affected area. Potential accident impacts are covered in Section 4.2.15. Section 4.2.16 discusses the decontamination and decommissioning impacts. Section 4.2.17 discusses the impacts of carbon dioxide and greenhouse gases. Potential terrorist activities are considered in Section 4.2.18.

4.2.1 Land Use Impacts

This section describes the potential impacts on land use during preconstruction, construction, and operation of the proposed EREF. Construction of a uranium enrichment facility such as the proposed EREF would alter the current land use, which consists primarily of agricultural and undeveloped rangeland. Land use impacts would result when project activities restrict future land use activities from occurring on or near the proposed facility or when the land use for the proposed project is not compatible with local, State, or Federal land use plans. Land use impacts could also occur if the activity restricts current or planned mineral resources exploitation. The proposed 240-hectare (592-acre) EREF site would be located entirely on private land. Proposed land uses on the property must comply with the zoning requirements of Bonneville County; and the county has zoned the location as G-1 Grazing, which allows for industrial development. This zoning is intended to allow certain activities that should be removed from population centers in the county (Serr, 2009). The operation of a uranium enrichment facility is consistent with the county's zoning. It is not anticipated that the proposed EREF preconstruction, construction, and operation would have any effect on the current land uses found on the surrounding Federal lands administered by the U.S. Bureau of Land Management (BLM) (Ennes, 2010). Land use impacts resulting from preconstruction, construction, and operation would be SMALL.

4.2.1.1 Preconstruction and Construction

Preconstruction and facility construction would result in the alteration of 240 hectares (592 acres) of land. Access to the 1700-hectare (4200-acre) property to be purchased by AES would be restricted beginning with preconstruction activities. It is probable that once preconstruction begins, all agricultural use on the proposed EREF property, including grazing and cultivation, would cease. However, similar land uses on surrounding lands would continue. As mentioned in Chapter 3, about 202 hectares (500 acres) on the proposed property are under cultivation. This area would no longer be used for agriculture, but this impact is not considered major due to the approximately 81,747 hectares (202,000 acres) of cultivated cropland found in Bonneville County (USGS, 2009). No other land uses could occur on the proposed property once preconstruction begins, other than those associated with the proposed EREF.

There is a potential for ongoing agricultural activities in surrounding areas to be temporarily affected by fugitive dust generated during preconstruction and construction. These offsite land use impacts could be lessened through the application of measures for fugitive dust control, which are discussed in Section 4.2.4.3. There is also the potential for preconstruction and construction activities to drive away some game species due to the increased activity on the proposed EREF site. This could affect successful hunting on surrounding lands because the preconstruction and construction activities would temporarily disturb game species such as pronghorn antelope, mule deer, and elk. However, these impacts on surrounding agriculture and local game would be temporary and would be SMALL.

The impacts of alteration of current land uses and the potential for temporary offsite land use impacts to agriculture and hunting resulting from preconstruction and construction would be SMALL. The alteration of land use would begin with preconstruction of the proposed EREF, and would continue through completion of construction. The majority (about 90 percent) of impacts to land use would occur during preconstruction when most of the land disturbance would occur.

4.2.1.2 Facility Operation

Operation of the proposed EREF would restrict land use on the proposed EREF property to the production of enriched uranium (AES, 2010a). The 1700-hectare (4200-acre) property would no longer be open to grazing and cultivation and would remain vacant (AES, 2010a). Operation of the proposed EREF is not expected to affect land use on adjacent public lands (Reynolds, 2010). Land use impacts from operation would be SMALL.

4.2.1.3 Mitigation Measures

Mitigation measures would be employed to minimize any potential impacts on offsite land use from erosion or fugitive dust. The following best management practices (BMPs), which have been identified by AES, would mitigate short-term increases in soil erosion or fugitive dust (additional discussion is provided in Section 4.2.5.3, Geology and Soils) (AES, 2010a):

- minimize the construction footprint to the extent practicable

- limit site slopes to a horizontal-vertical ratio of four to one, or less

- use a sedimentation detention basin

- protect undisturbed areas with silt fencing and straw bales, as appropriate

- use site stabilization practices such as placing crushed stone on disturbed soil in areas of concentrated runoff

- water onsite construction roads at least twice daily, when needed, to control fugitive dust emissions and, after construction is complete, stabilize the site with natural low-water-consumption, low-maintenance landscaping and pavement

4.2.2 Historic and Cultural Resources Impacts

This section describes the potential environmental impacts on historic and cultural resources resulting from preconstruction, construction, and operation of the proposed EREF. Historic and cultural resources include archaeological sites, historic structures, and places of cultural importance to groups for maintaining their heritage. Cultural resources are nonrenewable; that is, once altered, the information contained in cultural resources cannot be recovered. Impacts to cultural resources at the proposed EREF site would occur primarily during initial ground-disturbing activities. Some cultural resources could also be impacted by visual intrusions, in which case they are expected to occur primarily during construction and operation, as these are the actions that would most significantly affect the visual landscape through increased traffic and construction activities and the presence of an industrial complex. Impacts on historical and cultural resources from preconstruction, construction, and operation of the proposed EREF would range from SMALL to LARGE, although with the appropriate mitigation discussed below, the impacts would range from SMALL to MODERATE.

The *National Historic Preservation Act of 1966*, as amended (NHPA), requires that all adverse effects to *National Register of Historic Places* (NRHP)-eligible historic and cultural resources be considered during Federal undertakings, such as the NRC licensing activity for the proposed EREF. A resource is considered eligible for listing on the NRHP by meeting at least one of the following four criteria (36 CFR 60.4): (1) association with an historic person, (2) association with an historic event, (3) representation of the work of a master, or (4) potential to provide information on the history or prehistory of the United States.

Section 106 of the NHPA identifies the process for considering whether a project would affect significant cultural resources. The Area of Potential Effect for the Section 106 review for the proposed EREF project is the 240 hectares (592 acres) that would be directly affected by preconstruction and construction of the proposed EREF. The Section 106 process requires consultation between the lead Federal agency and the State Historic Preservation Office (SHPO), which is the custodian of information on cultural resources for the State. The Section 106 process also requires that Federally recognized Native American groups who have ancestral interest in the property should be consulted to determine if resources important to the tribe are present (36 CFR 800.2(4)(c)(ii)). For the proposed EREF project, Section 106 consultations are currently in progress between NRC and the Idaho SHPO and between the NRC and the Shoshone-Bannock Tribes. The NRC has contacted the Idaho SHPO and the Shoshone-Bannock Tribes concerning the presence of historic and cultural resources in the areas of the proposed EREF site and of the route of the proposed electrical transmission line needed to power the proposed EREF (see Section 1.5.6.2 and Appendix B).

4.2.2.1 Preconstruction and Construction

The greatest potential for impacts on historic and cultural resources would occur during ground disturbance during preconstruction. No additional significant impacts on historic and cultural resources are anticipated during facility construction because nearly all of the ground-disturbing activities would have already occurred during preconstruction. The proposed 240-hectare (592-acre) EREF site area has been surveyed for the presence of historic and cultural resources. The surveys were documented in two reports that were provided to, and reviewed by, the Idaho SHPO (Ringhoff et al., 2008; Estes and Raley, 2009). They identified site MW004, the John Leopard Homestead, and indicated that this site may be eligible for nomination to the NRHP. The site, which is described in Section 3.3.4 of this EIS, is important for the information it could provide on the homesteading activities in the area.

The SHPO concurred with the evaluations and recommendations in the two survey reports and agreed that site MW004 is the only one of the 13 sites located in the proposed EREF site eligible for listing on the NRHP (Idaho SHPO, 2009). During scoping and in its comments on the Draft EIS, the Shoshone-Bannock Tribes indicated that it would like to be part of the cultural resource surveys of the proposed EREF site area (Shoshone-Bannock, 2009). The tribes issued no response to requests for information relevant to the cultural resources aspect of the proposed project during the consultation under Section 106 of the NHPA (see Appendix B, Section B.2).

Site MW004 would be directly impacted by preconstruction activities at the proposed EREF site. Preconstruction activities would completely destroy this site because it would be under the footprint of the security fence and a proposed electrical substation for a proposed transmission line that would bring power to the proposed EREF. Therefore, AES prepared a treatment plan that detailed how it would mitigate site MW004 by professional excavation and data recovery prior to disturbing site MW004 during preconstruction activities (AES, 2010e). This treatment plan was provided to the Idaho SHPO for review, and the SHPO indicated its support for the proposed treatment of site MW004 (Idaho SHPO, 2010a).

During preconstruction and construction activities, there is the possibility for unexpected discoveries of archaeological or human remains. Therefore, AES also commissioned the development of the *Archaeological Monitoring and Discovery Plan for the EREF, AES, in Bonneville County, Idaho* (Stoner et al., 2009), which specifies procedures for addressing and handling the unexpected discovery of human remains or archaeological material at the proposed EREF. This plan has also been provided to the Idaho SHPO.

In a letter to the Idaho SHPO dated November 17, 2010, AES's archaeological consultant, Western Cultural Resource Management, Inc. (WCRM), provided a summary of its activities during the professional excavation of, and data recovery at, site MW004, which was conducted from October 5 to November 8, 2010 (WCRM, 2010). This mitigation serves to reduce the impact of the proposed EREF project on site MW004; however, the destruction of the site through formal professional excavation still is considered an adverse effect because the site no longer exists. In a letter dated November 26, 2010, the SHPO indicated that it had received and accepted the data recovery report (Idaho SHPO, 2010b). However, AES must receive a notice-to-proceed from the SHPO before initiating preconstruction activities in the area of site MW004. WCRM is preparing a report detailing the results of the excavations and an analysis of the information collected from the mitigation efforts (WCRM, 2010).

Preconstruction and construction are not expected to impact the Wasden Complex (see Section 3.3.4 for a description of the Wasden Complex). The site is distant enough from the proposed EREF property that no effects from these activities are anticipated. Visual or noise impacts are possible, but the distance makes it unlikely that the Wasden Complex would be affected.

Consultation among the NRC, the SHPO, the Shoshone-Bannock Tribes, and AES is ongoing. The NRC is developing a Memorandum of Agreement (MOA) with these parties. It is planned that the NRC, the SHPO, and AES will be signatories of the MOA. In addition, the Shoshone-Bannock Tribes has accepted the NRC's invitation to be a concurring party on the MOA (see Appendix B, Section B.2). The draft MOA addresses the completed mitigation of site MW004, the completed X-ray fluorescence analysis of obsidian artifacts found at the proposed EREF site (Idaho SHPO, 2010a), and the survey by AES for historical and cultural resources of any previously un-surveyed areas that may be identified following final design. Also, the draft MOA references AES's unanticipated discoveries and monitoring plan (Stoner et al., 2009).

The NRC staff initially considered that impacts on historic and cultural resources would be LARGE due to the destruction of site MW004 to accommodate preconstruction of the proposed EREF. However, since site MW004 was professionally excavated prior to ground disturbance in the area of this site, and because other examples of this particular homestead site type are found in the region (Gilbert, 2010), the impacts have been reduced to MODERATE. Impacts to other historic and cultural resources would be SMALL. The majority of impacts to historic and cultural resources would occur during preconstruction when most of the ground disturbances would occur; therefore, an estimated 90 percent of the impacts would be associated with preconstruction and only 10 percent with construction.

4.2.2.2 Facility Operation

No ground-disturbing activities are expected during operation of the proposed EREF. As a result, there is no potential for impacts on historic and cultural resources during operation. Operation is not expected to have any impact on the Wasden Complex because of its distance from the proposed EREF site. The greatest threat to the proposed site is unlawful collection of artifacts at the site by site workers; however, educating workers should minimize any effects. Therefore, impacts from operation would be SMALL.

4.2.2.3 Mitigation Measures

As discussed earlier, site MW004 was professionally excavated (with data recovery) by AES in accordance with a treatment plan supported by the SHPO (Idaho SHPO, 2010a). The Idaho SHPO received a summary of the data recovery efforts (WCRM, 2010) undertaken as mitigation (Idaho SHPO, 2010b). A report documenting the information discovered during the excavation, and an analysis of that information is being developed (WCRM, 2010). Any additional mitigation measures for historic and cultural resources, if needed, would be implemented through the *Archaeological Monitoring and Discovery Plan for the EREF, AES, in Bonneville County, Idaho* (Stoner et al., 2009) and the MOA that is being developed. The cultural resource mitigation measures identified by AES are listed below:

- educate workers on the regulations governing cultural resources stressing that unauthorized collecting is prohibited.

- use of onsite cultural resource monitors during construction activities

- procedures to address unexpected discoveries of human remains or previously unidentified archaeological materials during ground-disturbing activities and procedures for the evaluation and treatment of these resources

- cessation of construction activities in the area around any discovery of human remains or other item of archaeological significance and notification of the State Historic Preservation

Officer to make the determination of appropriate measures to identify, evaluate, and treat the discoveries

- treatment/mitigation plan for site MW004 (recommended eligible for inclusion in the NRHP) to recover significant information on that site (professional excavation and data recovery have been conducted)

4.2.3 Visual and Scenic Impacts

This section discusses the potential visual and scenic impacts that could result from preconstruction, construction, and operation of the proposed EREF. Visual impacts result when contrasts are introduced into a visual landscape. The current visual setting of the proposed EREF site is cultivated and undeveloped rangeland. The greatest potential for visual impacts would be expected from operation of the proposed EREF, as this would represent a long-term alteration of the existing landscape. Impacts on visual and scenic resources from preconstruction, construction, and operation of the proposed EREF would range from SMALL to MODERATE.

Visual impacts are often difficult to characterize due to the subjective nature of what is a concern visually. Opinions can vary widely on what is visually acceptable and whether it can enhance or detract from a visual setting. The BLM has developed an effective Visual Resource Management (VRM) System (BLM, 2007). This system relies on two main components: visual resource inventories (VRIs) and visual resource management. VRIs consider the base line visual characteristics of a location. VRM is a management decision by the BLM to either preserve a visual setting or to focus on resources other than visual resource considerations for a location. A more detailed discussion of this process is provided in Section 3.2. The visual resource impact discussion that follows relies on the terminology and concepts from the BLM VRM System.

BLM manages the visual resources on BLM lands in the area surrounding the proposed EREF, as illustrated in Figure 4-1 and described below. BLM has designated the public lands that immediately surround the proposed EREF property as VRM Class II. This designation reflects BLM's determination that the lands have scenic quality and that BLM will manage the lands to maintain the current visual character. Most of the BLM land south of US 20 (e.g., Hell's Half Acre WSA) is designated by BLM as VRM Class I. VRM I areas are managed to preserve the visual character with no new visual intrusions permitted. Also, in this region, some of the land that immediately borders US 20 is managed by BLM. The land along the highway is designated as VRM III. In VRM III areas, BLM is not trying to preserve the current visual setting.

4.2.3.1 Preconstruction and Construction

Preconstruction activities would be concentrated in the proposed EREF site area. Visual impacts could result along US 20 from the increased activity at the proposed site. Fugitive dust from preconstruction activities could also create visual impacts along US 20. These impacts would be of relatively short duration, with all activities occurring during daylight hours. The clearing of vegetation and installation of a perimeter fence would change the visual setting; however, they would not significantly alter the overall appearance of the area. The vehicular traffic associated with preconstruction would not be a permanent feature of the proposed project. The Wasden Complex a significant archaeological site located 1.6 km (1 mile) from the

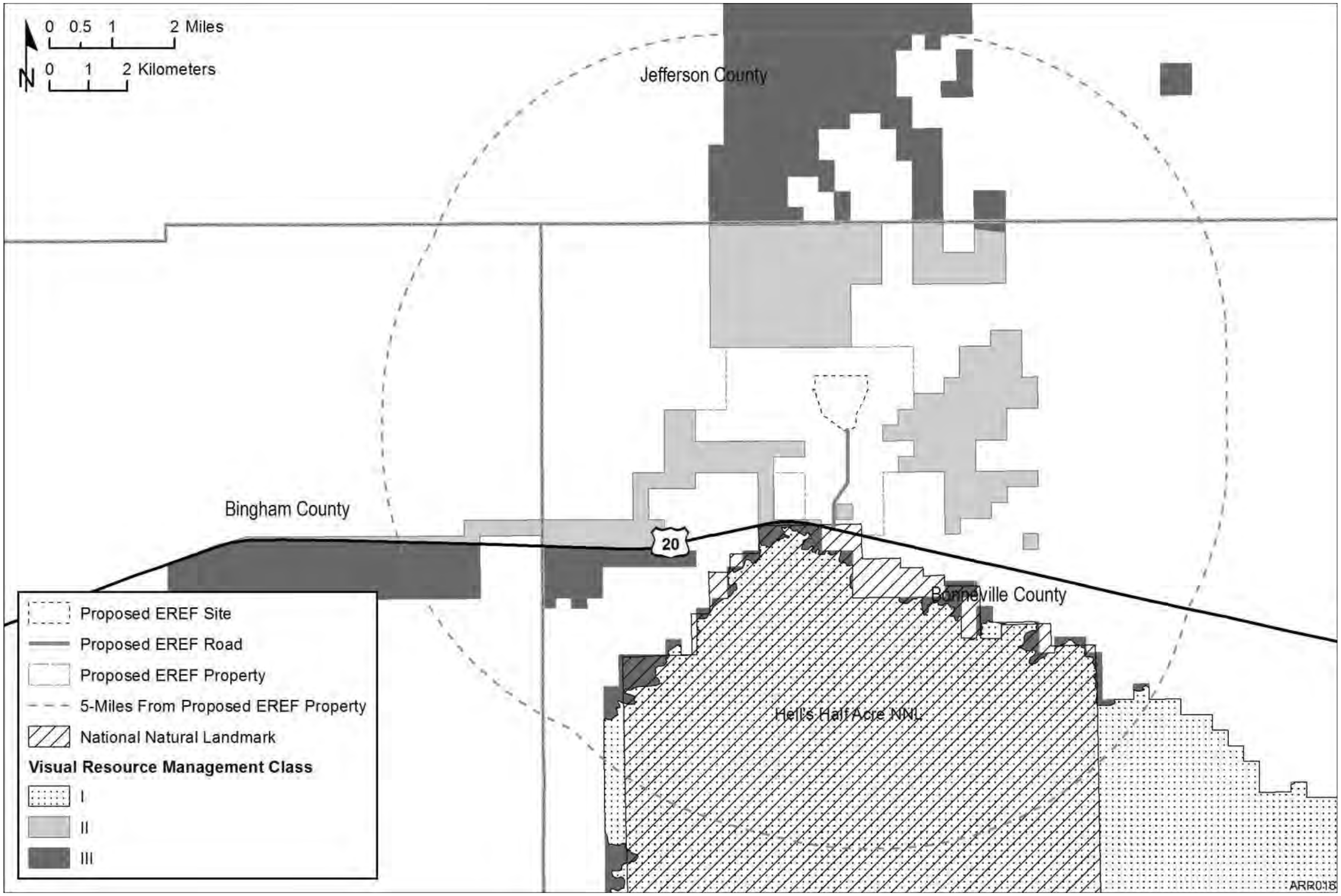

Figure 4-1 VRM Classes in the Area Surrounding the Proposed EREF Site

EREF site could also be impacted visually by preconstruction and construction (see Section 3.3.4 for a description of the Wasden Complex). An intervening ridgeline, would largely shield these activities from the site. Visual impacts associated with preconstruction would be SMALL.

Facility construction activities would involve erecting permanent buildings. The impact of such permanent structures is discussed in the following section on facility operation. The current visual landscape does not include any industrial structures of the types proposed for the proposed EREF. Industrial buildings are present at the Idaho National Laboratory (INL), but are not visible from the proposed EREF site. Facility construction activities would begin to introduce visual intrusions that are out of character with the surrounding region. The vehicular traffic associated with construction would not be a permanent feature of the plant. These activities would have an effect on the visual landscape; however, much of the activity associated with construction would end once construction was complete. Construction activities would not be expected to affect the Wasden site because the activities would be screened by an intervening ridgeline. Construction of the proposed facility may negatively affect the visual setting as perceived by visitors to Hell's Half Acre WSA. Construction activities would be partially visible from portions of Hell's Half Acre WSA. However, the security lighting required at the facility would result in the greatest impact due to it being visible to night users of Hell's Half Acre WSA (e.g., campers).

Visual impact levels associated with construction would range from SMALL to MODERATE. The majority of the impacts on visual and scenic resources would occur during construction (80 percent) when the taller built features are constructed; impacts associated with preconstruction are largely the result of increased activity (20 percent).

4.2.3.2 Facility Operation

The operation of the proposed EREF would have an effect on the overall visual setting of the area. The operation of a uranium enrichment facility would represent a significant visual departure from the existing visual setting. No developments of the type being proposed are currently visible near the proposed EREF site. The operation of the proposed facility would, using the BLM VRM System, be expected to lower the VRI value for the area of the proposed project. Based on the BLM VRI process, the visual landscape would be affected due to (1) sensitivity of the location for visual intrusions, (2) scenic qualities of the location, and (3) distances from which the location would be viewed (see Section 3.4 for a discussion of the VRI process). The area of the proposed project is presumed to have high sensitivity for recreational users, but lower sensitivity to the INL employees and farmers who use US 20. The scenic quality of the area is low, and the main viewing distance is roughly 2.4 kilometers (1.5 miles) away on US 20, which puts the proposed EREF site at a distance where intrusions are visible. Based on the BLM system, the impact level for operation of the plant is linked to its effect on the VRI class. BLM has indicated that the plant would reduce the relative visual value of the area (Boggs, 2010).

The Wasden Complex could be visually affected by the operation of the EREF. Due to an intervening ridgeline, only the top portions of the buildings would be visible from the Wasden Complex. Because only a portion of the complex would be visible, the operation of the EREF is not expected to visually affect the Wasden Complex.

Another factor to be considered in assessing the visual effect of operating a plant of this sort is the introduction of light pollution at night. Lights are perceivable over great distances in open environments like the vicinity of the proposed EREF site. The most sensitive locations where lights from the proposed EREF could be perceivable are at the trailhead for Hell's Half Acre Wilderness Study Area (WSA) located less than 3.5 kilometers (2 miles) south of the proposed EREF and from Craters of the Moon National Park located 72 kilometers (45 miles) to the west (NPS, 2009). The perimeter lighting for the plant would be plainly visible to campers at the Hell's Half Acre Twenty Mile Lava Trail trailhead where camping is permitted. Data is available from the National Park Service (NPS) for perception of the light dome from Craters of the Moon National Park (NPS, 2010). The NPS data show that the light from Idaho Falls is visible from the park. While the proposed EREF site is 20 miles closer to the park, it is a significantly smaller light source, and therefore is not expected to generate sufficient light that it would be perceivable from Craters of the Moon National Park.

The majority of those who would see the new plant are workers at INL who are not using the area for its visual qualities. The INL workers are the main group of commuters on US 20. Operation of the proposed facility may negatively affect the visual setting as perceived by visitors to Hell's Half Acre WSA. Operation would reduce the quality of the recreational experience for campers at the Hell's Half Acre trailhead for the duration of the proposed license. Additionally, operation would have an adverse impact on wilderness values at the Hell's Half Acre WSA because opportunities for solitude would be reduced due to the facility being within sight of user portions of the WSA. The impact would be greatest at night when artificial light is in use. Based on the NRC staff's review, the impact of operation of the proposed EREF on visual resources in the area of the proposed project would be MODERATE.

4.2.3.3 Mitigation Measures

Several mitigation measures have been identified by AES to reduce the effect of the proposed project on visual and scenic resources (AES, 2010a). They include the use of accepted natural low-water-consumption landscaping techniques using native landscape plantings on bare areas on the perimeter of the proposed EREF to limit any potential visual impacts, and the use of crushed stone in areas where planting is not viable. Revegetation would occur as quickly as possible during construction. Painting the proposed facility in colors that would blend with the surrounding vegetation could also reduce the contrast between the proposed EREF plant and the surrounding landscape. Creation of earthen berms or other types of visual screens made of other natural material would also help reduce the visibility of the proposed facility. To minimize light pollution, all perimeter lights would be downfacing (AES, 2010a).

4.2.4 Air Quality Impacts

Air quality impacts from the operation of construction equipment during preconstruction and facility construction were evaluated based on the construction schedules and parameters provided by AES (AES, 2010a). U.S. Environmental Protection Agency (EPA)-approved algorithms were applied to estimate emissions, and EPA-approved dispersion models were used to estimate ambient air concentrations of criteria pollutants at the proposed EREF property boundary under expected meteorological conditions. The impacts of travel to and from the EREF property by the construction workforce as well as truck deliveries of equipment and materials to the proposed EREF site were included in the evaluation. Air quality impacts during operation of the proposed EREF from the anticipated release of certain chemicals, the periodic operation of certain pieces of equipment such as emergency generators, and the potential release of uranium hexafluoride (UF_6) from the Cascade Halls were also evaluated. The NRC staff concludes that impacts on ambient air quality from preconstruction and construction would be SMALL for all hazardous air pollutants (HAPs) and all criteria pollutants except particulates, but may be MODERATE to LARGE for particulates during certain preconstruction periods and activities, despite application of mitigation measures. However, such impacts are expected to be the result of fugitive dust generation and to occur only when fugitive dust-generating activities are actually occurring. The NRC staff further concludes that impacts on ambient air quality from the routine operation of the proposed EREF would be SMALL with respect to all criteria pollutants and all HAPs.

4.2.4.1 Preconstruction and Construction

The NRC staff anticipates that air quality impacts may occur as a result of preconstruction and construction. Criteria pollutants would be generated as a result of the onsite operation of construction vehicles and equipment burning fossil fuels in internal combustion engines and from the operation of delivery vehicles and workforce transport vehicles traveling to and from the site. Lesser amounts of criteria pollutants may be released from the operation of heating systems using external combustion sources such as boilers or furnaces. Releases of volatile organic compounds (VOCs) (nonmethane hydrocarbons) may result from many onsite activities, including the onsite storage and/or dispensing of vehicle and equipment fuels, the use of cleaning solvents, and the applications of paints and corrosion-control coatings. Lesser amounts of VOCs may be released from the storage and use of fossil fuels for comfort heating and from the use of various industrial gases for welding, brazing, and other construction-related activities. Fugitive dust may result from the disturbance of the ground surface during cut-and-fill activities, excavations for foundations and footings, burial of utilities, construction of onsite roads, operation of an onsite concrete batch plant (including delivery, storage, and handling of sand, aggregate, and cement), and travel of construction vehicles on bare ground or on unpaved onsite roads. Lesser amounts of fugitive dust may result from wind erosion of bare ground.

Amounts of pollutants generated and released as a result of the above-noted activities would be functions of the scope and duration of each activity, circumstantial factors such as soil types, extant pollution-control devices, prevailing meteorological conditions, and mitigations resulting from the application of BMPs and appropriate controls. Although AES has not yet developed and submitted a detailed construction plan and schedule, sufficient details have been provided to derive a reasonable approximation of the air quality impacts that may result from preconstruction and construction. A similar array of assumptions and air impact-related parameters was developed by AES and provided in the EREF Environmental Report (ER) (AES, 2010a) and in supplementary information (AES, 2009b).

The NRC staff evaluated the assumptions and tentative schedules used by AES in estimating construction-related air impacts and, with exceptions noted below, found them to be reasonable, generally conservative, and appropriate representations of expected activities necessary and sufficient to support construction-related air impact analyses. Relevant parameters for construction activities proposed by AES are also consistent with industrial construction activities representative of EREF preconstruction and construction. Consequently, with the exception of expected reductions in fugitive dust from mitigation efforts (see below), AES's proposed construction-related parameters and schedules were used to form the basis for an assessment of air quality impacts.

The air emission model MOBILE 6.2, published by EPA (EPA, 2003), was used to estimate unit emissions of criteria pollutants from vehicles and equipment using fossil fuels in internal combustion engines (both compression-ignition [diesel] and spark-ignition engines). The NRC staff determined that the complement of construction support vehicles and construction vehicles and equipment proposed by AES was reasonable for the construction tasks at hand. Consequently, the number and type of vehicles proposed by AES were used to define the MOBILE 6.2 modeling inputs. Results for unit emission rates and daily emissions from construction support vehicles and construction vehicles and equipment as calculated by the NRC are displayed in Tables 4-1 and 4-2, respectively.

Supplemental information submitted by AES provide details of the onsite vehicle fuel storage and dispensing activities that would be occurring onsite during preconstruction and construction (AES, 2009b). Gasoline and diesel fuel would each be stored onsite in 2000-gallon aboveground steel tanks, each enclosed in reinforced concrete and each equipped with a 5-gallon overfill protection feature. Estimated throughputs during construction include 1325 liters (350 gallons) of gasoline per week and 37,854 liters (10,000 gallons) of diesel fuel per week. Assuming that design features that control releases of nonmethane VOCs are functional and BMPs are employed in the storage and dispensing of fuels (see Section 4.2.4.3), algorithms published in EPA AP-42, Fifth Edition, Volume 1, Chapter 7.1 (EPA, 2006a), and the EPA TANKS computer program (Version 4.09) (EPA, 2006b) predict VOC losses of 312 kilograms (688 pounds) per year during construction. Because each of the tanks has a

Table 4-1 NRC's Estimated Emissions of Criteria Pollutants from Construction Support Vehicles

Vehicle Type	Emission Factor g/km (g/mi)	Number in Operation[a]	Daily Estimated Mileage km (mi)[a]	Daily Emissions g (lb)	Workday Emission Rate g/s (lb/hr)
Carbon monoxide					
Light-duty vehicle	13.31 (21.41)	40	16.1 (10)	8572 (18.90)	0.238 (1.890)
Light-duty truck I	15.55 (25.03)	53	16.1 (10)	13,269 (29.25)	0.369 (2.925)
Light-duty truck II	15.60 (25.10)	4	16.1 (10)	1005 (2.22)	0.028 (0.222)
Heavy-duty truck	2.80 (4.50)	3	16.1 (10)	135 (0.30)	0.004 (0.030)
Totals				22,981 (50.67)	0.638 (5.066)
Nitrogen oxides					
Light-duty vehicle	0.66 (1.07)	50	16.1 (10)	425 (0.94)	0.018 (0.143)
Light-duty truck I	0.69 (1.12)	53	16.1 (10)	589 (1.30)	0.016 (0.130)
Light-duty truck II	0.88 (1.42)	4	16.1 (10)	57 (0.13)	0.002 (0.013)
Heavy-duty truck	5.82 (9.37)	3	16.1 (10)	2.81 (0.62)	0.094 (0.744)
Totals				1352 (2.99)	0.130 (1.029)

[a] Source: AES, 2010a.

Table 4-2 NRC's Estimated Emissions of Criteria Pollutants from Construction Vehicles and Equipment[a,b]

Equipment	Number	Workday Emission Rate in g/s (lb/hr)			
		Carbon Monoxide	Nitrogen Oxides	Sulfur Oxides	Particulates[c]
Wheeled tractor	1	0.006 (0.044)	0.015 (0.116)	0.001 (0.007)	0.001 (0.001)
Grader	4	0.021 (0.170)	0.057 (0.450)	0.004 (0.028)	0.001 (0.004)
Pans	5	0.023 (0.185)	0.058 (0.462)	0.004 (0.028)	0.001 (0.005)
Wheeled loader	8	0.440 (0.350)	0.117 (0.932)	0.007 (0.057)	0.001 (0.008)
Bulldozer	5	0.080 (0.633)	0.048 (0.380)	0.007 (0.056)	0.002 (0.015)
Dump truck	20	0.319 (2.531)	0.191 (1.519)	0.028 (0.225)	0,008 (0.060)
Roller	6	0.005 (0.041)	0.151 (1.197)	0.007 (0.056)	0.002 (0.013)
Water truck	4	0.022 (0.175)	0.059 (0.466)	0.004 (0.028)	0.001 (0.004)
Backhoe	9	0.036 (0.289)	0.094 (0.749)	0.006 (0.049)	0.001 (0.010)
25-ton crane	3	0.037 (0.295)	0.095 (0.757)	0.004 (0.032)	0.001 (0.008)
>25-ton crane	4	0.064 (0.506)	0.038 (0.304)	0.006 (0.045)	0.002 (0.012)
Manlift	16	1.119 (8.877)	0.061 (0.487)	0.002 (0.016)	0.002 (0.001)
Telehandler	5	0.350 (2.774)	0.019 (0.152)	0.001 (0.005)	0.001 (0.004)
Concrete truck	9	0.145 (1.139)	0.086 (0.684)	0.013 (0.101)	0.003 (0.027)
Concrete pumper truck	3	0.016 (0.128)	0.043 (0.388)	0.003 (0.021)	0.001 (0.003)
Miscellaneous	9	0.629 (4.994)	0.035 (0.274)	0.001 (0.001)	0.001 (0.001)
Total	111	2.914 (23.129)	1.167 (9.263)	0.097 (0.766)	0.022 (0.173)

[a] Data displayed are the result of the application of MOBILE 6.2 to EREF construction period parameters.
[b] Some rounding errors exist.
[c] Does not include particulates released as fugitive dust.

capacity of less than 37,854 liters (10,000 gallons), dispenses fuels with vapor pressures less than 80 mm of Hg @ 21°C, and is equipped with appropriate VOC controls, Idaho regulations categorize the tanks as insignificant sources (see IDAPA 58.01.01 Part 317.01(b)(i)(3)). The NRC staff concludes that VOC releases associated with the onsite storage and dispensation of vehicle fuels during preconstruction and construction would have a SMALL impact on air quality.

Fugitive dust from a variety of sources is a notable air impact from construction. Specific emission factors have been established for fugitive dust resulting primarily from vehicle travel on unpaved onsite roads (EPA, 2006c), cut-and-fill operations, aggregate handling and storage piles (EPA, 2006d), and other activities typically associated with heavy construction (EPA, 1995). EPA has also adopted guidance on adjusting emission factors to reflect local conditions in order to estimate PM_{10} (particulate matter ≤10 micrometers in aerodynamic diameter) and $PM_{2.5}$ (particulate matter ≤2.5 micrometers in aerodynamic diameter) fractions of fugitive dust generated (MRI, 2006). Particle size distribution of fugitive dust depends on a number of factors, particularly the silt and moisture contents of the impacted soils. Although the proposed EREF site is characterized broadly as a semiarid environment where soils typically have low silt content, available information indicates silt content of soils on the site to be as high as 70 percent (NRCS, 2009). Correction factors published by EPA that allow estimation of PM_{10} and $PM_{2.5}$ fractions of total suspended particulates (generally accepted to be represented as PM_{30}, which is particulate matter ≤30 micrometers in aerodynamic diameter) were derived from analyses of the behavior of soils with silt content no higher than 30 percent. For such soils, EPA guidance suggests that the modeled value of pounds of particulate per vehicle miles traveled (VMT) be multiplied by correction factors of 0.306 and 0.0306 to estimate PM_{10} and $PM_{2.5}$ fractions, respectively (MRI, 2006). However, EPA has not published correction factors for soils with exceptionally high silt content such as those present at the proposed EREF property; consequently, no additional corrections beyond those noted above are introduced in estimating PM_{10} and $PM_{2.5}$ fractions for indigenous soils at the proposed EREF site. To estimate fugitive dust generation, the NRC assumed an average rate of fugitive dust emissions of 1.2 tons per acre per month and an average daily disturbed acreage (i.e., active construction zone as indicated by AES) to be 89.4 hectares (221 acres). Without the introduction of any mitigative controls, this would result in estimated uncontrolled releases of PM_{10} at a rate of 97.3 grams per second (773.2 pounds per hour) and $PM_{2.5}$ of 9.7 grams per second (77.3 pounds per hour) over the construction hours of operation (10 hours per day for 21 days per month).

As noted above, the moisture content of the soils on unpaved roads plays a significant role in the rate of fugitive dust generation. AES has committed to a mitigative strategy that involves watering onsite roads at least twice a day. AES estimates that such a watering schedule would result in a 90 percent reduction in fugitive dust generated. However, EPA estimates that achieving a 90 percent reduction in fugitive dust would require maintaining the soil moisture content ratio, M,[1] well over 4.0 (see Figure 13.2.2-2 of EPA, 2006c). Given the high silt content of the soils, moisture levels that high could be expected to cause the roads to become safety hazards and even impassable in some cases. Instead, it is more reasonable to expect that a watering strategy that maintains a value for M of approximately 2.0 would be an appropriate compromise between mitigating fugitive dust to the greatest extent practical and avoiding hazardous road conditions. At an M value of approximately 2.0, a fugitive dust reduction of 75 percent would be anticipated. However, this analysis does not preclude additional mitigative measures such as use of alternative dust control techniques in addition to watering that would effect a greater reduction in fugitive dust without compromising safety. Additional mitigation options that could contribute to further reductions in fugitive dust generation are discussed in Section 4.2.4.3. A 75 percent reduction in uncontrolled fugitive dust results in controlled fugitive dust releases of PM_{10} at a rate of 24.3 grams per second (193.3 pounds per hour) and $PM_{2.5}$ of 4.9 grams per second (38.7 pounds per hour).

The EREF development plan states that four 2500-watt diesel-fueled emergency generators and two smaller diesel-fueled generators not related to construction but intended to support facility operation would become operational while the construction phase is still ongoing (AES, 2010a). Once installed, these generators would be enrolled in a preventative

[1] The moisture content ratio, M, is defined as the ratio of the moisture content of a watered roadway to that of an unwatered roadway (i.e., the roadway in a representative natural condition). It essentially represents the percentage of soil pore spaces that are filled with water.

maintenance protocol that requires their operation for an average of 1.6 hours per week, 52 weeks per year. Therefore, these generators would release criteria pollutants during both the construction and operation phases. However, none of the generators is expected to be used to provide power to support construction-related activities. To ensure the estimated impacts are conservative, emission calculations presume all six generators have nameplate ratings of 2500 watts. The generators would be exempt from permit requirements under a Category II Exemption as provided for in Section 222(01)(d) of Idaho air pollution rules (IAC, 2010). The generators would burn ultra-low-sulfur diesel fuel, the only diesel fuel expected to be available in the area through commercial vendors. Using the preventative maintenance schedule suggested by the equipment manufacturer and applying appropriate EPA-published algorithms reflective of the above assumptions, the estimated air quality impacts of the generators include: the generation of 61 kilograms per year (0.067 tons per year) of PM_{10}, 8437 kilograms per year (9.3 tons per year) of nitrogen oxides (NO_x), 726 kilograms per year (0.080 ton per year) of carbon monoxide (CO), and 168 kilograms per year (0.185 ton per year) of nonmethane VOCs (AES, 2010a). Annual impacts of the above magnitude would continue throughout the operating phase of the proposed EREF and may increase if any of the generators are called into service to provide emergency power.

On June 17, 2009, AES submitted a request to the NRC for an exemption from 10 CFR requirements governing commencement of certain preconstruction activities. As granted by the NRC (NRC, 2010a), the exemption allows AES to undertake certain preconstruction activities prior to NRC completing its environmental review and issuing a materials license for the EREF. Activities covered under the exemption include preconstruction actions such as clearing the site; site grading and erosion control; excavating the site (including rock blasting and removal, if required); installing parking areas, stormwater control features, and utilities; and constructing permanent highway access roads, onsite roads, buildings, offices, and other structures not subject to NRC licensing authority and not radiation safety-related.

Collectively, the identified preconstruction activities would constitute the majority of air quality impacts associated with preconstruction and construction. The construction activities that would remain to be addressed under the NRC license include construction of the Separation Building Modules (SBMs) and installation of centrifuges and their monitoring and emission-control systems. Because these remaining construction actions can be expected to occur on a relatively small disturbed land area and utilize a reduced construction workforce, and with the major pollutant-emitting activities being completed under the exemption, the NRC staff concludes that the identified preconstruction activities would constitute as much as 90 percent of the overall impacts expected from preconstruction and construction combined. Further, commencement of the identified preconstruction activities would coincide with cessation of agricultural activities on the site, thus eliminating the seasonal air quality impacts associated with the agricultural activities (e.g., fugitive dust from field cultivation and criteria pollutant releases from operating farm vehicles and equipment).

Average emissions of criteria pollutants and fugitive dust for a typical construction workday are shown in Table 4-3. The estimated emissions, adjusted for local conditions, and the relevant most recently available meteorological data from the National Weather Service (NWS) were used as inputs to the EPA-approved air dispersion model, AERMOD, to estimate air quality

Table 4-3 NRC's Estimated Daily Emissions during Preconstruction and Construction

Pollutant	Total Workday Average Emissions g/s (lb/hr)	Notes
Vehicle emissions		
Hydrocarbons	0.34 (2.67)	• Includes contributions from diesel emergency generators installed during construction and enrolled in a preventative maintenance program. • Particulates from vehicle exhaust are assumed to be $PM_{2.5}$.
Carbon monoxide	3.55 (28.19)	
Nitrogen oxides	1.30 (10.29)	
Sulfur oxides	0.10 (0.77)	
Particulates	0.02 (0.17)	
Fugitive dust		
PM_{10}	24.3 (193.1)	• Assumes a 75 percent reduction in fugitive dust from unpaved roads as a result of twice/day watering mitigations and maintenance of a moisture content ratio of 1.75. • Assumes an average daily disturbed acreage of 221 acres and a 10-hour workday for 21 days each month. • Assumes an uncontrolled fugitive dust emission rate of 1.2 tons/acre/month. • Assumes fine particle size ratios of 1.5/4.9 for PM_{10} and 0.15/4.9 for $PM_{2.5}$ with respect to PM_{30}.
$PM_{2.5}$	2.43 (19.3)	

impacts of the preconstruction and construction phases of the proposed EREF.[2] Local meteorological data from the NWS meteorological station located at the Idaho National Laboratory's Materials and Fuels Complex (identified in NWS databases as the MFC station) for the period calendar year (CY) 2005 through CY 2008 and upper-level data from the NWS Automated Surface Observing Systems station located at the Boise International Airport (the closest station to the proposed EREF at which upper-level data are recorded) collected over the same period were used as meteorological data inputs. Data from the Pocatello Municipal Airport NWS station over the same time frame were used to fill gaps in the MFC data, pursuant to the AERMOD model.

To determine whether the estimated emission levels would cause an exceedance of an ambient air quality standard, the modeled results were added to existing ambient air quality data representative of background conditions, and the sum was compared to the National Ambient Air Quality Standards (NAAQS) (see Table 3-12). The ambient air monitoring network in Idaho is maintained by the Idaho Department of Environmental Quality (IDEQ). Not all criteria pollutants are monitored at each authorized monitoring station, and there is no monitoring station close to the proposed EREF site. Therefore, the NRC staff selected the monitoring stations closest to the EREF site for each criteria pollutant. It is important to note that the

[2] Details of the model and the methodology for its application are presented in Appendix C. Additional descriptive information is available from the EPA Web site at http://www.epa.gov/scram001/dispersion_prefrec.htm#aermod.

closest monitoring station for particulates is in an urban setting in Pocatello. That monitoring location was determined to have a similar geographic setting to the proposed EREF site, and thus was expected to experience similar meteorological conditions over time, especially with respect to wind speeds and directions. However, because that monitoring station is in an urban setting, the potential sources of particulate emissions would be different from those expected from the proposed EREF's rural and agricultural setting, and the Pocatello particulate monitor may not capture seasonal peaks in airborne particulates associated with agricultural activities. Thus, the monitoring results from the Pocatello station may underrepresent background particulate values at the EREF site, which is surrounded by cultivated fields. However, since no monitoring data collected in an Idaho agricultural setting was available from which to assess the magnitude of the impact agricultural activities could have on particulate values, no attempt was made to introduce correction factors reflective of these acknowledged differences. Further, EPA guidance regarding the application of AERMOD does not require that quantitative corrections be made for unique circumstantial factors or events but does recommend consideration of such factors in interpreting modeling results (EPA, 2005a). The highest values for each criteria pollutant for calendar years 2006 and 2007 were identified, and the higher of the two values was selected as a conservative representation of the background concentration for each criteria pollutant at the proposed EREF site. Selected background ambient air quality data for the impact assessment are displayed in Table 4-4.

Results of AERMOD modeling are displayed in Table 4-5. The results suggest that over the preconstruction and construction phases, the NAAQS for both PM_{10} and $PM_{2.5}$ may be exceeded at the boundary of the proposed EREF property during certain meteorological conditions when actions to mitigate the release of fugitive dust from unpaved onsite roads are limited to twice-per-day watering to the extent necessary to effect a 75 percent reduction. Modeled results at the proposed EREF property boundary show 24-hour PM_{10} and $PM_{2.5}$ concentrations to be as high as 271.5 percent and 105.3 percent of their respective standards while all other NAAQS are satisfied. It must be noted, however, that meteorological data for the MCF station obtained from the NWS and used in the AERMOD model included wind speed data as low as 0.134 meter (5.3 inches) per second, reflecting the sensitivity of the wind speed monitoring instrument used at the NWS MCF weather station. Evaluation of the modeling data suggests that exceedance of the ambient air quality standard for particulates at the proposed EREF property boundary would occur primarily during periods of very low wind speed, as might typically occur during the early morning hours over the spring and summer seasons.

EPA recognizes that the manner in which AERMOD conceptualizes fugitive dust dispersion at low wind speeds and evaluates impacts from low-level (i.e., ground-level) sources introduces some bias that may result in overpredictions of near-field impacts during such conditions. Independent studies are ongoing designed to demonstrate the impacts of possible modeling bias (Paine and Connors, 2009). Nevertheless, the current EPA guidance does not provide the opportunity for corrections to reflect possible low wind speed bias, and actual observed wind speeds must be used as inputs to the model when they are available. While the modeled concentrations in Table 4-5 should be viewed as representative of preconstruction and construction impacts, some consideration of possible bias is appropriate. In order to evaluate

Table 4-4 Background Ambient Air Quality at Monitoring Stations Closest to the Proposed EREF Site

Pollutant	Averaging Period	Closest Monitoring Station	Station ID	Measured Ambient Background Concentrations		Selected Background Concentration
				2006	2007	
Carbon monoxide	1-hour	Eastman Building 166 N. 9th Street Boise, ID	160010014	3.5 ppm	4.3 ppm	4.3 ppm
Carbon monoxide	8-hour	Eastman Building 166 N. 9th Street, Boise, ID	160010014	2.1 ppm	1.6 ppm	2.1 ppm
Nitrogen dioxide	Annual	N. of Lancaster Road Hayden, ID	16055003	11.3 $\mu g/m^3$	11.3 $\mu g/m^3$	11.3 $\mu g/m^3$
Sulfur dioxide	3-hour	Sewage treatment plant Batiste and Chubbuck Roads Pocatello, ID	160050004	159.7 $\mu g/m^3$	133.5 $\mu g/m^3$	159.7 $\mu g/m^3$
Sulfur dioxide	24-hour	Sewage treatment plant Batiste and Chubbuck Roads Pocatello, ID	160050004	62.8 $\mu g/m^3$	62.8 $\mu g/m^3$	62.8 $\mu g/m^3$
Sulfur dioxide	Annual	Sewage treatment plant Batiste and Chubbuck Roads Pocatello, ID	160050004	13.1 $\mu g/m^3$	15.7 $\mu g/m^3$	15.7 $\mu g/m^3$
Particulate PM_{10}	24-hour	G&G Corner of Garret and Gould Pocatello, ID	160050015	52 $\mu g/m^3$	45 $\mu g/m^3$	52 $\mu g/m^3$
Particulate PM_{10}	Annual	G&G Corner of Garret and Gould Pocatello, ID	160050015	21 $\mu g/m^3$	22 $\mu g/m^3$	22 $\mu g/m^3$
Particulate $PM_{2.5}$	24-hour	G&G Corner of Garret and Gould Pocatello, ID	160050015	21 $\mu g/m^3$	Not detected	21 $\mu g/m^3$

Table 4-4 Background Ambient Air Quality at Monitoring Stations Closest to the Proposed EREF Site (Cont.)

Pollutant	Averaging Period	Closest Monitoring Station	Station ID	Measured Ambient Background Concentrations 2006	Measured Ambient Background Concentrations 2007	Selected Background Concentration
Particulate $PM_{2.5}$	Annual	G&G Corner of Garret and Gould Pocatello, ID	160050015	6.4 $\mu g/m^3$	Not detected	6.4 $\mu g/m^3$

Sources: IDEQ annual air quality monitoring reports for the calendar years 2006 and 2007 (IDEQ, 2007 and 2008, respectively).

Table 4-5 Estimated Air Quality Impacts at the Proposed EREF Property Boundary Associated with Initial Preconstruction and Construction[a]

			Concentration ($\mu g/m^3$, except ppm for CO)				Percent of Standard	
Pollutant	Emission Rate (g/s)	Averaging Time	Background	Modeled Maximum*	Total	NAAQS/ SAAQS[b]	Modeled Maximum	Total
CO	3.55	1-hour	4.3	0.8	5.1	35	2.4	14.6
	3.55	8-hour	2.1	0.1	2.2	9	1.5	24.9
NO_2	1.3	Annual	11.3	1.0	12.3	100	1.0	12.3
SO_2	0.1	3-hour	159.7	11.3	171.0	1300	0.9	13.2
	0.1	24-hour	62.8	1.8	64.6	365	0.5	17.7
	0.1	Annual	15.7	0.1	15.8	80	0.1	19.7
PM_{10}	24.3	24-hour	52.0	355.2	407.2	150	236.8	271.5
	24.3	Annual	22.0	15.9	37.9	50	31.8	75.8
$PM_{2.5}$	2.4	24-hour	21.0	15.9	36.9	35	45.3	105.3
	2.4	Annual	6.4	1.6	8.0	15	10.5	53.2

[a] AERMOD model uses the following:

- The highest of the second-highest concentrations over 5 years for CO and for 30-hr and 8-hr sulfur dioxide (SO_2).
- The highest of the annual averages over 5 years for nitrogen dioxide (NO_2) and SO_2.
- The high-6th-high concentration over 5 years for 24-hr PM_{10}.
- The highest of multiyear average of high-8th-high at each receptor for 24-hr $PM_{2.5}$, the highest of the annual averages over 5 years for NO_2 and SO_2, and with a wind speed measurement sensitivity of 0.134 m/s and no default value applied for low wind speed.

[b] SAAQS = State Ambient Air Quality Standards.

how AERMOD low wind speed bias might impact near-field results for the proposed EREF, the NRC staff also modeled impacts using the same emission factors, but introduced a “calm wind” default wind speed of 1.0 meter (3.3 feet) per second, allowing all other modeling parameters to remain unchanged. As expected, selection of a higher wind speed as the default value for calm wind resulted in reductions in near-field (i.e., property boundary) modeled concentrations of particulates. Table 4-6 displays the changes to modeling results that would occur if the “calm wind speed” default value was set at 1.0 meter (3.3 feet) per second. Under those conditions, only the 24-hour PM_{10} standard would be exceeded (by 161 percent) while all other standards are met.

The NRC staff concludes that preconstruction and construction would have a SMALL impact on ambient air quality for all criteria pollutants except particulates, but would have a MODERATE impact on near-field air quality (as modeled at the EREF property boundary) with respect to particulates when fugitive dust-producing construction activities (site clearing, grading, travel on unpaved onsite roads, transfer and stockpiling of materials) coincide with low prevailing wind speeds in the direction of the closest property boundary from the proposed EREF industrial area. Such wind directions are expected to occur less than 4 percent of the time (see Figure 3-11).

4.2.4.2 Facility Operation

<u>Air Impacts during the Four-Year Overlap Period</u>

The plan of development for the proposed EREF calls for a 4-year period of overlap during which some limited production (i.e., enrichment of UF_6) would begin before heavy construction has been completed (AES, 2010a). AES has indicated that all preconstruction work (site clearing, grading, stockpiling of materials), construction of all permanent onsite roads and parking areas (i.e., hard-surface paving for both roads and parking areas), construction of some production facilities, and construction of all ancillary faculties necessary to support full production would have been completed before the start of this overlap period (i.e., before any partial production begins) (AES, 2010a). AES indicates that construction during the overlap period would be limited to construction of the remaining SBMs, necessitating the disturbance of a relatively small land area and allowing for dramatic reductions in both the complement of construction vehicles and equipment and the construction workforce (AES, 2010a). Air quality impacts associated with continuing construction and limited facility operation would be additive during the overlap period. Air quality impacts during preconstruction and construction result primarily from the use of numerous pieces of heavy construction equipment, the disturbance of a large land area, the presence of a large construction workforce, and frequent material and equipment deliveries. With all such activities being completed or reduced during the construction/operation overlap period, the NRC staff concludes that approximately 85 percent of the air quality impacts related to preconstruction and construction would have occurred before any facility operations begin, with the remaining construction activities, approximately 15 percent, occurring during the construction/operation overlap period.

Table 4-6 Sensitivity of AERMOD Dispersion Modeling Results to Low Wind Speed Default Values

Pollutant	Averaging Time	Concentration ($\mu g/m^3$, except ppm for CO) NAAQS/ SAAQS[a]	Background	Modeled Maximum at Calm Wind Default Value of 0.134 m/sec	Total	Percent of Standard	Modeled Maximum at Calm Wind Default Value of 1.0 m/s	Total	Percent of Standard
CO	1-hour	35	4.3	0.8	5.1	14.6	0.3	4.6	13.2
	8-hour	9	2.1	0.1	2.2	24.9	0.1	2.2	24.1
NO_2[b]	Annual	100	11.3	1.0	12.3	12.3	0.8	12.1	12.1
SO_2[b]	3-hour	1300	159.7	11.3	171.0	13.2	6.3	166.0	12.8
	24-hour	365	62.8	1.0	63.8	18.4	0.3	65.1	17.5
	Annual	80	15.7	0.1	15.8	19.7	0.1	15.8	19.7
PM_{10}	24-hour	150	52.0	355.2	407.2	271.5	189.9	241.9	161.3
	Annual	50	22.0	15.9	37.9	75.8	13.1	35.1	70.2
$PM_{2.5}$	24-hour	35	21.0	15.9	36.9	105.3	12.0	33.0	94.1
	Annual	15	6.4	1.6	8.0	53.2	1.3	7.7	51.3

[a] SAAQS = State Ambient Air Quality Standards.
[b] NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide.

Plans submitted by AES indicate that the majority of preconstruction (cut and fill, onsite road construction, trenching, and burial of components) would all be completed for the entire site during the initial construction period, before any facility operation commences, and that construction of the second, third, and fourth SBMs and other miscellaneous structures and expansions of cask storage pads would occur during the 4-year overlap period (AES, 2010a). These remaining construction activities would result in a significant reduction in the number and types of heavy-duty construction vehicles onsite, as well as a substantial reduction in workforce; thus, air quality impacts would be substantially less than impacts during the initial preconstruction and construction phase. Impacts on air quality from partial operation during the period when operation and construction overlap would be minimal. Consequently, air quality impacts during the initial preconstruction and construction phase would represent a bounding condition that would not be exceeded during any subsequent phase of facility development and/or operation, including the 4-year construction/operation overlap period. Because of the bounding nature of the air impacts of the initial construction phase, a detailed air quality impact assessment representative of the overlap period and a more detailed plan of development for the overlap period are unnecessary.

Generation and Release of Criteria Pollutants Resulting from EREF Operations

Air impacts during operation include criteria pollutant releases from passenger vehicles and delivery vehicles traveling to and from the site, the periodic preventative maintenance-directed operation of emergency diesel generators (see below), and the operation of miscellaneous comfort heating systems burning fossil fuels. In its Environmental Report, AES (2010a) estimated the number of passenger vehicles involved in the workforce's daily commute to be 550 vehicles, which is equivalent to the number of individuals in the workforce (i.e., no credit taken for buses or carpools), and assumed each vehicle completes an average commute of 80.5 kilometers (50 miles) (daily, roundtrip).[3] AES also estimated the number and type of delivery vehicles traveling to or from the site daily to deliver materials, equipment, and feedstock and remove products and waste materials to be 36 heavy-duty trucks and estimated the average travel distance of each to be 805 kilometers (500 miles). AES has also estimated that there would be 250 workdays per year. Air impacts from the above activities were determined using the EPA-approved MOBILE 6.2 model. The NRC staff has reviewed the assumptions used by AES to define the input parameters for MOBILE 6.2 and has determined that all are reasonable and appropriate. The NRC staff confirmed the resulting air impacts through an independent analysis. The results are displayed in Table 4-7.

Not reflected in Table 4-7 are the incidental amounts of criteria pollutants that would result from the operation of comfort heating systems using fossil fuels such as natural gas and/or propane. However, because of the difficulty in predicting how much fuel would be consumed and because these contributions are expected to be negligible, they are not represented in Table 4-7. Also not reflected in Table 4-7 are impacts from the onsite storage and dispensing of vehicle fuels during EREF operation. Fuel consumption during operation is estimated at 568 liters (150 gallons) of gasoline per week and 568 liters (150 gallons) of diesel fuel per week.

[3] This assumption is consistent with the expectation that the majority of the EREF workforce would reside in Idaho Falls, approximately 25 miles east of the site.

Table 4-7 NRC's Estimated Emissions of Criteria Pollutants Resulting from Operations at the Proposed EREF

Vehicle Type	Emission Factor (g/mi)	Estimated Daily Number of Vehicles	Estimated Daily Mileage km (mi)	Daily Workday Emissions grams (tons)
Nonmethane hydrocarbons				
Light-duty vehicles (gasoline)	1.219	550	80 (50)	33,523 (3.7 × 10^{-2})
Heavy-duty vehicles (diesel)	0.506	36	805 (500)	9108 (1.0 × 10^{-2})
Emergency generators	NA[a]	6	NA	646[b] (7.1 × 10^{-4})
Total				43,277 (4.78 × 10^{-2})
Carbon monoxide				
Light-duty vehicles (gasoline)	20.350	550	80 (50)	559,625 (6.17 × 10^{-1})
Heavy-duty trucks (diesel)	2.560	36	805 (500)	46,080 (5.08 × 10^{-2})
Emergency generators				2792[c] (3.1 × 10^{-3})
Total				608,497 (6.81 × 10^{-1})
Nitrogen oxides				
Light-duty trucks (gasoline)	1.193	550	80 (50)	32,808 (3.6 × 10^{-2})
Heavy-duty trucks (diesel)	10.292	36	805 (500)	185,256 (0.204)
Emergency generators	NA	NA		32,450[d] (3.6 × 10^{-2})
Total				250,514 (0.277)

[a] NA = not applicable.
[b] Based on the AES estimate of 168 kg/yr (0.185 tons/yr) from preventative maintenance operations.
[c] Based on the AES estimate of 726 kg/yr (0.80 tons/yr) from preventative maintenance operations.
[d] Based on the AES estimate of 8437 kg/yr (9.3 tons/yr) from preventative maintenance operations.

EPA-approved algorithms predict releases of 298 kilograms (657 pounds) per year of VOCs during operation. Given the VOC control features of the tanks, their modest size, the limited volumetric throughputs, the estimated annual releases, and commitments by AES to identify and employ BMPs for the storage and dispensing of fuels (AES, 2010a), impacts on air quality from the storage and dispensing of fuels during operation would be SMALL.

Generation and Release of Non-Criteria Chemical Pollutants Related to EREF Operations

In addition to the criteria pollutants released as a result of preventative maintenance testing of emergency generators, AES has identified the potential for release of certain specific chemicals as a result of routine operations of the proposed EREF (AES, 2010a). Based on the operating experiences at a European enrichment facility using the same centrifuge technology as EREF, and scaled to the number of separative work units (SWUs) represented in the currently proposed EREF design, AES estimates the following releases: 2.0 kilograms (4.4 pounds) per year of hydrogen fluoride (HF),[4] 173 kilograms (382 pounds) per year of ethanol, and 1684 kilograms (3713 pounds) per year of methylene chloride. In addition to the above noted releases associated with operation of the centrifuges, the ER (AES, 2010a) also notes the potential for release of uranic materials to the atmosphere from the operation of the Liquid Effluent System Evaporator. The uranic materials in the liquid effluents discharged to the evaporator that are not removed and captured by precipitation or filtration would be evaporated to the atmosphere. AES estimates that the discharge of total uranium to the atmosphere from the evaporator would be <0.0356 grams per year (AES, 2010a). Idaho air regulations (Title 58 of the Idaho Administrative Code [IAC, 2010]) establish specific controls for fluoride, ethanol, methylene chloride, and total uranium (natural isotopic distribution, both soluble and insoluble salts).[5] The regulations establish occupational exposure levels (OEL), maximum allowable emission limits (EL), and acceptable ambient concentrations (AACs) for each, as shown in Table 4-8.

In addition to the applicable standards displayed in Table 4-8, the following allowable levels of fluoride in animal feed crops and forage crops are established in Title 58 Part 557.06: 40 ppm (dry basis, monthly), 60 ppm (dry basis, two consecutive months), and 80 ppm (dry basis, never to be exceeded) (IAC, 2010). Emissions of UF_6 from the GEVSs of the SBMs will result in the formation of HF in the atmosphere. These crop fluoride accumulation standards are relevant to the proposed EREF because of the potential for animal feed or forage crops to be grown on adjacent land parcels.

The NRC staff evaluated whether the estimated maximum annual amount of fluoride emissions would exceed Idaho limits for the maximum rate of fluoride release, AAC for fluoride, and/or the maximum amount of fluoride accumulation on forage crops (AES, 2010a). To ensure a conservative evaluation of the maximum concentration of fluoride in air, the NRC staff assumed that release of the entire projected annual amount of HF (2 kilograms [4.4 pounds]) occurred instead within a one-month period (i.e., over a period of 720 hours instead of over 8760 hours in a year). Those conditions would result in a release rate of approximately 2.7 grams per hour (6.0×10^{-3} pound per hour). Thus, the maximum release rate, even over a compressed time frame, is substantially less than the allowable rate of 75.8 grams (0.167 pound) per hour in Idaho rules. Based on the European experience, AES estimated an HF concentration at the point of release of 7.7 micrograms per cubic meter. The NRC staff has independently verified

4 Trace amounts of UF_6 are potentially released from the gaseous emission ventilation systems (GEVSs). Each mole of UF_6 released will hydrolize when exposed to humidity in ambient air to form 4 moles of HF and one mole of uranyl fluoride (UO_2F_2).

5 Releases from GEVSs would be in the form of UF_6. Although the feedstock arriving at EREF would contain a natural distribution of uranium isotopes, as the UF_6 progresses through the centrifuge chain, enrichment of the ^{235}U isotope occurs and the UF_6 no longer exhibits the natural isotopic ratio. UF_6 could be released from any of the centrifuges in the series, and releases from a particular centrifuge could change over time. All such releases are collected in a common header before being sent to a GEVS; thus, it is difficult to ascertain the precise isotopic ratio of the collective UF_6 releases arriving at each GEVS. However, for the purpose of this impact assessment, the Idaho standard for uranium releases is still presumed to apply to all GEVS releases, even though most such releases are unlikely to exhibit the natural isotopic distribution.

Table 4-8 Idaho Chemically Specific Air Quality Standards[a]

CAS Number	Pollutant	OEL (mg/m^3)	EL (lb/hr)	AAC
NA	Fluoride[b]	2.5	0.167	0.125 mg/m^3
64-17-5	Ethanol[b]	1880	125	94 mg/m^3
75-9-2	Methylene chloride[c]	4.1×10^{-6}	1.6×10^{-3}	0.24 $\mu g/m^3$
7440-61-1	Uranium[b]	0.2	0.013	0.01 mg/m^3

[a] CAS = Chemical Abstract Service Number (unique identifier).
NA = not applicable.
OEL = occupational exposure level.
EL = exposure level.
AAC = acceptable ambient concentration (mg/m^3 for noncarcinogens, $\mu g/m^3$ for carcinogens).
[b] *Idaho Administrative Procedures Act* (IDAPA) 58.01.01 Part 585, "Toxic Air Pollutants Noncarcinogenic Increments." Uranium as natural isotopic distribution, all soluble and insoluble salts.
[c] IDAPA 58.01.01 Part 586, "Toxic Air Pollutants Carcinogenic Increments."

this concentration at the point of release (SBM rooftop),[6] and finds it to be substantially less than the allowable 0.125 milligrams per cubic meter in Idaho rules. Dispersion even in the most stable atmospheric stability class would reduce this concentration even further at the proposed EREF property boundary, the closest possible distance for public access; thus, the public's HF exposure potential would be well below allowable levels.

The amount of HF released annually, 2 kilograms (4.4 pounds), represents 100 moles of HF (1900 grams of fluoride). Coincident with the formation of 100 moles of HF will be the formation of 25 moles of uranyl fluoride (UO_2F_2) (7700 grams [16.9 pounds]) (equivalent to 50 moles of fluoride, or 950 grams [2 pounds]). This represents a rate of release of 2850 grams (6.3 pounds) of fluoride over the course of 1 year (0.33 gram per hour or 7.2×10^{-4} pound per hour (lb/hr) over the course of a year, assuming a steady rate of release over the entire year). This amount would be substantially less than the Idaho allowable amount of 5.9 grams (0.013 pound) per hour.

Operation of the evaporator would result in the atmospheric release of less than 0.0356 gram per year of additional uranic materials. Assuming a continuous operation of the evaporator over the course of the year (8760 hours/yr), the release would equate to 3.99×10^{-4} gram per hour (8.79×10^{-7} pound per hour). This projected release rate is also substantially below the allowable 1.3×10^{-2} pound per hour exposure level. Collectively, all releases of uranic materials resulting from routine operation are also substantially below the allowable exposure level.

The most conservative site-specific air dispersion factor calculated at the proposed EREF property boundary is 4.3×10^{-6} second per cubic meter. Applying that to the calculated maximum rate of release for HF results in a concentration of HF in air of 2.7×10^{-7} milligram per cubic meter ($1.7. \times 10^{-14}$ pounds per cubic foot). This value is substantially less than the AAC of

[6] Flow rates from the GEVS are withheld from public disclosure in accordance with 10 CFR 2.390.

fluoride in ambient air of 0.125 milligram per cubic meter ($8. \times 10^{-9}$ pound per cubic foot) (annual average) specified in *Idaho Administrative Procedures Act* (IDAPA) 58.01.01 Part 585.[7]

The highest estimated deposition factor, occurring in the northeast sector of the proposed EREF site, was calculated to be 2.43×10^{-7} per square meter. Applying this deposition factor to the annual fluoride emissions of 2.0 kilograms (4.4 pounds) results in an estimated maximum HF deposition rate of 4.9×10^{-7} kilogram per square meter (2.6×10^{-6} pound per square meter). Over the course of the year, this rate of deposition would be distributed over surrounding sectors in accordance with the expected wind rose (e.g., a circular diagram showing, for a specific location, the percentage of time the wind blows from each compass direction over a specified period), and the IDAPA regulatory limits would not be exceeded.

An annual emission of 173 kilograms (382 pounds) of ethanol represents an emission rate of 2.0×10^{-2} kilogram per hour (4.4×10^{-2} pound per hour). This emission rate is less than the allowable rate of 56.7 kilograms (125 pounds) per hour contained in Idaho regulations (IAC, 2010). Applying a conservative assumption that the entire annual emissions of ethanol would occur over a 1-month period (720 hours), an emission rate of 0.24 kilogram per hour (0.53 pound per hour) would result, which is less than the allowable amount.

AES indicated that methylene chloride is used exclusively in small bench-top quantities to clean certain pieces of equipment on an average of 20 hours each week (based on a 5-day work week) (AES, 2010a). Of the total 5295 liters (849 gallons) of methylene chloride used each year, 4415 liters (638 gallons) would be recovered from the cleaning operation and managed as liquid hazardous waste, while an estimated 1055 kilograms (2325 pounds) would be released from the cleaning operation as vapor (AES, 2010a). Idaho rules establish a maximum allowable emission rate for methylene chloride of 7.2×10^{-5} gram per hour (1.6×10^{-3} pound per hour) and a maximum AAC concentration standard of 2.4×10^{-1} microgram per cubic meter (1.4×10^{-13} pound per cubic feet). Applying the most conservative site-specific air dispersion factor at the proposed EREF boundary of 4.3×10^{-6} second per cubic meter to the methylene chloride usage parameters proposed by AES, the emissions of methylene chloride would be in compliance with all applicable Idaho standards even without the application of any emission controls. The use of charcoal filters in the ventilation system serving the cleaning operation would further reduce the amount of methylene chloride actually released to the atmosphere to well below applicable standards.

NRC's analysis supports the conclusion that all emission standards in Idaho regulations for noncriteria pollutants released from point sources would be satisfied during normal operation, and all Idaho standards for AAC are met at the proposed EREF property boundary. The NRC further concludes that National Ambient Air Quality Standards would also be met at the proposed EREF property boundary during normal operations. The NRC staff therefore concludes that air quality impacts during operation of the EREF would be SMALL.

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[7] The Idaho standard is based on releases of the fluoride ion and not releases of HF. Correcting for the differences in weight of HF and the fluoride ion involves multiplying the amount of HF released by a correction faction of 18/19, or 0.95, to provide the amount of fluoride ion contained in that HF release. Given the five orders of magnitude difference between HF released and the fluoride standard, even with application of this correction factor, the HF releases are well below the fluoride standard.

4.2.4.3 Mitigation Measures

Impacts from the release of criteria pollutants, aside from PM associated with fugitive dust, from the operation of vehicles and equipment during preconstruction, construction, and operation are not expected to result in exceedance of ambient air quality standards or violation of applicable stationary source standards extant in Idaho.

Various mitigative measures are available to reduce, or in some cases eliminate, certain air quality impacts related to preconstruction, construction, and operation. AES has identified the following mitigative options for preconstruction and construction (AES, 2010a):

- BMPs would be applied during preconstruction and construction to reduce fugitive dust generation to the greatest practical level; such measures would include:
  - twice per day watering of unpaved onsite roads, excavation areas, and clearing and grading areas
  - use of alternative dust palliatives (inorganic salts, asphaltic products, synthetic organics)
  - established and enforced speed limits for onsite roads
  - suspension of certain dust-producing activities during windy conditions
  - application of gravel to the unpaved surfaces of onsite haul roads as an interim measure before permanent pavements are installed
  - apply erosion mitigation methods in areas of disturbed soils
  - use of water sprays at material-drop and conveyor-transfer points
  - limit the height and disturbance of material stockpiles
  - apply water to the surfaces of stockpiles
  - cover open-bodied trucks that transport materials that could be sources of airborne dust
  - promptly remove earthen materials deposited on paved roadways by wind, trucks, or earthmoving equipment
  - promptly stabilize or cover bare areas resulting from roadway or highway interchange construction

To mitigate potential impacts from onsite vehicle fuel storage and dispensing during preconstruction, construction, and operation, AES has identified the following mitigation measures (AES, 2010a):

- BMPs would be applied to the design and operation of onsite vehicle and equipment fueling activities to minimize the release to the atmosphere of nonmethane hydrocarbons and mitigate the potential impact of spills or accidental releases; these measures would include:
  - storage tanks would be equipped with appropriate VOC controls, liquid level gauges, and overfill protection
  - fuel delivery drivers would receive adequate training prior to being allowed onsite
  - appropriate warning signs would be posted at the fuel dispensing facility
  - fuel unloading and dispensing areas would be paved and equipped with curbs to control small spills
  - delivery contractors would carry spill kits and would be required to address minor spills during fuel deliveries

Mitigation measures identified by AES to control the release of volatile organic compounds and criteria pollutants during preconstruction and construction include:

- maintaining all internal combustion engines and their pollution control devices in good working order

Mitigation measures identified by AES for operation include the following:

- install the SBM Safe-by-Design Gaseous Effluent Vent System (GEVS) and SBM Local Extraction GEVS, which are designed to collect and clean all potentially hazardous gases from the plant prior to release to the atmosphere; provide instrumentation to detect and signal, via alarm, all nonroutine process conditions, including the presence of radionuclides or HF in the exhaust stream that will trip the system to a safe condition in the event of effluent detection beyond routine operational limits

- install the Technical Services Building (TSB) GEVS, which is designed to collect and clean all potentially hazardous gases in the serviced areas from the TSB prior to release to the atmosphere; provide instrumentation to detect and signal the Control Room, via alarm, regarding all nonroutine process conditions, including the presence of radionuclides or HF in the exhaust stream; operators would then take appropriate actions to mitigate the release

- install the Centrifuge Test and Postmortem Facilities GEVSs, which are designed to collect and clean all potentially hazardous gases in the serviced areas from the Centrifuge Assembly Building prior to release to the atmosphere; provide instrumentation to detect and signal the Control Room, via alarm, regarding all nonroutine process conditions, including the presence of radionuclides or HF in the exhaust stream; operators would then take appropriate actions to mitigate the release

- design the TSB Contaminated Area heating, ventilating, and air conditioning (HVAC) system, the Ventilated Room HVAC system in the Blending, Sampling, and Preparation Building (BSPB), and the Centrifuge Test and Postmortem Facilities exhaust filtration system to collect and clean all potentially hazardous gases in the serviced areas prior to release to the atmosphere

- apply gravel to the unpaved surface of the secondary access road

- impose speed limits on the unpaved secondary access road

- maintain air concentrations of criteria pollutants resulting from vehicle emissions and fugitive dust below NAAQS

The NRC staff concludes that the above mitigation measures and BMPs would be sufficient to ensure that air quality impacts would remain at acceptable levels over the majority of time throughout the preconstruction and initial construction phases. Additionally, the NRC staff concludes proper application of these mitigation measures, including temporary suspension of certain dust-producing activities, would ensure that periods of potentially unacceptable levels of air impacts would be avoided. The NRC further concludes that the BMPs committed to by AES for application during the operation of the proposed EREF would be sufficient to ensure air impacts remain at acceptable levels. The following mitigation measures identified by NRC would further reduce air quality impacts:

- ensure vehicles and equipment with internal combustion engines are properly tuned and pollution control devices are functional

- provide first responder training to selected workers; ensure storage tanks are equipped with fully functional overflow and vapor control features

- install hard-surface pavements, curbs, scupper drains, and drainage ways at fuel dispensing islands that will channel spilled fuels to fire-safe containment sumps; require delivery drivers to remain in attendance throughout all fuel deliveries; require drivers to verify the proper working condition of storage tank overfill features before commencing fuel deliveries; require drivers to promptly address all spills occurring during fuel deliveries (including removal of all fuels in overfill devices after completion of fuel transfers)

- install emergency shut-offs for fuel dispensing pumps; post spill response directives at the fuel dispensing islands; provide spill containment and cleanup materials at the fuel dispensing islands for cleanup of small spills; ensure the fuel dispensing islands have adequate lighting

- adopt a policy that requires prompt cleanup of all spilled materials

- identify and select construction-related products and chemicals that are free of volatile solvents

- suspend high fugitive dust-generating activities during early morning hours with calm winds and during windy periods

4.2.5 Geology and Soil Impacts

This section describes the potential environmental impacts on geologic resources and soils during preconstruction/construction and operation of the proposed EREF. Impacts could result primarily during the preconstruction and construction phases from planned surface grading and excavation activities that loosen soil and increase the potential for erosion by wind and water. Soil compaction as a result of heavy vehicle traffic could also increase the potential for soil erosion by increasing surface runoff. Spills and inadvertent releases during all project phases could contaminate site soils. Implementation of mitigation measures would ensure that these impacts would be SMALL. Because there are no known petroleum resources or nonpetroleum mineral deposits on the proposed EREF site (see Section 3.6.1.2), impacts on geologic resources are not expected.

4.2.5.1 Preconstruction and Construction

Preconstruction and construction activities for the proposed EREF site have the potential to impact site soils in the construction area. During preconstruction, conventional earth- and rock-moving and earth-grading equipment would be used. Blasting and mass rock excavation may also be required. Activities would include surface grading and excavation of the soils for roads, utility lines, stormwater basins, and installation of certain building foundations.

Preconstruction and construction activities would disturb a total of about 240 hectares (592 acres) within the proposed 1700-hectare (4200-acre) property, or about 14 percent of the total property area (AES, 2010a). This total includes the proposed EREF footprint of about 186 hectares (460 acres) and an additional 53.6 hectares (132.5 acres) for temporary construction facilities, parking areas, material storage areas, and excavated areas for underground utilities (AES, 2010a). The proposed EREF footprint would include buildings and other permanent structures such as parking areas, retention/detention ponds, cylinder storage pads, and roads. Facility structures would have foundations and footings with depths ranging from 0.76 meter (2.5 feet) to 6.0 meters (20 feet) (AES, 2009b); utility trenches would range in depth from 0.9 meter (3 feet) to 3.7 meters (12 feet) (AES, 2009b). The remaining land, about 1460 hectares (3608 acres), would be left in a natural state with no designated use for the life of the proposed facility (AES, 2010a). About 3 hectares (7.5 acres) would be landscaped, of which about 2 hectares (5 acres) would be irrigated (AES, 2009b). Areas within the proposed property boundaries currently used for irrigated crops and grazing would be taken out of service during the construction and operation of the proposed EREF (AES, 2010a).

The proposed EREF would be located on relatively flat terrain; however, some cut and fill would be required to bring the ground level to final grade (AES, 2010a). Onsite soils are suitable for fill and consist of a combination of soil and basaltic bedrock. Excavated soils would be used for fill at lower areas of the proposed site; no offsite disposal of soils would be required (AES, 2009b). Current plans are for a total of 778,700 cubic meters (1,018,500 cubic yards) of soil to be cut and used as fill (AES, 2010a). The deepest cut would be about 6 meters (20 feet), and the deepest fill also would be about 6 meters (20 feet) (AES, 2010a). Onsite soils would be used in site grading to the extent possible. Additional soil from offsite sources would be used to augment fill requirements of roads and structures, as needed (AES, 2009b). Approximately 66,000 cubic meters (86,325 cubic yards) of clay would be brought onto the proposed EREF site from a nearby source for use as liner material for the two Cylinder Storage Pads Stormwater Retention Basins (AES, 2009b).

Geologic Hazards

Preliminary site geotechnical investigations indicate that the entire area of the proposed EREF footprint is underlain by competent bedrock of basaltic lava (AES, 2010a). Subsidence due to construction is not expected; however, there is some potential for collapse due to increased loads during construction where lava tubes occur in the subsurface. Lava tubes have been observed at other locations on the Eastern Snake River Plain (ESRP) (such as that reported by Kesner, 1992). The presence of lava tubes will be considered during subsurface investigations associated with facility construction. The potential for landslides on the proposed EREF site is considered low because slopes across the proposed site are low, soils are thin or absent, and precipitation rates are low.

The proposed EREF site is in an area of very low seismic activity (see Section 3.6.1.1). Seismic history and geologic conditions indicate that earthquakes with a magnitude of more than 5.5 are not likely to occur within the ESRP; however, moderate to strong ground shaking from earthquakes with loci in other areas within the Basin and Range province could be felt at the proposed EREF site. The liquefaction potential of soils at the proposed EREF site is considered to be low since soils are dry or only partially saturated and groundwater at the proposed site is very deep.

The likelihood of a volcanic event (basaltic or silicic eruption) is very low at the proposed EREF site (see Section 3.6.1.1).

Impacts Summary

Preconstruction and construction activities could cause an increase in soil erosion at the proposed EREF site by loosening soils and making them more susceptible to erosion by wind action and rain, although rainfall in the vicinity of the proposed site is low. Compaction of soils due to heavy vehicle traffic could also contribute to soil erosion in some areas if infiltration rates are reduced to the point of causing increased surface runoff. Because these impacts are short-term and can be mitigated (see Section 4.2.5.3), they would be SMALL.

Chemical spills or releases around vehicle maintenance and fueling locations, storage tanks, and painting operations could introduce contaminants to soils during the preconstruction and construction phase. Contaminated soils could leave the proposed site via wind or water erosion (as fugitive dust or surface runoff). Leaching of contaminated soils could affect shallow groundwater. These processes are naturally mitigated by site characteristics such as thin or absent soil coverage, a low rate of precipitation, and the absence of onsite perennial drainages (see Sections 3.6.3 and 3.7.1). They also could be controlled by following best management practices and procedures (e.g., diverting stormwater to a detention basin). For all these reasons, impacts due to chemical spills or releases at the proposed EREF site would be SMALL.

The majority of soil-disturbing activities (i.e., blasting, excavating, and grading) and heavy equipment traffic would occur during the preconstruction period; it is estimated, therefore, that about 95 percent of the impacts described in this section would be attributed to the preconstruction phase of development (AES, 2010a).

4.2.5.2 Facility Operation

Soil conditions would stabilize during the operations period as ground-disturbing activities associated with construction wind down and mitigation measures such as revegetation are implemented. Impacts on soils during operation of the proposed EREF would be SMALL because operations would not involve activities that increase the potential for soil erosion and the rate of soil erosion due to wind and rain would be similar for the proposed site as that for the surrounding area.

Releases to the atmosphere during normal operation of the proposed EREF, as discussed in Section 4.2.4.2, could contribute to a small increase in the amount of HF, ethanol, methylene chloride, and UF_6 in surrounding soils as they are transported downwind. All estimated atmospheric releases of pollutants would be below the amounts allowed by permits, and the impacts on soil quality due to aerial deposition during operations would be SMALL. Therefore, operations at the proposed EREF would result in SMALL impacts on site and surrounding area soil resources.

4.2.5.3 Mitigation Measures

Mitigation measures identified by AES (2010a) to avoid or minimize impacts due to soil erosion include:

- using BMPs to reduce soil erosion (e.g., earth berms, dikes, and sediment fences)

- revegetating or covering bare areas with natural materials promptly

- watering soils to control fugitive dust

- using standard drilling and blasting methods to reduce the potential for over-excavation, minimize damage to surrounding rock, and protect adjacent surfaces intended to remain intact

- placing stockpiles in an appropriate manner

- reusing excavated materials whenever possible

The NRC identified the following additional mitigation measures:

- minimizing the areas affected by construction to the extent possible

- covering stockpiles to reduce exposure to wind and rain

- limiting routine vehicle traffic to paved or gravel roads

AES would be required to comply with the provisions in the National Pollutant Discharge Elimination System (NPDES) Construction General Permit and Industrial Stormwater Permit, issued by EPA Region 10 with an oversight review by the IDEQ (AES, 2010a). The NPDES Construction General Permit requires AES also to develop a Stormwater Pollution Prevention (SWPP) Plan to identify control measures to minimize disturbed areas and protect natural site features and erodible soil (EPA 2010a). A stormwater detention basin would be used during preconstruction, construction, and operation (AES, 2009b). Following the requirements of a Spill Prevention Control and Countermeasures (SPCC) Plan would reduce the potential impacts from chemical spills or releases around vehicle maintenance and fueling locations, storage tanks, and painting operations during construction and operation, and ensure prompt and appropriate cleanup. Appropriate waste management procedures would be followed to minimize the impacts on soils from solid waste and hazardous materials that would be generated during all phases. Where practicable, a recycling program for materials suitable for recycling would be implemented.

4.2.6 Water Resources Impacts

This section discusses the potential environmental impacts on surface water and groundwater during preconstruction/construction and operation of the proposed EREF. The discussion includes the potential impact to natural drainage on and around the proposed EREF property and the effect of the proposed EREF on the regional water supply.

During preconstruction, construction, and operation, the water supply for the proposed EREF would be obtained from onsite wells completed in the ESRP aquifer. The primary point of diversion would be the existing onsite agricultural well (Lava Well; as discussed in Section 3.7.2.3) and an additional well installed to supply potable water. No surface water sources would be used. Because the annual maximum usage rates during preconstruction, construction, and normal operations would be well below the annual water right appropriation (Carlsen, 2009), impacts on the groundwater supply would be SMALL.

All preconstruction and construction activities would comply with the requirements of the NPDES Construction General Permit[8] (AES, 2010a). Stormwater runoff would be diverted to a stormwater detention basin (AES, 2009b). During operations, stormwater would be released to onsite detention and retention basins from the central footprint area of the proposed EREF (AES, 2010a); stormwater runoff to adjacent properties therefore would not be increased. There would be no direct discharges of wastewater to surface water or groundwater (AES, 2010a). AES would develop an SWPP Plan to identify control measures to minimize disturbed areas and protect natural site features and erodible soil. Process effluents in the Liquid Effluent Treatment System Evaporator would only be discharged by evaporation to the atmosphere (AES, 2010a). Compliance with the requirements of an SPCC Plan would minimize impacts to water quality due to potential chemical spills or releases. For these reasons, impacts on water resources would be SMALL.

4.2.6.1 Preconstruction and Construction

Water Use

The water supply during the 12-year preconstruction and construction period would be obtained from one or more onsite wells completed in the ESRP aquifer. No surface water sources would be used. During this period, the proposed EREF would consume water to meet potable and sanitary needs, as well as for concrete mixing, dust control, compaction of fill, and watering of vegetation. None of this water would be returned to its original source.

Average daily water usage during the preconstruction and construction period would be about 207 cubic meters (54,700 gallons), with a peak daily usage of 382 cubic meters (101,000 gallons) in the second year (Table 4-9). Water requirements for construction are expected to taper off significantly after the seventh year. Average daily water usage during the last five years of construction would be about 28 cubic meters (7326 gallons). These usage rates are within the water right appropriation that has been transferred with the proposed property for use as industrial water. The annual appropriation for industrial use is 506.8 acre-feet, which is 625,000 cubic meters (165 million gallons), or about 1700 cubic meters (453,000 gallons) per day (Carlsen, 2009).

[8] Updates on the NPDES permitting process can be viewed on the EPA's website at http://cfpub.epa.gov/npdes/stormwater/noi/noidetail_new.cfm?ApplId=IDR10CI01.

Table 4-9 Water Use for the Preconstruction and Construction Period

	Construction[a]				
Year	Potable Water cubic meters (gallons)	Concrete[b] cubic meters (gallons)	Dust[c] cubic meters (gallons)	Soil Compaction[d] cubic meters (gallons)	Total Construction cubic meters (gallons)
1	19,555 (5,166,000)	1216 (321,331)	52,466 (13,860,000)	16,982 (4,486,100)	90,219 (23,833,431)
2	28,141 (7,434,000)	3649 (963,993)	52,466 (13,860,000)	12,130 (3,204,350)	96,385 (25,462,343)
3	19,078 (5,040,000)	10,948 (2,891,978)	52,466 (13,860,000)	9704 (2,563,500)	92,196 (24,355,478)
4	13,832 (3,654,000)	72,989 (1,927,985)	52,466 (13,860,000)	4852 (1,281,750)	78,448 (20,723,735)
5	13,832 (3,654,000)	6082 (1,606,655)	52,466 (13,860,000)	4582 (1,281,750)	77,232 (20,402,405)
6	8347 (2,205,000)	4561 (1,204,991)	52,466 (13,860,000)	0 (0)	65,374 (17,269,991)
7	6677 (1,764,000	2433 (642,662)	52,466 (13,860,000)	0 (0)	61,576 (16,266,662)
8	6677 (1,764,000)	1216 (321,331)	26,233 (6,930,000)	0 (0)	34,127 (9,015,331)
9	6677 (1,764,000)	304 (80,333)	6558 (1,732,500)	0 (0)	13,540 (3,576,833)
10	5962 (1,575,000)	76 (20,083)	1640 (433,125)	0 (0)	7678 (2,028,208)
11	5008 (1,323,000)	19 (5021)	410 (108,281)	0 (0)	5437 (1,436,302)
12	3816 (1,008,000)	5 (1255)	102 (27,070)	0 (0)	3923 (1,036,326)

[a] Assumes 252 workdays per year for construction-related activities (5 days per week).
[b] Assumes a usage rate of 151.4 liters (40 gal) used per cubic yard of concrete mixing and curing.
[c] Assumes a usage rate of 208,198 liters (55,000 gal) per day.
[d] Earthwork and soil compaction are assumed to be completed by the end of the 5th year.
Source: AES, 2010a.

The average daily (industrial) water usage during the preconstruction and construction period would be less than 1 percent of the total daily groundwater withdrawals of 640,000 cubic meters (169 million gallons) from the ESRP aquifer in Bonneville County, as measured by the USGS in 2005 (USGS, 2010). The preconstruction phase is estimated to occur during an 8-month period.

Water usage for landscaping and restoration of disturbed areas would begin in the second year of construction (2013) and continue to increase until construction is completed in 2022. AES would use xerophilic plants in landscaped areas and drought-tolerant native plants to reclaim disturbed areas. The method of irrigation would be chosen so water usage does not exceed 24,670 cubic meters (6.5 million gallons) during the growing season, April 1 through October 31, as defined by the IDWR in Carlsen (2009) (AES, 2009b). This is within the appropriation for irrigation, which is 20.0 acre-feet per year, or 25,000 cubic meters (6.5 million gallons) (Carlsen, 2009).

Water Quality

No wastewater would be generated or discharged during the preconstruction and construction period. Sanitary waste would be handled by portable systems until such time that the sanitary waste facility is operational. Short-term increases in sediment, oil and grease, fuel, and chemical constituents in surface (stormwater) runoff would be expected. Stormwater runoff would be collected in a stormwater detention basin in accordance with the NPDES Construction General Permit to contain stormwater within the boundaries of the proposed EREF property.[9] The stormwater detention basin would allow water to evaporate or infiltrate the ground surface and would overflow only during extreme rainfall events exceeding its design capacity (5.70 cm [2.22 inches] of rainfall in a 24-hour period) (AES, 2010a). Flood control measures would not be required because the site grade is above the 100- and 500-year floodplain elevations (see Section 3.7.1.3).

Ground-disturbing activities such as blasting, surface grading, and excavation could increase groundwater contamination by creating conduits that could accelerate downward migration of contaminants, if present. However, these activities are not expected to affect groundwater in the ESRP aquifer because they would take place at relatively shallow depths (i.e., no deeper than 6.0 meters [20 feet]) as compared to groundwater below the proposed site, which occurs at depths of 201.5 meters (661 feet) below the ground surface (see Section 3.7.2.2).

Chemical spills or releases around vehicle maintenance and fueling locations, storage tanks, and painting operations could infiltrate the ground surface and contaminate shallow groundwater during the preconstruction and construction phase. However, such spills and releases are not expected to affect groundwater in the ESRP aquifer because it occurs at great depths (201.5 meters [661 feet]) below the ground surface (see Section 3.7.2.2) and contaminants would likely be adsorbed by overlying soils before reaching the aquifer.

Impacts Summary

During the preconstruction and construction period, the proposed EREF would consume water to meet potable and sanitary needs, as well as for concrete mixing, dust control, compaction of fill, and watering of vegetation. Water for these uses would be obtained from one or more onsite wells completed in the ESRP aquifer; no surface water would be used. Average and

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[9] Because site preparation and construction activities would disturb an area greater than 0.4 hectare (1 acre), a NPDES Construction General Permit from EPA Region 10 and an oversight review by the IDEQ would be required (EPA, 2010b). The permit also requires the development of a SWPP Plan (EPA, 2010a).

peak daily water usages during this period would be well within the water right appropriation that has been transferred with the proposed property for use as industrial and irrigation water. The daily water usage would be less than 1 percent of the total daily groundwater withdrawals from the ESRP aquifer in Bonneville County. For these reasons, the impact to the regional water supply from water consumption during preconstruction and construction would be SMALL.

No wastewater would be generated or discharged during the preconstruction and construction period. Sanitary waste would be handled by portable systems until such time that the sanitary waste facility is operational. Surface water quality could be affected by short-term increases in sediment, oil and grease, fuel, and chemical constituents in surface (stormwater) runoff. Because stormwater would be diverted to an onsite detention basin, the potential for contaminated stormwater discharging to water bodies on adjacent properties is low. For these reasons, the NRC staff concludes that the impact to surface water quality would be SMALL.

Ground-disturbing activities have the potential to increase groundwater contamination by creating conduits that could accelerate the downward migration of contaminants, if present; chemical spills or releases could contaminate groundwater resources by infiltrating the ground surface. Because groundwater in the ESRP aquifer in the vicinity of the proposed site occurs at great depths (201.5 meters [661 feet]) and contaminants would likely be adsorbed by overlying soils before reaching the aquifer, the impact to groundwater quality would be SMALL.

4.2.6.2 Facility Operation

<u>Water Use</u>

The water supply for operation of the proposed EREF would be obtained from one or more onsite wells completed in the ESRP aquifer. No surface water sources would be used. The proposed EREF would consume water to meet potable, sanitary, and process consumption needs. None of this water would be returned to its original source.

Average and peak daily water usage during the operation period would be about 68 cubic meters (18,100 gallons) and 1567 cubic meters (416,160 gallons), respectively (AES, 2010a). Usage rates under normal operations are within the water right appropriation that has been transferred with the proposed property for use as industrial water. The annual appropriation for industrial use is 506.8 acre-feet, which is 625,000 cubic meters (165 million gallons), or about 1700 cubic meters (453,000 gallons) per day (Carlsen, 2009). Usage rate estimates under peak conditions could exceed the water right appropriation during the 8-hour period following a fire when the proposed facility would be required to refill its fire water storage tanks (with an estimated usage rate of up to 1.4 cubic meters per minute [375 gallons per minute]; AES, 2010a). Both the average and peak annual water use requirements would be less than 1 percent of the total groundwater withdrawals of 640,000 cubic meters (169 million gallons) per day from the ESRP aquifer in Bonneville County, (as measured by the USGS in 2005 (USGS 2010).

Water would continue to be used for landscaping during the operations phase. AES would use xerophilic plants in landscaped areas and choose a method of irrigation that would limit water usage to no more than 24,670 cubic meters (6.5 million gallons) during the growing season, April 1 through October 31, as defined by the IDWR in Carlsen (2009) (AES, 2009b). This is within the appropriation for irrigation, which is 20.0 acre-feet per year, or 25,000 cubic meters (6.5 million gallons) (Carlsen, 2009).

During the first 7 years of construction (which includes the period when construction and operations activities overlap), the average annual water usage would be about 92,740 cubic meters (24.5 million gallons), with an estimated annual maximum of 98,460 cubic meters (26.0 million gallons) during the second year, decreasing to 85,550 cubic meters (22.6 million gallons) during the seventh year (AES, 2010a; Table 4-10). The maximum annual usage rate comprises about 16 percent of the annual water right appropriation that has been transferred with the proposed property for use as industrial water. Figure 4-2 shows the change in water usage for construction and operation during the overlap period, starting with construction in 2011 and ending with full facility production in 2022.

The closest and largest municipalities that rely on the ESRP aquifer for drinking water are Idaho Falls (Bonneville County) and Pocatello (Bannock County). Groundwater consumption at the proposed EREF would not affect groundwater availability in these municipalities because of their location relative to the predominant groundwater flow pattern in the ESRP aquifer (see Figure 3-24; Section 3.7.2.1). Idaho Falls is hydrologically upgradient of the proposed EREF; Pocatello is on the other (southeastern) side of the Snake River, a major discharge area.

Water Quality

Liquid effluent generation rates would be relatively small, and no direct discharges to surface water or groundwater would occur. Wastewater volume from all sources would be about 18,800 cubic meters (5 million gallons) annually. This includes approximately 59.1 cubic meters (15,600 gallons) annually of wastewater from the Liquid Effluent Collection and Treatment System and 18,700 cubic meters (4.9 million gallons) from the Domestic Sanitary Sewage Treatment Plant.

The Liquid Effluent Collection and Treatment System would treat (by precipitation and filtration) liquid wastes such as laboratory wastes, floor washings, miscellaneous condensates, degreaser water, and spent citric acid and discharge them to the atmosphere by evaporation through the Liquid Effluent Treatment System Evaporator. None of these waste effluents would be discharged to the stormwater basins. Domestic sanitary sewage effluent would be discharged to the two Cylinder Storage Pads Stormwater Retention Basins.

Approximately 420,090 cubic meters (111 million gallons) of stormwater would be released annually to the onsite detention and retention basins from the developed central footprint area of the proposed EREF, which comprises about 164.9 hectares (407.5 acres), or 9.7 percent of the proposed site property area. In addition, about 3.9 million cubic meters (1.0 billion gallons) of annual runoff from the undeveloped areas within the proposed site property could be expected. Site drainage is intermittent and generally flows to the south; however, runoff does not discharge into any natural surface water bodies because there are no natural surface water bodies within or near the proposed EREF property and most of the water would be consumed by evapotranspiration or infiltration before it reaches the proposed property line. Water that infiltrates the ground surface may be held in soil and taken up by plant roots or eventually make its way to the water table. It is not expected, therefore, that the proposed EREF would increase stormwater runoff to adjacent properties.

Table 4-10 Water Use for Overlapping Years of Construction and Operations

	Construction	Operations			Total
Year	Total Construction cubic meters (gallons)	Potable Water cubic meters (gallons)	Process Water[a] cubic meters (gallons)	Total Operations[b] cubic meters (gallons)	Total Construction and Operation cubic meters (gallons)
1	90,219 (23,833,431)	0 (0)	0 (0)	0 (0)	90,219 (23,833,431)
2	96,385 (25,462,343)	2073 (547,500)	0 (0)	2073 (547,500)	98,458 (26,009,843)
3	92,196 (24,355,478)	4145 (1,095,000)	1593[c] (420,833)[c]	5738 (1,515,833)	97,934 (25,871,311)
4	78,448 (20,723,735)	17,409 (4,599,000)	461 (121,667)	17,870 (4,720,667)	96,318 (25,444,402)
5	77,232 (20,402,405)	17,409 (4,599,000)	691 (182,500)	18,100 (4,781,500)	95,332 (25,183,905)
6	65,374 (17,269,991)	19,896 (5,256,000)	921 (243,333)	20,817 (5,499,333)	86,191 (22,769,324)
7	61,576 (16,266,662)	22,798 (6,022,500)	1151 (304,167)	23,949 (6,326,667)	85,525 (22,593,329)
8	34,127 (9,015,331)	22,798 (6,022,500)	1382 (365,000)	24,179 (6,387,500)	58,306 (15,402,831)
9	13,540 (3,576,833)	22,798 (6,022,500)	1554 (410,625)	24,352 (6,433,125)	37,892 (10,009,958)
10	7678 (2,028,208)	22,798 (6,022,500)	1727 (456,250)	24,525 (6,478,750)	32,203 (8,506,958)
11	5437 (1,436,302)	22,798 (6,022,500)	1900 (501,875)	24,697 (6,525,375)	30,134 (7,960,677)
12	3923 (1,036,326)	22,798 (6,022,500)	2073 (547,500)	24,870 (6,570,000)	28,793 (7,606,325)

[a] Process water includes demineralized water, fire water, and liquid effluent water.
[b] Value represents industrial water use only. Irrigation water use would not exceed 24,700 cubic meters (6.5 million gallons) during the growing season, April 1 through October 31.
[c] Process (makeup and deionized) water and fire protection water values begin in the third year, just before the first cascade is placed into service. About 1363 cubic meters (360,000 gallons) of the process water demand value for this year is for a one-time fill of two Fire Water Tanks, each storing 681.5 cubic meters (180,000 gallons).
Source: AES, 2010a.

<u>Liquid Effluent Collection and Treatment System</u>

Routine liquid effluents discharging to the Liquid Effluent Collection and Treatment System are listed in Table 4-10. Liquid process effluents would be contained on the proposed EREF site in collection tanks. Effluents in the tanks would be sampled and analyzed periodically to determine if treatment is needed before being discharged to the Liquid Effluent Treatment System Evaporator. About 59.1 cubic meters (15,600 gallons) of liquid process effluents would

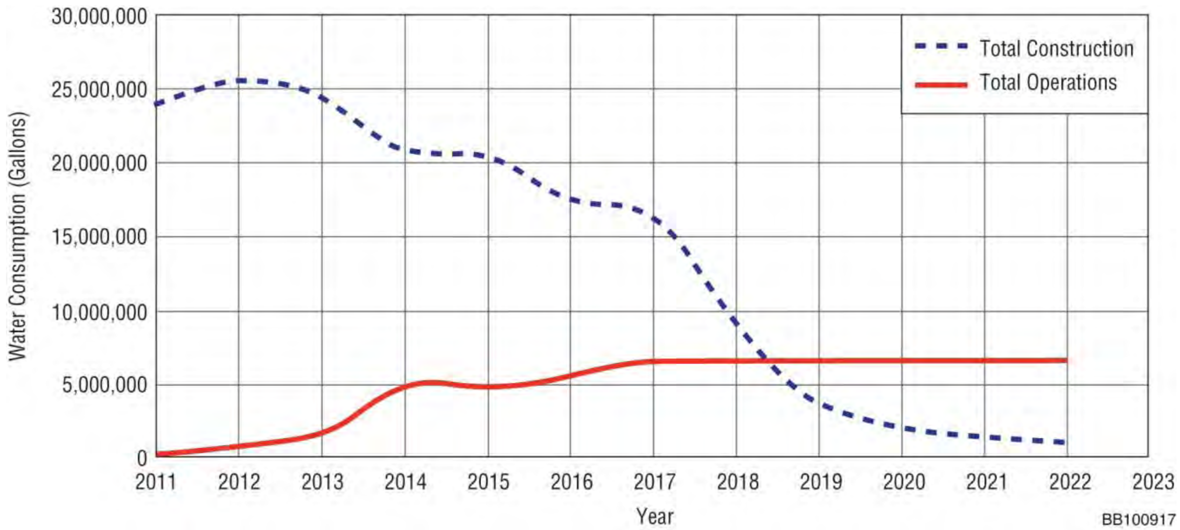

Figure 4-2 Water Use during Period When Construction and Operations Activities Overlap (AES, 2010a)

be treated and discharged annually by evaporation to the atmosphere in the Liquid Effluent Treatment System Evaporator. Because no process effluents from plant operations would be discharged to the retention or detention basins or into surface water, the Liquid Effluent Collection and Treatment System would have a SMALL impact on water resources.

<u>Cylinder Storage Pads Stormwater Retention Basins</u>

Treated sanitary effluents from the Domestic Sanitary Sewage Treatment Plant and stormwater runoff from the concrete-paved areas in the cylinder storage areas would be discharged to two Cylinder Storage Pads Stormwater Retention Basins, located northwest of the proposed EREF footprint (Figure 4-3). The retention basins would serve an area of about 26 hectares (63 acres); each would have a storage capacity of about 83,000 cubic meters (67 acre-feet), maintaining a freeboard of 0.3 meter (1.0 feet). Water discharged from the Domestic Sanitary Sewage Treatment Plant would consist only of treated sanitary effluents; no process-related effluents would be treated there (AES, 2010a). The retention basins would be open to the air and lined to prevent infiltration, and would have no outlets. The only discharge from the retention basins would be by evaporation to the atmosphere; no direct discharge to surface water or groundwater would occur. If necessary, residual solids would be removed for treatment and disposal (AES, 2010a).

A water balance of each of the retention basins (which have identical construction), including consideration of effluent and precipitation inflows and evaporation outflows, indicates that they could be dry for up to 5 months of the year (June through October), depending on annual precipitation rates. The basins would have the capacity to hold all inflows for the life of the proposed EREF. Because all of the water discharged to the Cylinder Storage Pads Stormwater Retention Basins would evaporate, the basins would have a SMALL impact on water resources.

Site Stormwater Detention Basin

Site stormwater runoff from paved surfaces (except the Cylinder Storage Pad area), building roofs, and landscaped areas would be diverted to the Site Stormwater Detention Basin located to the south of the proposed EREF footprint (Figure 4-3). The Site Stormwater Detention Basin would be unlined and would serve an area of about 139.3 hectares (344 acres). It would have a storage capacity of about 32,800 cubic meters (27 acre-feet), maintaining a freeboard of 0.6 meter (2 feet). Discharges from the detention basin would occur mainly by evaporation and infiltration into the ground. The detention basin would also have an outlet that would allow overflow runoff to the surrounding ground surface (and downgradient terrain) in the event of extreme rainfall events (exceeding 24-hour, 100-year design criteria) (AES, 2010a).

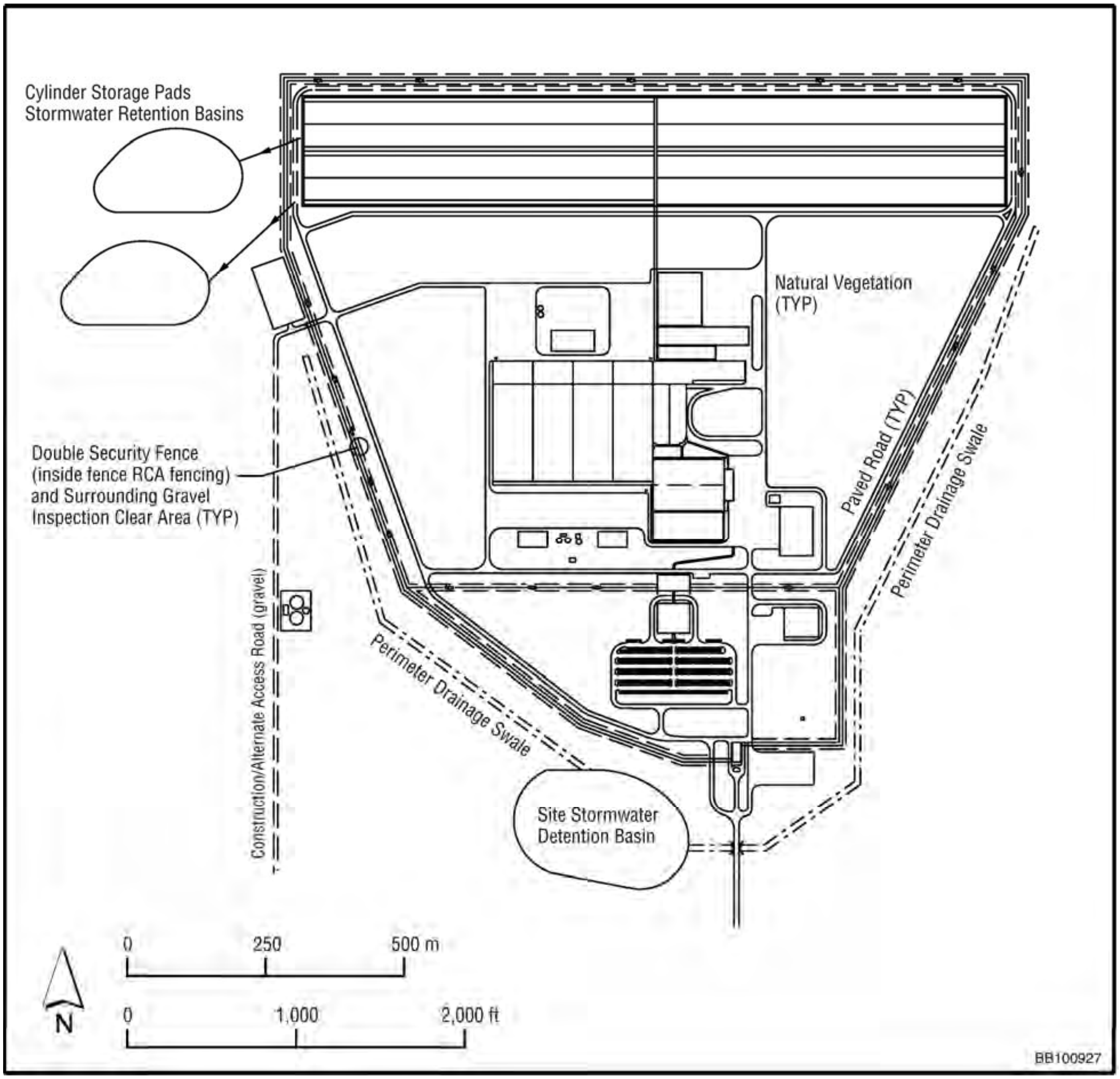

Figure 4-3 Locations of the Proposed EREF Stormwater Basins (AES, 2010a)

A water balance of the Site Stormwater Detention Basin, including consideration of effluent and precipitation inflows and evaporation outflows, indicates that it would be dry every month of the year except during rainfall events (because the evaporation rate typically exceeds the rate of effluent and precipitation inflows except during rainfall events). Most of the water discharged into the basin would seep into the ground or evaporate and would not find its way to a natural surface water body. Water seeping into the ground from the detention basin would flow vertically downward until reaching a low-permeability layer such as a sedimentary interbed. There the water could become temporarily perched or flow laterally until the low-permeability layer pinches out or contacts a higher permeability zone (e.g., fractures in the basalt). Water would migrate from the ground surface downward in a step-like manner until it reaches the saturated zone. Further transport would depend on the transmissivity and flow direction of groundwater in the aquifer.

The water quality of the basin discharge would be typical of runoff from paved surfaces and building roofs from any industrial facility. Except for small amounts of soil products and grease expected from onsite traffic that would readily adsorb onto the soil, the plume would not be expected to contain contaminants. As a result, the Site Stormwater Detention Basin seepage would have a SMALL impact on water resources of the area.

Compliance with the requirements of an SPCC Plan would minimize the impacts due to potential spills during operations. Following standard BMPs to minimize and contain stormwater within the proposed site boundaries would also minimize impacts on offsite surface water bodies. Sanitary wastewater generated during operation of the proposed EREF would be discharged to a lined stormwater retention basin. Because natural surface water bodies are absent within and near the proposed EREF site and no wastewater would be discharged to the ground surface, water quality impacts during the operations period would be SMALL.

Impacts Summary

During the operations period, the proposed EREF would consume water to meet potable, sanitary, and process consumption needs. Water for these uses would be obtained from one or more onsite wells completed in the ESRP aquifer. No surface water sources would be used. Average and peak daily water usages during normal operations are within the water right appropriation that has been transferred with the proposed property for use as industrial and irrigation water. The daily water usage would be less than 1 percent of the total daily groundwater withdrawals from the ESRP aquifer in Bonneville County. For these reasons, the impact on the regional water supply would be SMALL.

The maximum annual (industrial) water usage would occur during the second year of the construction and operations overlap period. Because this value represents only about 16 percent of the annual water right appropriation that has been transferred with the proposed property for use as industrial water, the impact to the regional water supply would be SMALL.

Liquid effluent generation rates would be relatively small, and no direct discharges to surface water or groundwater would occur. Stormwater runoff does not discharge into any natural surface water bodies because there are no natural surface water bodies within or near the proposed EREF property and most of the water is consumed by evapotranspiration or infiltration before it reaches the proposed property line. Routine liquid process effluents would be treated and discharged only by evaporation to the atmosphere. Runoff from the cylinder storage areas would be discharged to two lined retention basins, each designed with the capacity to hold all inflows for the life of the proposed EREF. Therefore, the impacts to surface water and groundwater quality would be SMALL.

4.2.6.3 Mitigation Measures

Water Use

Mitigation measures to minimize water use (relative to conventional practices) at the proposed EREF identified by AES (2010a) include:

- using low-water consumption landscaping practices
- implementing conservation practices when spraying water for dust control
- installing low-flow toilets, sinks, and showers
- localizing floor washing by using mops and self-contained cleaning machines
- incorporating closed-loop cooling systems
- eliminating evaporative losses and cooling tower blowdown by not using cooling towers

Water Quality

Mitigation measures to minimize potential impacts on water quality identified by AES (2010a,b) include:

- employing BMPs to control the use of hazardous materials and fuels
- maintaining construction equipment in good repair, without visible leaks of oils, grease, or hydraulic fluids
- controlling and mitigating spills in conformance with the SPCC Plan
- ensuring all discharges to surface impoundments meet the standards for stormwater and treated domestic sanitary wastewater, and that no radiological discharges are made
- using BMPs to control stormwater runoff to prevent releases to nearby areas
- using BMPs for dust control associated with excavation and fill operations (water conservation would be considered when deciding how often dust suppression sprays would be applied)
- using silt fencing and/or sediment traps
- using only water (no detergents) for external vehicle washing

- placing stone construction pads at entrances/exits in areas where unpaved construction accesses adjoin a State road

- arranging all temporary construction basins and permanent basins to provide for prompt, systematic sampling of runoff in the event of special needs

- controlling water quality impacts by compliance with the NPDES Construction General Permit requirements and by applying BMPs as detailed in the site SWPP Plan

- implementing a SPCC Plan for the proposed facility to identify potential spill substances, sources, and responsibilities

- berming or self-containing all aboveground gasoline and diesel storage tanks

- constructing curbing, pits, or other barriers around tanks and components containing radioactive wastes

- handling any hazardous materials by approved methods and shipping offsite to approved disposal sites.

- handling sanitary wastes by portable systems until the Domestic Sanitary Sewage Treatment Plant is available for site use and providing an adequate number of these portable systems

- requiring control of surface water runoff for activities covered by the NPDES Construction General Permit

- eliminating the need to discharge treated process water to an onsite basin by using evaporators in the Liquid Effluent Collection and Treatment System

The NRC identified additional mitigation measures to reduce the impacts of stormwater runoff from impervious surfaces. The following mitigation measures are based on EPA (2005, 2007):

- reducing the size of impervious surfaces (parking lots, roads, and roofs) to the extent possible

- implementing a “fix it first” infrastructure policy to set spending priorities on the repair of existing infrastructure (e.g., roads) over the installation of new infrastructure

- employing low-impact development strategies and practices during construction and operation activities, as defined and promoted by the EPA (EPA, 2007).

4.2.7 Ecological Impacts

The potential impacts on ecological resources from preconstruction, construction, and operation of the proposed EREF are evaluated in this section. Preconstruction could result in direct impacts due to habitat loss and wildlife mortality as well as indirect impacts to ecological resources in surrounding areas primarily from fugitive dust and wildlife disturbance. Impacts associated with construction of facility components would primarily include wildlife disturbance and fugitive dust. Facility operations would result in impacts primarily due to wildlife disturbance. Impacts on plant communities and wildlife from preconstruction would be MODERATE. Impacts from facility construction would be SMALL, and impacts from facility operation would be SMALL.

According to the U.S. Fish and Wildlife Service (FWS) (FWS, 2009), no Federally listed threatened or endangered species, or critical habitat for any species, occur in the vicinity of the proposed EREF site; therefore, no impacts on these species or habitats would occur as a result of the preconstruction, construction, and operation of the proposed EREF. Similarly, no impacts on the yellow-billed cuckoo (*Coccyzus americanus*), a candidate species, would occur because that species does not occur in the vicinity of the proposed EREF site. The greater sage-grouse (*Centrocercus urophasianus*), a candidate species (FWS, 2010), occurs on the proposed property and would be affected by preconstruction, construction, and operation of the proposed EREF. Potential impacts on species identified by FWS and the Idaho Department of Fish and Game (IDFG) are summarized in Table 4-11.

4.2.7.1 Preconstruction and Construction

Preconstruction and construction activities would extend over an 84-month period, with preconstruction comprising the first 8 months. A total of approximately 240 hectares (592 acres) of the proposed, approximately 1700-hectare (4200-acre), property to be

Table 4-11 Special Status Species Identified for the Proposed EREF

Common Name	Scientific Name	Status[a]	Impact Level
Plants			
Ute ladies'-tresses	*Spiranthes diluvialis*	FT	None
Animals			
Canada lynx	*Lynx canadensis*	FT, ST	None
Utah valvata snail	*Valvata utahensis*	FE	None
Grizzly bear	*Ursus arctos*	FT, ST	None
Yellow-billed cuckoo	*Coccyzus americanus*	FC, PNS	None
Greater sage-grouse	*Centrocercus urophasianus*	FC	Moderate
Ferruginous hawk	*Buteo regalis*	SGCN, PNS	Moderate
Townsend's big-eared bat	*Corynorhinus townsendii*	SGCN, PNS	Small
Sharp-tailed grouse	*Tympanuchus phasianellus*	SGCN	Moderate
Bald eagle	*Haliaeetus leucocephalus*	ST	Small

[a] FE = Federally listed as endangered, FT = Federally listed as threatened, FC = Federal candidates for listing as threatened or endangered, SGCN = Species of Greatest Conservation Need in Idaho, ST = State listed as threatened, PNS = Idaho protected nongame species.
Source: FWS, 2010; IDFG, 2009, 2010.

purchased by AES would be disturbed during preconstruction and facility construction. This area would include the proposed facility footprint as well as temporary construction areas such as temporary construction facilities, parking areas, material storage areas, and areas excavated for underground utilities. The proposed EREF footprint would occupy 186 hectares (460 acres) and would include buildings and other permanent structures such as parking areas, retention/detention ponds, cylinder storage pads, and roads, and all habitats and non-mobile biota would be eliminated within this footprint. About 53.6 hectares (132.5 acres) of the disturbed area would be replanted with native plant species following the completion of construction activities (AES, 2010a).

Vegetation

Plant communities would be affected by direct and indirect impacts associated with preconstruction and construction. Direct impacts would result from land clearing and grading as well as construction activities such as underground utility installation and road construction during preconstruction. All vegetation would be cleared from the proposed facility footprint, as well as from construction laydown areas and equipment assembly and staging areas. Approximately 75 hectares (185 acres) of sagebrush steppe habitat, 55 hectares (136 acres) of nonirrigated pasture, and 109 hectares (268 acres) of irrigated cropland would be eliminated by preconstruction and construction activities (AES, 2010a). Figure 4-4 shows the proposed EREF in relation to habitats on the proposed site. No rare or unique habitats, wetlands, riparian areas, or aquatic habitat would be impacted by preconstruction and construction.

Sagebrush steppe is the predominant plant community type in the region, and provides valuable habitat for numerous native species. The sagebrush steppe that would be lost under the proposed action is a small proportion of sagebrush (*Artemisia* spp.) habitat in the area (0.7 percent within an 8-kilometer [5-mile] radius of the center of the proposed EREF site) (Landscape Dynamics Lab, 1999). Because the sagebrush steppe habitat that would be lost is located adjacent to irrigated cropland and nonirrigated pasture, habitat fragmentation of this community type would be limited.

The exclusion of livestock from the remaining 1514 hectares (3740 acres) of the proposed property outside the proposed EREF footprint would increase species diversity and overall habitat quality in the remaining sagebrush steppe habitat. Spring forb production would likely increase with the removal of grazing, and non-native species, such as cheatgrass (*Bromus tectorum*), would likely decrease due to increased shading. Livestock exclusion would also likely result in an increase in native plant species in the remaining nonirrigated pasture habitat.

Nonirrigated pasture is a highly modified and degraded habitat, resulting from the removal of shrubs from sagebrush steppe and the planting of crested wheatgrass (*Agropyron cristatum*), which has become the dominant species, and other grasses. Small areas of native species are associated with rock outcrops. Because of the high degree of disturbance, this community type includes a high representation of non-native species, particularly crested wheatgrass. The loss of 55 hectares (136 acres) of this habitat type would have a negligible effect on native vegetation.

Fugitive dust levels would, in certain conditions, exceed NAAQS at the proposed EREF property boundary during portions of the preconstruction period (see Section 4.2.4.1). Deposition of

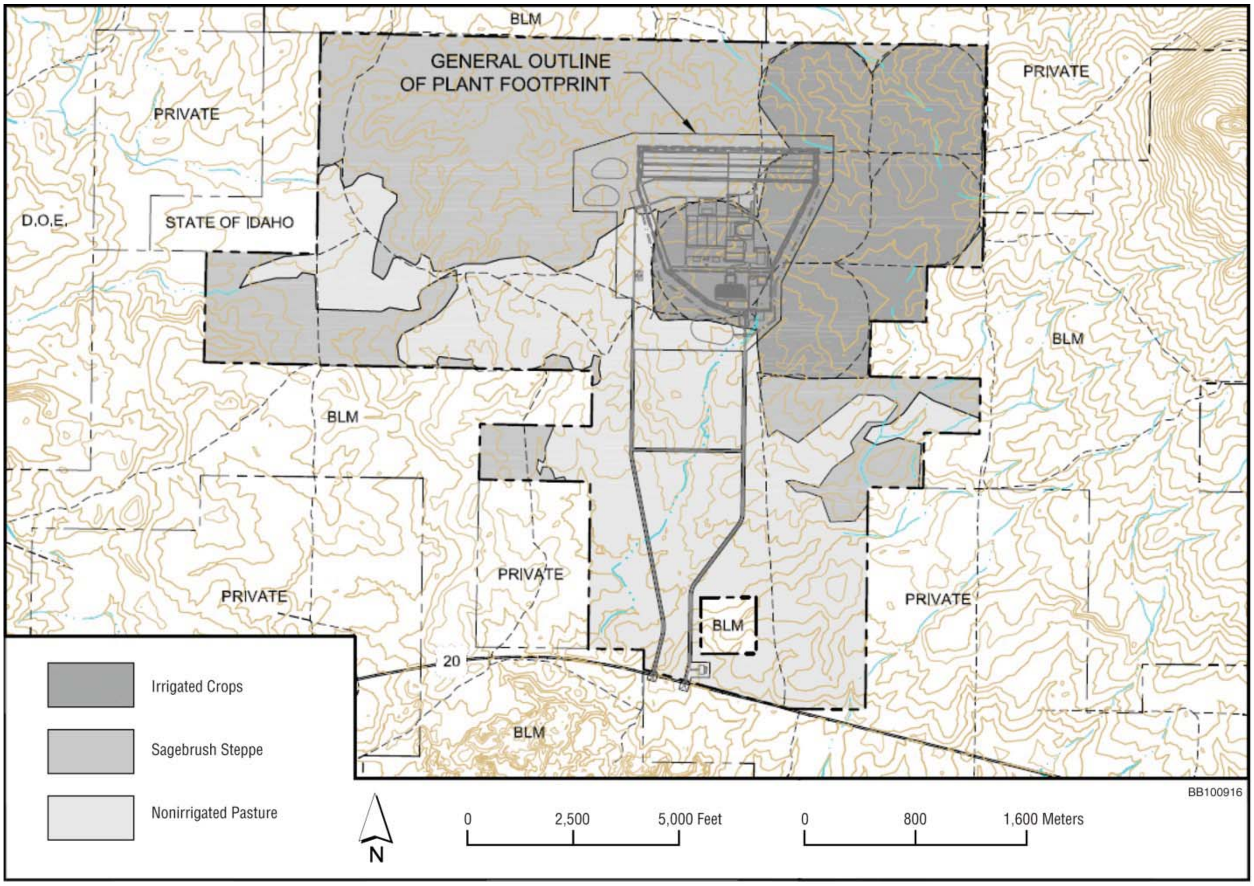

Figure 4-4 Proposed EREF Footprint Relative to Vegetation (AES, 2010a)

fugitive dust could occur in nearby offsite areas, potentially including the Hell's Half Acre Wilderness Study Area (WSA) immediately south of the proposed EREF site near the proposed new access road entrance. Deposition of fugitive dust can adversely affect plants, potentially reducing productivity and species diversity. However, soils in the region are wind-formed soils, and plant species in native habitats are regularly exposed to wind-generated fugitive dust. Because of the smaller, finer leaf structure of the native evergreen shrubs, grasses, and forbs, they may be less susceptible to the effects of fugitive dust deposition (Hlohowskyj et al., 2004). Impacts of fugitive dust would be minor.

Disturbed soils could provide an opportunity for the establishment and spread of non-native invasive species. Seven non-native species have been identified on the proposed EREF property (see Section 3.8). Additional non-native species could be introduced by construction equipment. Herbicides would not be used during the preconstruction and construction period (AES, 2010a). Invasive species present in low population densities on the proposed site, such as Canada thistle (*Cirsium arvense*), could develop large populations during the preconstruction and construction overlap period and contribute to increased occurrences in the sagebrush steppe habitat beyond the proposed site. Although these species are known to already occur in various habitats in the region, the development of increased seed sources in disturbed areas during the preconstruction and construction period could increase the spread of these species in nearby habitats.

Stormwater runoff from construction areas could result in erosion of disturbed soils and could be a source of sedimentation. Although the release of surface runoff or sediment to areas outside of the proposed EREF site is unlikely, if sediment was released from the proposed EREF site, plant communities in adjacent areas could be adversely affected by sediment accumulation, resulting in decreased plant cover and diversity. Also, sedimentation could promote the establishment and spread of invasive species.

Although spills are unlikely, accidental releases of hazardous materials such as fuels, lubricants, or other materials used or stored on the proposed EREF site could adversely affect biotic communities near and downgradient from a spills. The potential impacts of a spill would depend on the material spilled, its volume, its location, the season, and the efficacy of cleanup measures. The movement of spilled materials to areas off the proposed EREF project site would be unlikely due to the infiltration capacity of soils on the proposed site.

Impacts on plant communities due to the loss of 75 hectares (185 acres) of sagebrush steppe habitat as a result of preconstruction and construction would be MODERATE.

Wildlife

Vegetation removal and site grading would result in direct impacts on wildlife present on the proposed EREF site. Preconstruction would result in mortality of less mobile species, such as reptiles and small mammals, and nesting or burrowing species; species with greater mobility would likely be displaced to nearby suitable habitat. Increased competition in these areas could result in reduced survival of displaced individuals. The loss of 75 hectares (185 acres) of sagebrush steppe would particularly affect individuals of sagebrush obligate species that would be present at the start of preconstruction, due to their restriction to sagebrush habitats for breeding, nesting, brood-rearing, and foraging. However, species currently present on the proposed site occur throughout the region, and preconstruction and construction would not result in the local elimination of any wildlife species.

The sagebrush steppe community type provides habitat for numerous wildlife species. As noted above, the sagebrush steppe that would be lost under the proposed action is a small proportion of sagebrush steppe in the area (0.7 percent within an 8-kilometer [5-mile] radius of the center of the proposed EREF site). Some wildlife species are totally dependent on the sagebrush steppe ecoregion for their livelihood and are classified as sagebrush obligates. Depending on the species and specific habitat requirements, this loss of sagebrush habitat could potentially reduce available habitat for various life stages, such as breeding, nesting, brood rearing, or wintering. Pygmy rabbits (*Brachylagus idahoensis*), a sagebrush obligate species and Idaho species of conservation concern, live in burrows. Because they are abundant in similar habitats at the nearby INL (S.M. Stoller Corporation, 2001), pygmy rabbits may occur on the proposed site. Clearing and grading of sagebrush steppe habitat could potentially result in mortality of pygmy rabbits as well as habitat loss.

Migratory birds could be affected by preconstruction and construction activities. Several migratory species, such as sage thrasher (*Oreoscoptes montanus*), sage sparrow (*Amphispiza belli*), and Brewer's sparrow (*Spizella breweri*), which were observed on the proposed EREF property, are also sagebrush obligate species (see Section 3.8.2). Disturbance of active nests would be unlikely due to the seasonal timing of land clearing, as clearing would occur outside the nesting period. However, depending on specific habitat requirements, the loss of sagebrush steppe from the proposed EREF property could reduce the amount of habitat available for nesting of some species, and could potentially reduce the local overall level of nesting success. Because these species' populations occur over the large area of sagebrush habitat that is available in the region, population-level effects for the region would be unlikely.

Wildlife species with large home ranges, such as pronghorn antelope (*Antilocapra americana*), would likely avoid the proposed EREF site area; however, no impacts on local populations would occur due to habitat loss because of the contiguous extensive habitat available in the vicinity. Although the proposed EREF site is located within the crucial winter range for pronghorn, the total area affected, including an avoidance zone, would represent a small portion of that habitat. Migration patterns of other wildlife, such as elk (*Cervus canadensis*) or mule deer (*Odocoileus hemionus*), would not be altered due to the extensive undisturbed landscape in the region available for migratory movements. Onsite roads would present a hazard to wildlife from construction-related traffic, and traffic would increase on roads off the proposed site. Wildlife mortality from vehicles could increase; however, limiting vehicle speeds on the proposed site would help reduce impacts on wildlife (AES, 2010a).

Wildlife in nearby habitats would be disturbed by preconstruction and construction activity, human presence, and noise. Preconstruction and construction would result in increased noise levels from various sources, such as equipment operation during site grading (see Section 4.2.8). In addition, activities such as blasting would result in periodic high noise levels. While current background noise levels are approximately 30 A-weighted decibels (dBA), noise levels of approximately 61 dBA are estimated to occur at the north boundary of the proposed EREF property, the closest boundary to the industrial footprint of the proposed facility (for comparison, an automobile at 15 meters (50 feet) ranges from about 60 to 90 dBA; see Section 3.9.1). As a result, many wildlife species in adjacent habitats would be expected to avoid the vicinity of the proposed project site. Many species, such as migratory birds, would continue to be affected by noise throughout the 84-month preconstruction and construction period.

The loss of sagebrush steppe habitat would likely affect greater sage-grouse. No sage-grouse leks (breeding areas) were found during surveys of the proposed property on May 6–7, 2008 (MWH, 2008a) and April 28–29, 2010 (North Wind, 2010). Recommended survey dates are early March to early May (Connelly et al., 2003); specifically, lek surveys should be conducted March 25 through April 30 for low elevation areas and April 5 through May 10 for higher elevations (ISAC 2006). At approximately 5200 feet (1600 meters) MSL, the proposed EREF property could be considered a high elevation site. Surveys of the proposed EREF property indicated that the sagebrush steppe on or near the proposed property is used by the local sage-grouse population (AES, 2010a; MWH, 2008 a,b,c; MWH, 2009). However, extensive sagebrush habitat is available in the region, and loss of habitat on the proposed site would not threaten the local sage-grouse population.

Sage-grouse annually migrate between seasonal use areas in southeast Idaho, and populations occupy relatively large areas (Leonard et al., 2000; BLM/DOE, 2004). In one Idaho study, conducted northeast of the proposed EREF site, the average distance sage-grouse moved from their lek was 3.5 kilometers (2.2 miles) in spring, 12.1 kilometers (7.52 miles) in summer, 21.9 kilometers (13.6 miles) in fall, and 27.7 kilometers (17.2 miles) in winter

(Leonard et al., 2000). These sage-grouse utilized large areas over the course of a year, moving an average of 107 kilometers (66.5 miles). A population may occupy a summer home range of 3 to 7 square kilometers (1-3 square miles), while a winter home range may be more than 140 square kilometers (54 square miles) (Connelly et al., 2000).

Sage-grouse habitat requirements include breeding habitat (consisting of nesting habitat and early brood-rearing habitat), summer late brood-rearing habitat, and fall and winter habitat.

Within breeding habitat, female sage-grouse may travel more than 20 kilometers (12.4 miles) from lek to nest in the spring (Connelly et al., 2000). At INL, nesting sites have been known to be up to 18 kilometers (11 miles) from leks (BLM/DOE, 2004). Studies in Idaho indicate that nesting habitat includes a grass height of 15–34 centimeters (5.9–13 inches), coverage of 3–30 percent, and sagebrush height of 58–79 centimeters (23–31 inches) at the nest site and an overall canopy cover of 15–38 percent (Connelly et al., 2000). Guidelines for productive sage-grouse breeding habitat include a sagebrush height of 30–80 centimeters (10–30 inches), varying by moisture regime, with a cover of 15–25 percent, and a grass/forb height more than 18 centimeters (7.1 inches) with a cover of at least 15 percent and in mesic sites greater than 10 percent forb cover (Connelly et al., 2000). Greater nesting success occurs in areas of greater sagebrush canopy cover and greater height and cover of grasses (Connelly et al., 2000). Early brood-rearing habitat is usually near nesting areas and is characterized by a high species diversity and abundant forb cover with tall grasses and forbs, although sagebrush cover may be relatively open with about 14 percent cover (Connelly et al., 2000).

Summer habitats for sage-grouse broods include a variety of habitat types but are usually mesic areas with a relatively abundant forb component (Connelly et al., 2000). Guidelines for productive sage-grouse summer late brood-rearing habitat include a sagebrush canopy cover of 10–25 percent with a height of 40–80 centimeters (16–31 inches), along with a grass/forb cover greater than 15 percent (Connelly et al., 2000), although the grass/forb cover can be greater than 60 percent (Braun et al., 2005).

Fall habitat is frequently located on higher north-facing slopes that provide succulent native forbs (Braun et al., 2005). Sage-grouse begin to shift toward traditional winter use areas and the increased use of areas with a sagebrush canopy cover greater than 20 percent and more than 25 centimeters (9.8 inches) tall (Braun et al., 2005).

Winter habitat requires an adequate sagebrush component, as this constitutes nearly the entire winter diet of sage-grouse (Connelly et al., 2000; Braun et al., 2005). Studies in Idaho indicate the sagebrush canopy above snow may range 15–26 percent with a height of 26–46 centimeters (10–18 inches) above snow; studies that measured the entire canopy found a 38 percent coverage of sagebrush and a sagebrush height of 56 centimeters (22 inches) (Connelly et al., 2000). Guidelines for productive sage-grouse winter habitat include a sagebrush canopy cover of 10–30 percent and height of 25–35 centimeters (9.8–14 inches) above snow (Connelly et al., 2000). Sage-grouse tend to use south- and southwest-facing slopes in hilly areas (Braun et al., 2005).

The canopy coverage of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) on the proposed EREF property is approximately 16 percent and that of threetip sagebrush

(*Artemisia tripartita*) is approximately 0.3 percent (AES, 2010a). The total areal cover of all plants, excluding mosses, is about 60 percent. The total areal cover of shrubs is about 34 percent, of grasses about 20 percent, and forbs about 6 percent. The density of Wyoming big sagebrush ranges from 6000 plants per hectare (2428 per acre) for those less than 40 centimeters (15.7 inches) in height to 6900 plants per hectare (2792 per acre) for those at least 40 centimeters (15.7 inches) in height. The average maximum vegetation height is about 43 centimeters (17 inches).

Although the spatial relationships of habitat used by sage-grouse are not well understood (Braun et al., 2005), habitat characteristics can help evaluate potential use of a particular habitat by sage-grouse populations. The canopy cover and height of sagebrush on the proposed EREF property would provide suitable habitat for sage-grouse. Although the grass cover within this community would potentially provide habitat, forb production is relatively low. The proposed EREF property appears to be located within the annual range of a local sage-grouse population, and sage-grouse evidently use the proposed site. Sage-grouse were observed, and male sage-grouse were heard, just north of the proposed property during surveys in 2008, and evidence of the presence of sage-grouse was observed on the proposed property in 2008 and 2009. The nearest known lek is located approximately 5.6 kilometers (3.5 miles) from the boundary of the proposed site, and numerous leks are located within 16 kilometers (10 miles). The loss of 75 hectares (185 acres) of sagebrush steppe, plus an additional area of avoidance around the proposed EREF, could reduce available habitat for the local sage-grouse population; however, based on the size of seasonal use areas in Idaho and elsewhere, the area likely represents a small portion of seasonal habitat use.

The exclusion of livestock from grazing the proposed 1700-hectare (4200-acre) EREF property would result in an increase in species diversity and overall habitat quality in the remaining sagebrush steppe habitat, including an increase in available forage in the spring, especially forbs production and a decrease in non-native species, such as cheatgrass. Livestock exclusion would also likely result in an increase in native plant species in the remaining nonirrigated pasture habitat. These changes in habitat quality would likely increase the habitat value for sage-grouse.

Greater sage-grouse breeding behavior at lek sites can be affected by high noise levels that are more than 10 dBA above ambient levels. The nearest known lek is located approximately 5.6 kilometers (3.5 miles) from the boundary of the proposed EREF site. At that distance, noise levels due to preconstruction and construction of the proposed EREF, other than from blasting, are estimated to be approximately 35 dBA (see Section 4.2.8.1). This is less than 10 dBA above the ambient levels of approximately 30 dBA, measured at the northwest corner of the proposed EREF property (see Section 3.9). In addition, recommendations for avoiding disturbance to breeding sage-grouse from construction of energy-related facilities in the Upper Snake Sage-Grouse Planning Area include maintaining a distance of at least 3.2 kilometers (2 miles) from active leks (USSLWG, 2009), while the proposed EREF site boundary is approximately 5.6 kilometers (3.5 miles) from the nearest lek. Impacts on sage-grouse from preconstruction/construction-related noise would be minimal.

Ferruginous hawks (*Buteo regalis*), an Idaho species of conservation concern, are known to nest within 8 kilometers (5 miles) of the proposed EREF site (IDFG, 2009). Impacts on this species could result from habitat loss or human disturbance in the vicinity of nesting sites.

Ferruginous hawks hunt for small mammals, such as ground squirrels, on grassland and shrub-steppe habitats. The average home range for breeding males in Idaho is approximately 7 to 8 square kilometers (2.7 to 3.0 square miles) (IDFG, 2005). The loss of habitat as a result of proposed EREF preconstruction/construction could affect a locally nesting pair; however, grassland and shrub-steppe habitats are relatively abundant in the area. Ferruginous hawks are easily disturbed during the breeding season, and disturbance may result in nest abandonment (White and Thurow, 1985; Dechant et al., 1999). Noise and human presence associated with preconstruction and construction activities for the proposed EREF could potentially impact ferruginous hawks in the vicinity of the proposed project.

Townsend's big-eared bats (*Corynorhinus townsendii*), an Idaho species of conservation concern, use lava tube caves, approximately 8 kilometers (5 miles) from the proposed EREF site, for roosts and winter hibernacula (IDFG, 2009). This species forages for insects, primarily moths, above shrub-steppe habitats (Pierson et al., 1999). The loss of 75 hectares (185 acres) of sagebrush steppe would constitute a small impact on the foraging habitat of local bat populations. Noise from preconstruction and facility construction would be unlikely to disturb roosting or hibernating bats.

The sharp-tailed grouse (*Tympanuchus phasianellus*), an Idaho species of conservation concern, is known to occur in the vicinity of the proposed EREF site (IDFG, 2010). The sharp-tailed grouse does not occur throughout the Upper Snake River Plain, and its distribution in the proposed EREF site area is somewhat limited (IDFG, 2005). The loss of shrub and grass habitat as a result of vegetation clearing during preconstruction could reduce habitat used by sharp-tailed grouse in the area. No sharp-tailed grouse leks are known to occur in the vicinity of the proposed EREF site; however, disturbance from noise and human presence would affect sharp-tailed grouse use of habitat near the proposed EREF site.

The bald eagle (*Haliaeetus leucocephalus*), listed as a threatened species by the State of Idaho, nests along the Snake River and winters near open water (IDFG, 2005; FWS, 2007). Foraging is generally near rivers, lakes, or other water bodies. Disturbance during nesting is considered the greatest threat to bald eagles in Idaho (IDFG, 2005). Because bald eagles do not nest in the vicinity of the proposed EREF and winter habitat does not occur in the vicinity, the bald eagle would be unlikely to be affected by disturbance or habitat loss resulting from preconstruction or construction.

The implementation of BMPs and mitigation measures during construction would reduce potential impacts on wildlife on and in the vicinity of the proposed EREF. Therefore, impacts on wildlife due to preconstruction and construction would be SMALL to MODERATE.

Preconstruction activities would result in most (95 percent) of the habitat losses associated with development of the proposed EREF, while approximately 5 percent of habitat loss would be attributable to the construction of facility components. Preconstruction and construction are expected to extend over an 84-month time period, with the preconstruction phase estimated to comprise 10 percent of that period and facility component construction comprising 90 percent. Some impacts, such as wildlife disturbance due to noise and human presence, would occur throughout the long facility construction period. Because the greatest ecological impacts would be attributable to habitat loss and mortality associated with preconstruction activities, the estimated contribution to ecological impacts from preconstruction would be 80 percent, with

20 percent from construction. On this basis, preconstruction would result in MODERATE impacts, and facility construction would result in SMALL impacts.

4.2.7.2 Facility Operation

Limited facility operations would begin 8 years before the end of the construction phase. Operation of the proposed EREF is assumed to continue for approximately 30 years. Permanent structures of the proposed EREF would include buildings, depleted UF_6 storage pads, retention and detention basins, parking areas, and local roadways. Stormwater runoff from buildings, roads, and parking areas would be collected in a detention basin. Runoff from the Cylinder Storage Pads would be collected in two lined retention basins, which would also receive treated domestic sanitary effluent. The detention basins would have an overflow discharge, while the retention basins would be designed to prevent overflow (AES, 2010a). Potential impacts from stormwater runoff, such as erosion and sedimentation, would be minimized by the stormwater collection basins.

Vegetation

Maintenance activities associated with facility operation would include the periodic application of herbicides along roadways, the security fence, and the industrial area to control noxious weed species (AES, 2010a). Invasive species populations in areas of the proposed property outside of the industrial footprint would remain unaffected. Although nontarget species in the area could be impacted by drift during herbicide application, the amount of drift and associated effects would be very small.

The area of native plant communities would increase as the remaining irrigated crop areas and temporary construction areas would be replanted using native plant species at the conclusion of the preconstruction and construction phase. Successful restoration of habitats in arid climates is difficult, however, and extended periods of time may be required (Monsen et al., 2004). Thus, the restored plant community may be different from regional sagebrush steppe communities in species composition and shrub cover (Newman and Redente, 2001; Paschke et al., 2005).

Although operation of the proposed EREF could result in some impacts on plant communities, habitat quality in the undisturbed areas would continue to improve from the exclusion of cattle, and the area of native communities would increase from the replanting of disturbed areas. Therefore, impacts on plant communities from facility operation would be SMALL.

Wildlife

Wildlife use of the undeveloped portions of the proposed AES property may increase as a result of improved habitat quality from the exclusion of livestock, and because the existing boundary fence around the proposed 1700-hectare (4200-acre) property would be modified to be conducive to access by wildlife, such as pronghorn antelope (smooth wire would be used for the bottom wire, which would be at least 40 centimeters [16 inches] above the ground [AES, 2010a]). However, many wildlife species would likely avoid areas near the proposed facility due to noise, structures, and human presence, although noise and human presence would decrease following the construction period.

The proposed EREF would not discharge process water to the onsite basins. However, the retention basins would receive Cylinder Storage Pad runoff and treated domestic sanitary effluents, and the detention basins would receive general site stormwater runoff. The retention and detention basins would be fenced to minimize access by wildlife. However, birds, reptiles, tiger salamanders (*Ambystoma tigrinum*), or small mammals could potentially enter the basins and be exposed to contaminants when the basins contain water. Contaminants in the retention basins could include water treatment chemicals and, potentially, small amounts of radionuclides. Small amounts of oil, grease, or other automotive fluids could be present in the detention basins. Because of the scarcity of surface water in the region, birds and small wildlife species would likely be attracted to the basins.

Collisions with vehicles along the entrance road would continue to be a hazard for wildlife, and may increase if wildlife use of the habitat on the proposed site increases. In addition, facility buildings could present a collision hazard for birds. Lights would be located along roadways and near building areas. Nocturnal insects attracted to lights could be preyed upon by bats, such as the Townsends big-eared bat.

Although the Cylinder Storage Pads would be fenced to exclude wildlife, entry to the storage pads by small species could occur. A small number of individuals could subsequently be exposed to elevated radiation levels from the cylinders. However, it is unlikely that wildlife would be present for extended periods. Atmospheric releases of materials such as UF_6 could also result in exposures of wildlife or plants. The U.S. Department of Energy (DOE) has established radiation dose limits of 1 rad (10 milligray) per day for the protection of terrestrial plants and 0.1 rad (1 milligray) per day for terrestrial animals (DOE, 2002). Based on atmospheric releases of radionuclides from the proposed EREF, estimated doses to biota in the surrounding area would be below the DOE limits. Therefore, impacts on biota from exposure to elevated radiation levels would also be small.

Greater sage-grouse would also be affected by factors related to operation of the proposed EREF. Sage-grouse would likely avoid areas near the proposed facility due to noise, visibility of structures, lighting, and human presence. Avoidance of otherwise suitable habitat would result in a larger area of effective loss of habitat for the local population and would displace individuals to other areas of their seasonal range. In addition, the EREF property fence could be a source of mortality for sage-grouse. Although, as noted above, the fence would be modified for access by wildlife, fences are known to create a collision hazard for sage-grouse (ISAC, 2006). The addition of markers to increase wire visibility (AES, 2010g) could help reduce collision-related mortality.

Operation of the proposed EREF could result in impacts on wildlife and plant communities on the proposed EREF site and occupying nearby habitats. However, the implementation of mitigation measures and BMPs would reduce potential impacts. Therefore, impacts on ecological resources from facility operation would be SMALL.

4.2.7.3 Mitigation Measures

This section presents mitigation measures to minimize impacts on ecological resources. Included are mitigation measures that AES has committed to (AES, 2010a) and mitigation measures identified during the NRC staff's review.

Mitigation Measures Identified by AES

- unused open areas, including areas of native grasses and shrubs, would be left undisturbed and managed for the benefit of wildlife

- native plant species (i.e., low-water-consuming plants) would be used to revegetate disturbed areas, to enhance wildlife habitat

- the detention and retention basins would be fenced to limit access by wildlife

- vehicle speeds on the proposed site would be reduced

- dust suppression BMPs would be used to minimize dust, thereby reducing the impact of fugitive dust on nearby plant communities; when required, and at least twice daily, water would be applied to control dust in construction areas in addition to other fugitive dust prevention and control methods

- during construction and operations, all lights would be focused downward

- the boundary fence around the proposed property would be improved to allow pronghorn access to the remaining sagebrush steppe habitat on the proposed property; the fence would include a smooth top wire no more than 42 inches above the ground, adequate wire spacing to prevent wildlife entanglement, a smooth bottom wire approximately 16 to 18 inches above the ground, and durable markers to increase wire visibility (AES, 2010g)

- livestock grazing on the proposed property would be eliminated when the proposed EREF becomes operational

- measures would be taken to protect migratory birds during construction and decommissioning, e.g., clearing or removal of habitat, such as sagebrush, including buffer zones, would be performed outside of the migratory bird breeding and nesting season; additional areas to be cleared would be surveyed for active nests during the migratory bird breeding and nesting season; activities would be avoided in areas containing active nests of migratory birds; the FWS would be consulted to determine appropriate actions regarding the taking of migratory birds, if needed

- herbicides would not be used during construction, but would be used in limited amounts along the access roads, plant area, and security fence surrounding the plant to control noxious weeds during operation of the plant; herbicides would be used according to government regulations and manufacturer's instructions to control noxious weeds

- eroded areas would be repaired and stabilized, and sediment would be collected in a stormwater detention basin

- erosion- and runoff-control methods, both temporary and permanent, would follow BMPs such as minimizing the construction footprint to the extent possible, limiting site slopes to a horizontal-to-vertical ratio of four to one or less, using sedimentation detention basins, protecting adjacent undisturbed areas with silt fencing and straw bales, as appropriate, and using crushed stone on top of disturbed soil in areas of concentrated runoff

- cropland areas on the proposed property would be planted with native species when the proposed EREF becomes operational

- consider all recommendations of appropriate State and Federal agencies, including the Idaho Department of Fish and Game and the FWS

Additional Mitigation Measures Identified by NRC

- plant disturbed areas and irrigated crop areas with native sagebrush steppe species to establish native communities and prevent the establishment of noxious weeds; plant immediately following the completion of disturbance activities and the abandonment of crop areas

- develop and implement a noxious weed control program to prevent the establishment and spread of invasive plant species; hose down tires and undercarriage of off-road vehicles prior to site access to dislodge seeds or other propagules of noxious weeds; monitor for noxious weeds throughout the construction and operations phases and immediately eradicate new infestations; minimize indirect impacts of weed control activities, such as herbicide effects on nontarget species, and soil disturbance and fire hazards from vehicle operation in undisturbed areas during weed control activities

- develop areas that will retain water of suitable quality for wildlife and provide wildlife access to such areas with suitable water quality

- for basins with water quality unsuitable for wildlife, use animal-friendly fencing and netting or other suitable material over basins to prevent use by migratory birds

- place metal reflectors on the top wire of the fence along the AES property boundary, to reduce sage-grouse mortality resulting from collisions with the fence

- coordinate with Idaho National Laboratory in monitoring risks to sage-grouse and other sensitive species and identifying measures to reduce risks and protect these species and their habitat, particularly sagebrush steppe

- coordinate with Idaho Department of Fish and Game to determine corrective action or mitigation for the offsite public lands lost to wildlife due to project effects

4.2.8 Noise Impacts

Noise impacts from preconstruction and construction were evaluated based on the number and type of construction equipment proposed to be on the proposed EREF site during those periods, together with other relevant parameters associated with those actions. The noise assessment also included an assessment of incremental noise along US 20 resulting from travel to and from the proposed site by the construction and operating workforces, as well as resulting from trucks delivering equipment and materials during construction and trucks delivering feedstock and removing wastes and enriched uranium products from the proposed site during operation. Background noise levels at the proposed property boundary were provided by AES and documented in the ER (AES, 2010a). No independent measurements of background noise were conducted. Instead, NRC verified the appropriateness of the data collection instruments and methodology used by AES.

NRC assigned typical noise signatures of construction vehicles and equipment in order to anticipate noise sources during preconstruction and construction. A standard noise attenuation rate of 6 dB per doubling of distance from the source was applied to each significant noise source that was presumed to be operating anywhere along the perimeter of the proposed EREF site (i.e., the industrial footprint of the proposed EREF) in order to estimate approximate noise levels at the nearest human receptor (beside the construction workforce).

Noise estimates from operation were based on expected noise signatures of the various pieces of noise-producing equipment that would be operating in outside locations.

The NRC staff has concluded from its noise assessments that, notwithstanding short-term noise impulse events such as blasting, adequate mitigation controls would ensure noise impacts during preconstruction, construction, and operation would all be below recommended standards at the closest human receptor; thus, noise impacts would be SMALL.

4.2.8.1 Preconstruction and Construction

Noise impacts would result from preconstruction and from construction activities. Specifically, noise would result from: the operation of various construction vehicles and equipment; the operation on area roads of vehicles used by the workforce to commute to and from the proposed site and delivery trucks bringing materials and equipment to the proposed site; the use of explosives (together with associated warning alarms), pile drivers, and/or backhoes to remove rock outcrops, install foundations, and bury utilities or facilitate cut and fill and grade alterations; travel of vehicles on onsite roads, loading, unloading, transferring, and stockpiling soils and materials; onsite support activities such as a concrete batch plant operation; and the operation of stationary sources such as the six emergency generators that would become operational while construction is still ongoing and, once installed, would be operated periodically throughout the construction period for the purpose of preventative maintenance. A similar preventative maintenance schedule would extend throughout the operation phase for each of the generators.

Although a detailed preconstruction and construction plan has not yet been produced, AES has developed a comprehensive list of the number and types of vehicles that would be involved and identified the general parameters of their expected use (AES, 2010a). In addition to light-duty commuting and light-duty and heavy-duty delivery vehicles, AES has indicated that the following types of vehicles and equipment would be used: cranes, cherry pickers, water trucks, concrete delivery trucks, concrete pump trucks, stake body trucks, compressors, generators, and pumps (AES, 2010a).

Noise would be generated at US 20 during construction of the site access roads and at their interconnection with US 20. Noise related to traffic on US 20 would increase due to traffic increases in delivery vehicles and commuting vehicles of the construction workforce.

Notwithstanding construction of the US 20 interchange, the majority of the construction activities would occur within the proposed EREF site (i.e., the industrial footprint of the proposed facility), which is located in the approximate center of the proposed EREF property, approximately 3060 meters (10,039 feet) north of the US 20 interchange. AES estimates that noise from the operation of construction vehicles and equipment would range from 80 to 95 dBA at a distance of 15 meters (50 feet) from each source (AES, 2010a). Given that the majority of vehicles and equipment would be operating primarily within the industrial footprint (construction of the highway interchange and site access roads notwithstanding) and with the expectation that access to the active area would be limited to the authorized, fully informed, and adequately protected construction workforce, it is reasonable to expect that all potential public receptors would be at least no closer than 15 meters (50 feet) from high noise sources and, in most instances, at substantially greater distances from those sources. Members of the public traveling on US 20 would be close to high noise sources associated with construction of the interchange, but those individuals would be in vehicles and their exposures would be limited to a relatively short duration as their vehicle passed by the active construction zone. The noise level is expected to vary throughout the 10-hour workday with certain activities such as blasting creating short-term, high-intensity impulse noise that is likely to be higher than 95 dB at the source.

According to the facility construction plan proposed by AES (AES, 2010a), most of the major noise-producing activities (site clearing and grading, excavations [including the use of explosives], utility burials, construction of onsite roads [including the US 20 interchanges], and construction of the ancillary buildings and structures) would occur during preconstruction.

As discussed in Section 3.9, various noise standards have been promulgated at the Federal level that could serve as a basis for local ordinances. Although no specific noise ordinances have been adopted for the local area, the Federal standards of relevance in evaluating the acceptability of noise impacts from preconstruction and construction of the proposed EREF include:

- Day-night average noise levels, L_{dn}, less than 65 dBA are considered clearly acceptable for residential, livestock, and farming land uses; L_{dn} between 65 dBA and 75 dBA are normally unacceptable but could be made acceptable (to human receptors) with the application of noise attenuation features to occupied structures; L_{dn} above 75 dBA are always unacceptable for residential land uses, but L_{dn} between 70 and 80 dBA are acceptable for industrial and manufacturing areas (HUD, 2009).

- Day-night average noise levels, L_{dn}, less than 65 dBA are considered compatible with residential land uses; levels up to 75 dBA may be compatible with residential uses and transient lodging if structures have noise isolation features (EPA, 1980).

- Day-night average noise levels, L_{dn}, below 55 dBA are always acceptable (EPA's goal for outdoor spaces).

Noise attenuation with distance is dependent on a number of factors, including land type and cover, topography, the presence of natural or man-made obstructions, and meteorological conditions such as wind speed and direction, temperature inversions, and cloud cover. The widely accepted rate of noise attenuation is a reduction of 6 dBA for every doubling of distance.

However, this rate represents a fully vegetated land surface. In arid or semiarid locations where vegetative cover is less than complete and surface soils tend to be highly sound-reflective, lesser amounts of attenuation can be expected. However, despite its characterization as a semiarid steppe, the proposed EREF site has a relatively complete vegetative cover, notwithstanding the volcanic rock outcroppings that constitute approximately 28 percent of the land area (see Section 3.6 for additional details). It is therefore reasonable to expect that noise attenuation would occur at or near the average of 6 dBA with every doubling of distance from the source.[10]

Figure 4-5 shows the site plan for the proposed EREF site, the access roads, US 20 interchange, and the visitor center. The proposed EREF property boundary closest to the industrial footprint is to the north at a distance of approximately 762 meters (2500 feet). The industrial footprint is approximately 3060 meters (10,039 feet) north of US 20. Except as noted below, adjacent land parcels are expected to continue to be used for livestock grazing and agricultural activities. The nearest residence to the proposed site was identified by AES as being 7.7 kilometers (4.8 miles) east of the proposed site. No other sensitive human receptors (schools, churches, hospitals) are closer. The Wasden Complex, an archeological site, is approximately 1.0 kilometer (0.6 mile) outside the proposed EREF property boundary. The Wasden Complex contains no brick-and-mortar or masonry structures and, at its distance from the proposed site, would not experience any potentially destructive sound pressure levels. (See Section 4.2.7 for a more detailed discussion of ecological impacts from noise related to preconstruction, construction, and operation.)

Assuming a noise level of 95 dBA at the perimeter of the proposed EREF site (potentially occurring during preconstruction activities), applying an attenuation rate of 6 dBA per distance doubling, and considering the distances from the active construction zone to facility boundaries, noise levels of 61 dBA are estimated to occur at the north boundary of the proposed EREF property. Assuming the maximum noise levels from site access road construction to also be 95 dBA, an attenuation rate of 6 dBA per doubling of distance, and considering that access roads approach the west facility boundary of the proposed EREF property as close as 37 meters (120 feet), noise levels at that boundary are estimated to be as high as 89 dBA. Although this anticipated level exceeds suggested acceptable limits, construction activities for the road in proximity to the west boundary of the proposed EREF property would be short-term, and the immediately adjacent offsite land parcel is expected to be used for either livestock grazing or agriculture and to not have a human presence during the majority of time the preconstruction activities are occurring.

At their closest point, one access road, the highway interchange, and the visitor center are immediately adjacent to BLM's Hell's Half Acre WSA located to the south. However, individuals visiting Hell's Half Acre are expected to be no closer than the start of the hiking trail, another 0.5 kilometer (0.3 mile) farther to the south. At the start of the hiking trail, attenuated construction noise is estimated to be between 51 and 66 dBA. Although construction noise would be audible at the hiking trail, the initial preconstruction and construction activities that represent the highest potential noise emissions would be short-term (for intermittent periods

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[10] Some slight seasonal variation in noise attenuation is anticipated due to the presence or absence of vegetative cover or snow cover. No quantitative estimates were made, however, since it is difficult to anticipate the manner in which adjacent land parcels would be used from year to year.

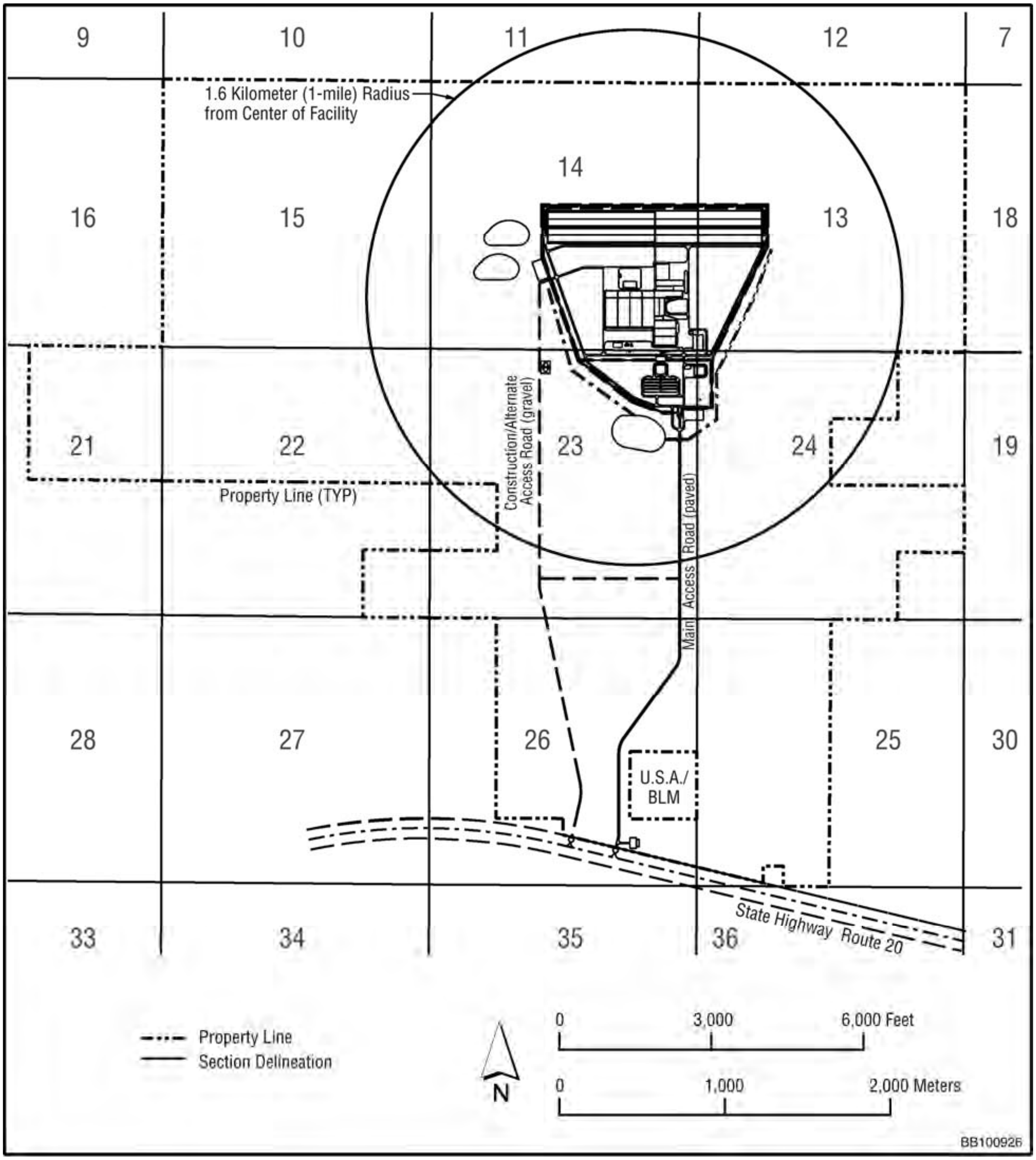

Figure 4-5 Proposed EREF Site Plan (AES, 2010a)

over the 12 month construction period for the highway interchanges) and associated noise would combine with highway noise already occurring in that area, measured and documented by AES in the AES ER at 57 dBA (AES, 2010a).

Available data suggest that construction noise during preconstruction would be audible at some boundaries of the proposed EREF property. Construction noise emanating from activities within the industrial footprint is expected to be attenuated to acceptable levels at the boundaries of the proposed EREF property. Noise resulting from highway interchange, site access road, and visitor center construction may occur at offsite locations at levels above values suggested in Federal standards as acceptable, albeit for relatively short periods of time throughout construction of the US 20 interchanges (estimated by AES as 12 months or less). However, with the exception of individuals using the Hell's Half Acre hiking trail or traveling on US 20 (at highway speeds), the potentially impacted offsite areas are all used for livestock grazing and/or agricultural purposes and would typically not have a human presence. No residence is expected to experience unacceptable levels of noise during any phase of preconstruction and construction.

The NRC staff concludes that noise impacts from initial preconstruction activities may exceed established standards at some locations along the proposed EREF property boundary for relatively short periods of time. However, because of the distances involved, expected levels of attenuation, the application of mitigation measures, and the expected limited presence of human receptors at these locations, the impacts would be SMALL for human receptors. During the 4-year overlap period when partial operations begin as heavy construction is completed, noise impacts from remaining construction activities and from operation are expected to be additive, but nevertheless substantially reduced from noise levels during preconstruction and construction would be SMALL.

4.2.8.2 Facility Operation

Current development plans provide for a period of approximately 4 years when the proposed facility becomes partially operational while some structure construction is still ongoing within the industrial footprint. However, the majority of the largest noise emissions are expected to occur during preconstruction. Those activities would all have been completed throughout the proposed site before any operations begin, with ongoing construction confined to a small area and not involving major noise-producing equipment or activities. The combined noise impacts from simultaneous remaining construction and partial operation would be dominated by the higher noise source but nevertheless is expected to be diminished from impacts during initial preconstruction and construction.

Major noise sources associated with operation of the proposed EREF include the six diesel-fueled emergency generators located at outdoor areas within the industrial footprint, commuter traffic noise for the operational workforce (and a small construction workforce for the 4-year period of heavy construction and operation overlap), traffic noise from the movement of delivery vehicles to bring feedstock materials and other support materials to the proposed site and remove product and waste materials from the proposed site, noise from operation of various pumps and compressors, and cooling fan noise. Numerous pieces of equipment associated with operation can be expected to have noise signatures. However, with the exception of emergency generators, cooling fans, and large compressors, the majority of noise-producing equipment would be located inside buildings and their noise sources would be significantly attenuated by those structures.[11] Some of the outdoor equipment with significant noise signatures are expected to be located within noise-suppressing enclosures.

AES referenced noise measurements from the Almelo Enrichment Plant in Almelo, The Netherlands, a facility also using the same gas centrifuge design as the proposed EREF, as ranging from 30 to 47 dBA at the facility boundary (AES 2010a). Because the Almelo Facility's design does not include a substantial fallow buffer area between industrial activities and the facility's boundary, AES has characterized the Almelo-measured operational noise levels as conservative representations of the proposed EREF operational noise levels (as measured at the proposed EREF property boundary) and concluded they satisfy all relevant or potentially relevant U.S. noise standards and guidance. NRC concurs that same noise levels that would occur at the proposed EREF would comply with relevant U.S. noise standards and guidance.

Traffic associated with operations at the proposed EREF would result in increased noise levels along US 20 in the vicinity of the proposed EREF, contributing to traffic-related noise that already exists in proximity to the highway, especially during expected periods of commuting of INL personnel from Idaho Falls. Residents in the vicinity of US 20, but otherwise unaffected by operational noise emanating from the proposed EREF site, would be impacted by increased traffic noise. Traffic noise can be expected to increase slightly and, depending on the operational schedules established for the proposed EREF, the duration of traffic noise may increase over the course of a workday.

The NRC staff concludes that distances from noise sources to sensitive receptors would result in adequate control of noise sources related to operation of the proposed EREF, and noise impacts from operation of the proposed EREF would be SMALL.

4.2.8.3 Mitigation Measures

The most effective strategy for mitigating noise impacts to the general public involves maximizing the distance between noise sources and potential public receptors. The size of the proposed EREF property, the positioning of the proposed EREF site within that property, the design of the proposed EREF site, and site access controls would guarantee such separations during preconstruction, construction, and operating periods. In addition to the intrinsic controls of the proposed EREF property and the placement of the proposed EREF site within that property, AES identified the following noise mitigation strategies for preconstruction and construction (AES, 2010a):

- restricting most of US 20 use after twilight through early morning hours to minimize noise impacts to the nearest residence; restrict usage of heavy truck and earthmoving equipment after twilight through early morning hours during construction of the access roads and

[11] The gas centrifuges operate at extremely high speeds. However, because they are supported magnetically and operate under high vacuum, their operation is expected to be extremely quiet. Catastrophic failure of a centrifuge may create a high impulsive noise. Their design, together with their locations inside buildings, suggest that the centrifuges would not contribute significantly to the operational noise signature of the proposed EREF that would be experienced at the proposed EREF property boundary.

highway entrances, to minimize noise impacts on the Hell's Half Acre Wilderness Study Area

- performing construction or decommissioning activities with the potential for noise or vibration at residential areas that could have a negative impact on the quality of life, during the daytime hours (7:00 am–7:00 pm); if it is necessary to perform an activity that could result in excessive noise or vibration in a residential area after hours, AES would notify the community in accordance with site procedures

- using engineered and administrative controls for equipment noise abatement, including the use of equipment and vehicle mufflers, acoustic baffles, shrouding, barriers, and noise blankets

- sequencing construction or decommissioning activities to minimize the overall noise and vibration impact (e.g., establish the activities that can occur simultaneously or in succession)

- using blast mats, if necessary, when using explosives

- creating procedures for notifying State and local government agencies, residents, and businesses of construction or decommissioning activities that may produce high noise or vibration that could affect them

- posting appropriate State highway signs warning of blasting

- creating a Complaint Response Protocol for dealing with and responding to noise or vibration complaints, including entering the complaint into the site's Corrective Action Program

- establishing and enforcing onsite speed limits

The NRC identified the following additional noise mitigation measure for preconstruction and construction:

- suspend the use of explosives during periods when meteorological conditions (e.g., low cloud cover) can be expected to reduce sound attenuation

AES has identified the following mitigative actions to control noise impacts during operation of the proposed EREF (AES, 2010a):

- mitigating operational noise sources primarily by plant design, whereby cooling systems, valves, transformers, pumps, generators, and other facility equipment are located mostly within plant structures and the buildings absorb the majority of the noise located within

- restricting most of US 20 use after twilight through early morning hours to minimize noise impacts to the nearest residence

- establishing preventative maintenance programs that ensure all equipment is working at peak performance (AES, 2009b)

4.2.9 Transportation Impacts

This section discusses the potential impacts from transportation to and from the proposed EREF site. Transportation impacts resulting from the movement of personnel and material during preconstruction, construction, and operation of the proposed EREF include:

- transportation of construction materials and construction debris
- transportation of the construction workforce
- transportation of the operational workforce
- transportation of feed material (including natural UF_6 [i.e., not enriched], empty tails cylinders, and supplies for the enrichment process)
- transportation of the enriched UF_6 product (and empty product cylinders)
- transportation of process wastes, including depleted UF_6 and other radioactive wastes

The primary impact of preconstruction and the proposed action on transportation resources is expected to be increased traffic on nearby roads and highways. Transportation impacts during preconstruction and construction, and during facility operation would be SMALL to MODERATE on adjacent local roads (due to the potentially significant increase in average daily traffic), but regional impacts would be SMALL.

No fatalities are expected as a result of construction worker traffic to and from the proposed EREF site during each of the peak years of construction. Measures proposed by AES to mitigate potential traffic impacts at the entrance to the proposed EREF include encouraging carpooling, varying shift change times, and incorporating traffic safety measures to improve traffic flow on US 20 (AES, 2010a).

No construction or operational worker fatalities are expected from traffic accidents. Less than two latent fatalities are expected from truck emissions on an annual basis. Less than two latent cancer fatalities (LCFs) to either the general public or occupational workers are expected from incident-free transport of radioactive materials. No fatalities to the general public resulting from truck accidents are anticipated. The potential health impacts from the transportation of radioactive materials and from chemical exposures resulting from a transportation accident would be SMALL.

4.2.9.1 Preconstruction and Construction

Preconstruction and construction activities for the proposed EREF would cause an impact on the local transportation network due to the construction of the highway entrance(s), the daily commute of up to 590 construction workers during the peak years of construction, and daily construction deliveries and waste shipments (AES, 2010a). The commute of the peak number of construction workers, combined with the anticipated number of construction deliveries and waste shipments, could increase the daily traffic on US 20 from 2210 vehicle trips per day (see Table 3-23 in Chapter 3) to 3420 vehicle trips per day (2210 plus 590 commuting round trips and 15 delivery/waste round trips). This represents a 55 percent increase in traffic volume over current levels. Based on employment and delivery/shipment projections for the proposed facility, this estimate also represents the maximum number of vehicle-trips during the period when construction and operations overlap (AES, 2009b) (see Section 4.2.9.2).

Because traffic volume is expected to remain below capacity on Interstate 15 (I-15) and traffic slowdowns or delays would only be expected to occur at the entrance to the proposed EREF during shift changes, the impacts on overall traffic patterns and volumes would be MODERATE on US 20 and SMALL on I-15.

In addition to the increased traffic that might result from the construction of the site entrance(s) along US 20, there would be an increased potential for traffic accidents. Assuming an 80-kilometer (50-mile) round-trip commute (i.e., the round-trip distance between the Idaho Falls area and the proposed EREF) for 250 workdays per year, 590 vehicles would travel an estimated total of 11,800,000 vehicle kilometers (7,375,000 vehicle miles) per year. This average round-trip distance was assumed because Idaho Falls is the closest principal business center to the proposed EREF. Based on the statewide vehicle accident and fatality rates of 85.8 injuries and 1.59 fatalities per 100 million annual vehicle miles (ITD, 2009), seven injuries and no fatalities (risk of <0.12 fatalities estimated) would be expected to occur during a peak preconstruction/construction employment year. Therefore, the impacts from construction vehicle accidents would be SMALL.

An average of 3940 delivery and waste trucks would arrive and depart the proposed site in each of the three peak years of construction (about 16 trucks per day) (AES, 2010a). Assuming an average round-trip distance of 80 kilometers (50 miles), construction-related trucks would travel an estimated 315,200 vehicle kilometers (197,000 vehicle miles) per year. Based on State-level surface freight accident rates of 63.4 injuries and 40.1 fatalities per 100 million annual truck miles (Saricks and Tompkins, 1999), no injuries (risk of <0.13 injuries) and no fatalities (risk of <0.08 fatalities) from construction delivery and waste shipments would be expected to occur during peak preconstruction/construction. The impacts from the truck traffic to and from the proposed site during preconstruction and construction would have a SMALL impact on overall traffic.

In addition to the potential for injuries and fatalities from construction shipments, there are potential impacts from truck emissions. Based on a conservative (Class VIIIB) emission rate (Biwer and Butler, 1999), no latent fatalities would be expected from truck emissions during a peak year of construction (risk of <0.17 latent fatalities). Therefore, pollution impacts from construction vehicle traffic would be SMALL.

Two access roadways into the proposed EREF site are planned to support access during preconstruction, construction, and facility operation (AES, 2010a).[12] The main (eastern) access road would run north from US 20 to the southern entrance of the proposed EREF site. The construction/alternate (western) access road would run north from US 20 to the western entrance of the proposed EREF site. One or both roadways would eventually be converted to

[12] Plans for permanent access to US 20, including the number of full-time operational connections, have not been finalized. As of August 2010, AES continues to consult with ITD. The impacts described in this EIS are not expected to be sensitive to the number or placement of access roads.

permanent access roads upon completion of construction. The Idaho Transportation Department (ITD) would require AES to secure and maintain a permit for access to the proposed EREF site (NRC, 2009b).

AES has initiated discussions with ITD regarding the construction of the site access roads from US 20 and related safety requirements. For the main (eastern) access road, AES has expressed little interest in at-grade turn lanes (which would not solve difficulties associated with left turns to and from the main site access road) or a loop road similar to that used by INL (which would not solve difficulties associated with the high-speed merge into peak traffic that includes few gaps) (ITD, 2010). Instead, AES has indicated a preference for a grade-separated interchange (ITD, 2010). The proposed EREF site is favorable for construction of an overpass due to existing physical features, peak directional flow to/from INL, and low traffic volumes at all other times (ITD, 2010). Ramp construction would likely require 3 to 4 months and would present a minor impact on current traffic flow (due to the mandatory construction zone speed reduction to 72 kilometers per hour [45 miles per hour]); overpass construction would result in some traffic flow disruption, but it is not expected to be significant (ITD, 2010). US 20 appears to have the available capacity to absorb additional traffic created by construction and operations related to the proposed EREF without adverse effects, with the possible exception of peak, directional travel periods (i.e., rush hour) in the morning and afternoon. Impacts on US 20 peak flow could be minimized by ceasing construction activities during peak directional flow (see Section 3.12.1) (ITD, 2010). Impacts on US 20 traffic flow due to construction of site access roads would be SMALL and temporary, occurring only during the period of access road construction.

As noted above, there is currently no road or parking infrastructure at the proposed EREF site. Therefore, site-specific traffic levels (e.g., during construction and shift changes) are based on maximum projections of construction traffic, regular operational workforce, incoming deliveries, and outgoing shipments. Peak traffic flows are anticipated at shift changes, with the principal problem area occurring where the site access roads meet US 20. The proposed EREF site is assumed to have enough parking capacity to accommodate each working shift and any necessary visitors (AES, 2010a).

Overall, the anticipated transportation impacts from preconstruction and construction, as well as the period when construction activities and operation overlap, would be SMALL to MODERATE. Assuming AES estimates for the first year of construction are representative of preconstruction (AES, 2010a), and assuming eight months of preconstruction, the estimated relative contributions to these impacts are 10 percent during preconstruction and 90 percent during construction.

4.2.9.2 Facility Operation

Operations impacts could occur from the transport of personnel, nonradiological materials, and radioactive material to and from the proposed EREF site, with the highest impacts occurring during the period when facility construction and operation overlap. The impacts from each are discussed below.

Transportation of Personnel

Operations at the proposed EREF would be continuous, requiring an operational workforce of 550 workers, approximately 4.2 employees to staff each position, three shifts per day (seven days per week), and an average of 130 positions per shift (AES, 2010a). Based on a conservative commuting density of one employee per vehicle, the average increase in daily local traffic (on US 20) due to employee commuting is estimated to be 35 percent (2210 plus 780 employee vehicle trips). Assuming a round-trip distance of 80 kilometers (50 miles) and statewide vehicle accident rates, employees would travel approximately 11,388,000 vehicle kilometers (7,117,500 vehicle miles) per year of facility operation. Based on statewide vehicle accident and fatality rates (ITD, 2009), seven injuries and no fatalities (risk of <0.12 fatalities) would be anticipated from traffic accidents during a peak year of operation.

As noted in Section 4.2.9.1, the maximum number of daily vehicle-trips during the period when construction and operations overlap is projected to be 590 commuting round trips (1180 vehicle-trips) and 15 delivery/waste round trips (30 vehicle-trips). This projection bounds the 780 daily vehicle-trips that are anticipated during peak operation, and the associated level of increased traffic would have a SMALL to MODERATE impact on the current traffic on US 20 (SMALL for an off-peak shift change).

Transportation of Nonradiological Materials

The transportation of nonradiological materials would include the delivery of routine supplies and equipment necessary to sustain operation and the removal of nonradiological wastes (including hazardous wastes). The transportation of hazardous waste is subject to EPA and U.S. Department of Transportation (DOT) regulations. Nonradiological deliveries and waste removal would require an estimated 3889 truck round-trips per year (including eight shipments of hazardous waste per year) (AES, 2010a), or approximately 16 round-trips per day. This traffic would have a SMALL impact on the current traffic on US 20. Assuming a round-trip distance of 80 kilometers (50 miles), these trucks would travel approximately 311,120 kilometers (194,450 miles) per year of operation, no injuries (risk <0.13), and no fatalities (risk <0.8) would be expected per year of peak operation. Therefore, the impacts from accidents involving the shipment of nonradiological materials would be SMALL. The 80-kilometer (50-mile) distance is reflective of the round-trip distance between the proposed EREF site and the Idaho Falls area. Peterson Hill Landfill, the proposed destination for most of the nonhazardous and nonradioactive waste generated by the proposed EREF, is located near Idaho Falls. Hazardous wastes would be shipped to a local or regional Resource Conservation and Recovery Act (RCRA)-permitted treatment, storage, and disposal facility (TSDF), such as the U.S. Ecology facility near Grandview, Idaho (approximately 121 kilometers [75 miles] from the proposed EREF site).

Transportation of Radiological Materials

Transportation of radiological materials would include shipments of feed material (natural UF_6), product material (enriched UF_6), depleted tails (depleted UF_6) and other radioactive wastes, and empty feed, tails, and product cylinders. Due to the lack of rail access in the region, AES did not propose rail transportation as a future means of shipping radioactive material and wastes

(AES, 2010a). AES has proposed trucking as the sole mode of freight transportation to and from the proposed EREF.

Transportation of radiological materials is subject to NRC and DOT regulations. All materials shipped to or from the proposed EREF could be shipped in Type A containers. The product (enriched UF_6) is considered by the NRC to be fissile material and would require additional fissile packaging considerations such as using an overpack surrounding shipping containers. However, when impacts are evaluated, the effects of the overpack are not incorporated into the assessment and result in a set of conservative assumptions.

The potential impacts from radiological shipments, other than the traffic increase on local roads, were analyzed using the WebTRAGIS and RADTRAN computer codes. WebTRAGIS (Johnson and Michelhaugh, 2003) is a Web-based version of the Transportation Routing Analysis Geographic Information System (TRAGIS), which is used to model highway, rail, and waterway routes within the United States. RADTRAN 5 (Weiner et al., 2008) is used to calculate the potential impacts of radiological shipments using the routing information generated by WebTRAGIS. Appendix D presents details of the methodology, calculations, and results of these analyses.

RADTRAN 5.6 estimates several different types of transportation impacts. “Incident-free” impacts are those not involving any release of radioactive material, including health impacts from traffic accidents (fatalities) and due to radiation exposure from a passing radiological shipment (latent cancer fatalities [LCFs]). These impacts are estimated based on one year of shipments and are presented for both the general public near the transportation routes and the maximally exposed individual (MEI).[13] Risks are calculated based on a population density located within 800 meters (0.5 mile) of the transportation route. In addition to incident-free impacts, RADTRAN presents impacts and resultant risks (impact multiplied by probability of occurrence) from a range of accidents severe enough to release radioactive material to the environment. It was conservatively assumed that once a container is breached, the material that is released is completely aerosolized and respirable (see Section D.3.4.2).

Health effects from vehicle exhaust emissions (latent fatalities) are also considered to be an incident-free impact. These impacts are estimated using the methodology discussed in Appendix D.

<u>Radiological Shipments by Truck</u>

Impacts discussed in this section include the traffic impacts from EREF-related truck traffic as well as the radiation exposure from the radiological shipments involving UF_6, enriched product, depleted UF_6, and other low-level radioactive wastes, and empty shipping containers.

The NRC staff evaluated the number of shipments of each type of material based on the amount and type of material being transported to and from the proposed EREF:

[13] A maximally exposed individual (MEI) is a member of the general public that would be expected to receive the highest potential radiological dose for a given scenario.

- Feed material (natural UF_6) would be shipped to the proposed EREF site in Type 48Y cylinders (up to 1424 per year) primarily from UF_6 conversion facilities near Metropolis, Illinois, or Port Hope, Ontario, Canada (AES, 2010a). Feed material could also be received from international sources, via major international shipping ports on the East Coast (Portsmouth, Virginia, or Baltimore, Maryland). There would be one 48Y cylinder per truck, resulting in approximately six shipments per day (assuming 250 shipping days per year).

- Enriched UF_6 product would be shipped in Type 30B cylinders (up to 1032 per year) to any of three domestic fuel manufacturing plants (located in Richland, Washington; Wilmington, North Carolina; or Columbia, South Carolina) or to international destinations via the two international shipping ports (Portsmouth, Virginia, or Baltimore, Maryland). Up to five Type 30B cylinders could be shipped on one truck; however, AES proposes to ship only two cylinders per truck (AES, 2010a). Therefore, 516 truck shipments per year (approximately two per day) would leave the proposed site.

- The impacts of transporting depleted UF_6 to a conversion facility in preparation for eventual disposal were also analyzed. Conversion could be performed at a DOE facility or a private facility (see Section 2.1.5), although AES has not indicated any plans to use a private facility. DOE conversion facilities are currently being constructed at Paducah, Kentucky, and Portsmouth, Ohio, and the NRC is currently reviewing a license application for a private conversion facility (International Isotopes, Inc.) (NRC, 2010d). Depleted UF_6 would be placed in Type 48Y cylinders for temporary storage at the proposed EREF site and eventual shipment offsite. Approximately 1222 truck shipments per peak year (one cylinder per truck) would be required to transport the depleted UF_6 to a conversion facility where the waste would be converted into U_3O_8. If DOE performs the conversion at the Paducah or Portsmouth facilities, the resulting U_3O_8 could be shipped offsite for disposal.

- In addition to full feed, product, and depleted UF_6 shipments, 1424 empty feed, 1032 empty product, and 1222 empty depleted UF_6 cylinders on an average annual basis would be shipped to or from the proposed EREF. Assuming two cylinders per truck for all shipments (AES, 2010a), 1839 truck shipments would be required per year (about 7 to 8 per day, assuming 250 shipping days per year).

- Other radiological waste of approximately 146,500 kilograms (323,000 pounds) per year would be shipped offsite to EnergySolutions (in Oak Ridge, Tennessee) for processing or to EnergySolutions (near Clive, Utah) or U.S. Ecology (in Hanford, Washington) for disposal (AES, 2010a). These shipments would total approximately 16 truck shipments per year. The distance to the Oak Ridge disposal site, which is the furthest of the two disposal sites from the proposed EREF, adequately encompasses the range of radiological waste disposal sites that could be available in the future.

Based on the discussion above, the total number of trucks containing radiological shipments (i.e., both incoming and outgoing material) would be about 20 per day (5017 total shipments over 250 shipping days per year), which would have a minimal impact on US 20 traffic in the vicinity of the proposed EREF site.

Latent Cancer Fatality from Exposure to Ionizing Radiation

A latent cancer fatality (LCF) is a death from cancer resulting from, and occurring an appreciable time after, exposure to ionizing radiation. Death from cancer induced by exposure to radiation may occur at any time after the exposure takes place. However, latent cancers would be expected to occur in a population from 1 year to many years after the exposure takes place. To place the significance of these additional LCF risks from exposure to radiation into context, the average individual has approximately 1 chance in 4 of dying from cancer (LCF risk of 0.25).

The EPA has suggested a conversion factor such that for every 100 person-sieverts (10,000 person-rem) of collective dose, approximately 6 individuals would ultimately develop a radiologically induced cancer (Eckerman et al., 1999). If this conversion factor is multiplied by the individual dose, the result is the individual increased lifetime probability of developing an LCF. For example, if an individual receives a dose of 0.00033 sieverts (0.033 rem), that individual's LCF risk over a lifetime is estimated to be 2×10^{-5}*. This risk corresponds to a 1 in 50,000 chance of developing a LCF during that individual's lifetime. If the conversion factor is multiplied by the collective (population) dose, the result is the number of excess latent cancer fatalities.*

Because these results are statistical estimates, values for expected latent cancer fatalities can be, and often are, less than 1.0 for cases involving low doses or small population groups. If a population group collectively receives a dose of 50 sieverts (5000 rem), which would be expressed as a collective dose of 50 person-sieverts (5000 person-rem), the number of potential latent cancer fatalities experienced from within the exposure group is 3. If the number of latent cancer fatalities estimated is less than 0.5, on average, no latent cancer fatalities would be expected.

Source: NRC, 2004, 2005.

Table 4-12 presents a summary of the potential health impacts to the public and transportation crews for one year of shipments via truck, calculated using RADTRAN 5. The results are presented in terms of a range of values for each type of shipment. The range represents the lowest to highest impacts for the various proposed shipping routes. For example, for feed material, the range of impact values represents one year of shipments from any of the four locations where feed material shipments could originate. If feed materials were provided from one or more of the locations, the impacts would be somewhere between the low and high values (impacts could be evaluated by summing the products of the fraction of material from each location and the calculated impacts from those locations). Also included in the table are the range of impacts summed over shipments of the feed, product, depleted uranium, and waste.

Table 4-12 Summary of Annual Impacts on Humans from Truck Transportation of Radioactive Material[a]

Material	Range	Incident-Free LCF			Accident	
		Latent Emissions Fatalities	Public Radiation LCF	Crew Radiation LCF	Physical Fatalities	LCF[b]
Feed	High	6.1×10^{-1}	1.9×10^{-1}	1.1×10^{-2}	8.2×10^{-2}	6.6×10^{-3}
	Low	3.5×10^{-1}	9.6×10^{-2}	7.2×10^{-3}	5.7×10^{-2}	4.8×10^{-3}
Product	High	2.4×10^{-1}	8.4×10^{-2}	3.1×10^{-3}	3.0×10^{-2}	5.9×10^{-3}
	Low	3.9×10^{-2}	1.3×10^{-2}	6.6×10^{-4}	7.3×10^{-3}	8.4×10^{-4}
Depleted UF_6/tails	High	3.5×10^{-1}	1.1×10^{-1}	7.8×10^{-3}	5.9×10^{-2}	4.4×10^{-3}
	Low	3.1×10^{-1}	9.6×10^{-2}	6.0×10^{-3}	5.0×10^{-2}	3.2×10^{-3}
Empty feed	High	3.0×10^{-1}	2.7×10^{-1}	1.6×10^{-2}	4.1×10^{-2}	2.5×10^{-8}
	Low	1.8×10^{-1}	1.6×10^{-1}	1.1×10^{-2}	2.9×10^{-2}	1.6×10^{-8}
Empty product	High	2.4×10^{-1}	3.2×10^{-1}	1.5×10^{-2}	3.0×10^{-2}	1.2×10^{-8}
	Low	3.9×10^{-2}	6.6×10^{-2}	3.3×10^{-3}	7.3×10^{-3}	1.7×10^{-9}
Empty depleted UF_6/tails	High	2.6×10^{-1}	2.3×10^{-1}	1.4×10^{-2}	3.5×10^{-2}	2.5×10^{-8}
	Low	1.5×10^{-1}	1.3×10^{-1}	9.0×10^{-3}	2.5×10^{-2}	1.0×10^{-8}
Waste	High	5.0×10^{-3}	1.4×10^{-3}	1.9×10^{-4}	7.6×10^{-4}	1.3×10^{-6}
	Low	1.2×10^{-3}	2.6×10^{-4}	3.0×10^{-5}	1.1×10^{-4}	2.5×10^{-7}
Total	High	2.0	1.2	6.7×10^{-2}	2.8×10^{-1}	1.7×10^{-2}
	Low	1.1	5.6×10^{-1}	3.7×10^{-2}	1.8×10^{-1}	8.8×10^{-3}

[a] Risks calculated based on a population density within 800 meters (0.5 mile) of the transportation route.
[b] LCF from accidental release is a population risk (probability × consequence).

Table 4-13 presents the radiological risk from each type of shipment to a member of the general public who is an MEI (calculated using RADTRAN 5). The MEI is defined as being located 30 meters (98 feet) from a shipment passing at a speed of 24 kilometers per hour (15 miles per hour) (NRC, 1977). MEI dose and risk are dependent only on the cargo dose rate, not on the route or distance traveled.

For members of the general public, the largest impacts from the shipment of radioactive materials are from incident-free transportation (one to two latent fatalities from the vehicle emissions per year and less than one fatality from traffic accidents per year). The high-range risk of LCFs would be approximately one per year from incident-free radiation exposure and no LCFs would be expected from postulated accidents. These impacts on the public would be SMALL, because the collective radiation exposure would be distributed among all people along the transportation routes and each exposed individual would receive a minimal dose. The greatest radiological risk to an MEI would be from empty product cylinders (risk of 2.1×10^{-7}, or 1 chance in 4.8 million) and the associated dose would be less than 0.00001 percent of the

Table 4-13 Risk to the MEI from a Single Radioactive Material Shipment[a]

Material	Dose (rem)	LCF[b]
Feed	1.9×10^{-4}	1.1×10^{-7}
Product	6.9×10^{-5}	4.1×10^{-8}
Depleted UF_6/tails	1.6×10^{-4}	9.6×10^{-8}
Empty feed	2.9×10^{-4}	1.7×10^{-7}
Empty product	3.5×10^{-4}	2.1×10^{-7}
Empty depleted UF_6/tails	2.5×10^{-4}	1.5×10^{-7}
Waste	2.1×10^{-6}	1.3×10^{-9}

[a] MEI is located 30 m from a passing shipment that is traveling 24 km/h (15 mph).
[b] LCFs based on risk of 6×10^{-4} fatal cancer per person-rem (EPA, 1999).

100-millirem annual regulatory limit for members of the general public. No LCFs would be expected from incident-free radiation exposure to transportation crews, so these impacts would also be SMALL.

Import and Export Impacts

As noted in the previous section, AES has indicated that the proposed EREF could import feed materials from overseas suppliers or export enriched product to overseas purchasers (AES, 2010a). In this case, the proposed EREF would need to comply with licensing and other requirements for import and export activities in 10 CFR Part 110. Any import or export activity would also need to be conducted in accordance with transportation security requirements in 10 CFR Part 73. Transportation security for the proposed EREF should be addressed in a physical security plan. The discussion below summarizes expected transportation impacts associated with potential import/export activities along routes to the two seaports identified by AES (Portsmouth, Virginia, and Baltimore, Maryland).

For this EIS, the NRC staff performed analyses for the transportation of enriched uranium from the proposed EREF to fuel fabrication facilities in Wilmington, North Carolina (Global Nuclear Fuels-America); Columbia, South Carolina (Westinghouse Electric); and Richland, Washington (AREVA NP). These analyses are representative of enriched uranium shipments from the proposed EREF to the seaports identified above, because the truck and rail routes that would be used in transporting enriched uranium to these seaports have similar distances and population densities to the routes analyzed for shipments to the domestic fuel fabrication facility destinations.

The NRC staff also performed analyses for the transportation of feed material to the proposed EREF from Port Hope, Ontario, Canada. This analysis is considered representative of potential feed material shipments from the seaports to the proposed EREF, because the distances, population densities, and expected external radiation doses for such shipments would not be significantly different from those already analyzed.

Therefore, for shipments of both enriched uranium and feed material to or from seaports, transportation impacts (incident-free and accidents) would be SMALL and would not be significantly different from transportation impacts referenced above.

Chemical Impacts during Transportation of Radioactive Materials

In addition to the potential radiological impacts from the shipment of UF_6, chemical impacts from an accident involving UF_6 could affect the surrounding environment and public. No chemical impacts are expected during normal transportation conditions as no releases from packaging would occur. However, when released from a shipping container, UF_6 would react with moisture in the atmosphere to form hydrofluoric acid and uranyl fluoride (UO_2F_2), which are chemically toxic to humans. Hydrofluoric acid is extremely corrosive and can damage the lungs and result in death if inhaled at high enough concentrations. Uranium compounds, in addition to being radioactive, can have toxic chemical effects (primarily on the kidneys) if they enter by way of ingestion and/or inhalation (DOE, 2004a,b).

The potential chemical impacts resulting from transportation accidents involving depleted UF_6 have been analyzed in EISs previously published by DOE (DOE, 2004a,b). The results of these analyses were used to estimate the chemical impacts associated with the proposed EREF and are discussed in Appendix D. The results are applicable because the chemical impact analysis performed by DOE is independent of shipping route and level of enrichment. Chemical impacts would be only dependent on the quantity of UF_6 being transported. In addition, the proposed EREF would use the same containers (Type 48Y cylinders) that DOE evaluated. The DOE analyses showed the estimates of irreversible adverse effects from chemical exposure to be approximately 1 to 3 orders of magnitude lower than the estimates of public latent cancer fatalities from radiological accident exposure. Since the estimated public health effects from radiological accident exposure would be SMALL, the chemical impacts would also be SMALL.

4.2.9.3 Mitigation Measures

Measures identified by AES to mitigate transportation impacts during preconstruction activities, construction, and facility operation include (AES, 2010a):

- encourage carpooling and minimize traffic due to employee travel

- stagger shift changes to reduce the peak traffic volume on US 20

- promptly remove earthen materials on paved roads or the proposed EREF site carried onto the roadway by wind, trucks, or earthmoving equipment

- promptly stabilize or cover bare earthen areas once roadway and highway entrance earthmoving activities are completed

- cover open-bodied trucks that transport materials likely to give rise to airborne dust

- construct acceleration and deceleration lanes at the entrances to the proposed EREF site to improve traffic flow and safety on US 20

- construct acceleration and deceleration lanes (or a grade-separated interchange) on US 20 at the entrances to the proposed EREF site to improve traffic flow and safety

- build gravel pads at the proposed EREF entry/exit points along US 20 in accordance with the Idaho Department of Environmental Quality (IDEQ) *Catalog of Stormwater Best Management Practices for Idaho Cities and Counties, Volume 2, Erosion and Sediment Controls* (IDEQ, 2009)

- apply periodic top dressing of clean stone to the gravel pads, as needed, to maintain the effectiveness of the stone voids

- perform tire washing, as needed, on a stabilized stone (gravel) area that drains to a sediment trap

- prior to entering US 20, inspect vehicles for cleanliness from dirt and other matter that could be released onto the highway

- maintain low speed limits onsite to reduce noise and minimize impacts on wildlife

The NRC identified the following additional mitigation measures to reduce transportation impacts during facility operation:

- consider working with INL to operate a joint bus system

- establish shift changes outside of INL peak commuting periods

The ITD would review any access permit application, as noted in Table 1-3. If a permit is issued, ITD may assign mitigation measures specific to the proposed EREF (e.g., turning lanes).

4.2.10 Public and Occupational Health Impacts

This section analyzes the potential impacts on public and occupational health from proposed EREF preconstruction/construction and operation. The analysis is divided into two main sections: nonradiological impacts and radiological impacts.

The analysis of nonradiological impacts during the preconstruction and facility construction phase includes estimated numbers of injuries and illnesses incurred by workers and an evaluation of impacts due to exposure to chemicals and other nonradiological substances, such as particulate matter (dust) and vehicle exhaust. All such potential nonradiological impacts would be SMALL. Analysis of nonradiological impacts during facility operation likewise evaluates the numbers of expected illnesses and injuries and impacts from exposure to toxic chemicals used or present during operations, mainly uranium and HF. These impacts would be SMALL.

No radiological impacts are expected during preconstruction and initial facility construction, prior to radiological materials being brought onsite. The radiological impacts analysis for facility operations addresses both public and occupational exposures to radiation. Exposures to construction workers completing facility construction during initial phases of operation are also evaluated. Evaluated exposure pathways include inhalation of airborne contaminants, ingestion of contaminated food crops, and direct exposure from material deposited on the ground and external exposure associated with stored UF_6 cylinders. Impacts from exposure of members of the public would be SMALL. Worker exposures would vary by job type, but would be carefully monitored and maintained as low as reasonably achievable (ALARA) and impacts would be SMALL.

4.2.10.1 Preconstruction and Construction

This section evaluates the potential for occupational injuries and illnesses associated with the proposed preconstruction and construction activities. It also evaluates the potential public and occupational health impacts from nonradiological and radiological releases during preconstruction and construction.

Occupational Injuries and Illnesses

The proposed EREF project involves a major construction activity with the potential for industrial accidents related to construction-vehicle accidents, material-handling accidents, and trips and falls. Resultant injuries could range from minor temporary injuries to long-term injuries and/or disabilities, and even to fatalities. The proposed activities are not anticipated to be any more hazardous than those for other major industrial construction or demolition projects.

Numbers of injuries and illnesses potentially incurred by workers during preconstruction and construction were estimated using annual injury and illness data for heavy construction compiled by the U.S. Department of Labor (DOL) Bureau of Labor Statistics (BLS). For preconstruction and construction of the proposed EREF, North American Industry Classification System Code 237, “Other Heavy and Civil Engineering Construction,” is applicable. Incident rates for total recordable cases and lost workday cases for calendar year 2007 for this activity code were obtained from the BLS data for 2007 (BLS, 2008a). Fatality incident rates for 2007 were taken from BLS data for construction occupations (BLS, 2008b) to estimate potential fatalities during preconstruction and construction of the proposed EREF. The number of construction workers per year (full-time equivalents [FTEs]) and the duration of construction were obtained from AES’s ER (AES, 2010a). The incident rates for total recordable cases, lost workday cases, and fatalities were applied to the number of construction workers per year and the construction schedule to estimate the total number of respective incidents. The estimated total incidents are summarized in Table 4-14.

A total of 202 nonfatal illnesses and injuries and less than one fatality are estimated during the projected 7 years of heavy preconstruction and construction activities based on peak construction levels. The numbers of such incidents would be substantially smaller during the four following years of assemblage and testing of the proposed project, as a much smaller number of worker-years would be involved, while the nature of work would shift from primarily structural crafts to primarily electrical and mechanical crafts with typically lower injury rates.

Table 4-14 Estimated Occupational Health Related Incidences during Preconstruction and Construction

FTE		Injury and Illness Cases		Lost Workday Cases		Fatalities	
FTEs per Year	Total FTE[a]	Incidents per 100 FTEs[b]	Total Recordable Cases	Incidents per 100 FTEs[b]	Lost Workday Cases	Incidents per 100,000 FTEs[c]	Total Fatalities
590	4130	4.9	202	2.6	107	12.3	0.51

[a] FTEs = full time equivalents; total FTEs based on 7 years at a peak level of 590 per year.

[b] BLS, 2008a.

[c] BLS, 2008b.

Based on these estimates, impacts on occupational safety from preconstruction and construction would be SMALL.

Nonradiological Exposures

Occupational exposures during preconstruction and construction would include exposure of construction workers to airborne fugitive dust generated from vehicle traffic and heavy equipment use, exposure to pollutants emitted from diesel- and gasoline-powered equipment (e.g., CO, NO_x, SO_x, and PM), and exposure to vapors from any fuels, paints, or solvents that are used. Any such exposures would be minor and would be minimized using the work practices and personal protective equipment as required by OSHA (29 CFR 1910). Such exposures would be typical of other construction projects of industrial facilities. Therefore, impacts to workers from chemical and dust exposure during preconstruction and construction would be SMALL.

Approximately 10 percent of the total occupational injury and nonradiological impacts discussed above would occur from the preconstruction activities. This value is based on AES's estimate that the preconstruction activities would be completed within the first 8 months of a total 84-month construction schedule (AES, 2009b). This 10 percent estimate is likely an upper bound, as fewer workers would be expected to be involved during preconstruction than during the main facility construction phase.

Radiological Exposures

The radionuclide concentrations at the proposed EREF site are either at or below background natural levels (see Section 3.6.4). Therefore, there would not be any radiological impacts above normal background levels.

4.2.10.2 Facility Operation

This section evaluates the potential for occupational injuries and illnesses associated with the operation of the proposed EREF. It also evaluates the potential public and occupational health impacts from nonradiological and radiological releases during facility operation.

Occupational Injury and Illness Rates and Fatalities

Workplace safety regulations are administered by the Occupational Safety and Health Administration (OSHA). Occupational hazards would be minimized when workers adhere to safety standards and use appropriate protective equipment; however, fatalities and injuries from accidents could still occur.

The ER summarizes a comparison of yearly reportable lost-time accidents for fiscal years 2003–2007 for the similar URENCO Capenhurst Limited uranium enrichment facility in Great Britain. The OSHA lost workday case rates varied from 0 to 1.62 per 100 FTE workers (FTEs) per year (AES, 2010a). For comparison, the BLS compiles annual injury and illness incidence rates by industry (BLS, 2008a). The national average incidence rate of nonfatal occupational injuries and illnesses resulting in lost workdays for classification 325, "Chemical Manufacturing," for calendar year 2007 was 0.8 per 100 FTEs per year, which is within range of 0 to 1.62 reported for the Capenhurst enrichment facility. Thus, the rates of occupational injuries and illnesses at the proposed EREF would be expected to be similar to those at the existing Capenhurst facility and to those in the chemical manufacturing industry in general.

Assuming an estimated 550 FTEs during operation of the proposed EREF (AES, 2010a) and using a rate of 3.1 total incidents and 0.8 lost-time injuries and illnesses per 100 workers, 17 total incidents and 4.4 lost-time injuries and illnesses per year would be projected. For an operating period of 30 years, 512 total incidents and 132 lost-time incidents would be projected, as shown in Table 4-15.

The number of fatal accidents projected during operations was computed assuming an incident rate of 2.0 per 100,000 FTEs for chemical manufacturing (BLS, 2008b). For 30 years of operation, less than one fatality is projected. Accordingly, impacts for occupational illnesses and injuries and fatalities during facility operation would be SMALL.

Nonradiological Exposures

Chemical exposures of primary concern to workers and members of the public during plant operations would be to UF_6 vapors and HF, which are produced along with UO_2F_2 when UF_6 vapors contact moisture in air. Exposures to uranium compounds and HF would be of similar concern, given similar exposure standards for these chemicals in occupational settings. However, the potential for exposures to any of these chemicals during normal operations would be slight, since the UF_6 process line is maintained at subatmospheric pressure. Exposure risks at process line points where feed and product vessels are connected and disconnected would be minimized through the use of flexible fume collection lines operated at subatmospheric pressure and through the use of personal protective equipment by workers. Handling of all chemicals would be done in accordance with the Environment, Health, and Safety Program for the proposed EREF, which would conform to 29 CFR 1910 and specify the use of engineering controls, including personal protective equipment, to minimize chemical exposures during operations (AES, 2010a).

Process ventilation lines would be run to chemical traps before venting to the outdoors to prevent exposures to the public. AES estimates that the annual average HF concentration emission from a nominal 6 million SWU per year centrifuge enrichment plant would be

Table 4-15 Estimated Occupational Health-Related Incidences during Plant Operation

FTE		Injury and Illness Cases		Lost Workday Cases		Fatalities	
FTEs per Year	Total FTE[a]	Incidents per 100 FTEs[b]	Total Recordable Cases	Incidents per 100 FTEs[b]	Lost Workday Cases	Incidents per 100,000 FTEs[c]	Total Fatalities
550	16,500	3.1	512	0.8	132	2.0	0.33

[a] Assumes 30 years of operation.

[b] BLS, 2008a.

[c] BLS, 2008b.

7.7 micrograms per cubic meter (0.0094 ppm) at the point of discharge (rooftop) based on annual emission of less than 2.0 kilograms (4.4 pounds) (AES, 2010a). This concentration is well below the occupational exposure limit of 2.5 milligrams per cubic meter (3.1 ppm) for 8-hour exposure set by both OSHA and the National Institute for Occupational Safety and Health (NIOSH) (ATSDR, 2003). Workers would not be expected to be exposed to HF concentrations greater than that at the discharge point.

Taking atmospheric dispersion into consideration, the discharge point concentration would fall to 3.4×10^{-4} micrograms per cubic meter (4.2×10^{-7} ppm) at the proposed property boundary 1100 meters (3600 feet) to the north, based on dispersion modeling (see Appendix E), and to even lower levels at further distances where members of the public might be exposed. These levels are several orders of magnitude below Idaho's AAC of 125 micrograms per cubic meter (0.15 ppm) for fluoride (IDAPA 58.01.01).

Occupational and public exposure to uranium compounds, UF_6 and UO_2F_2, would be to concentrations similar to or less than that of HF. Using releases from a 1.5 million SWU plant described in NUREG-1484 (NRC, 1994) linearly scaled up to a 6.6 million SWU facility, the size of the proposed EREF, results in an estimated annual gaseous release of 743 grams (1.63 pounds) of uranium which is about half the estimate of the annual HF release. Conservatively applying the same dispersion factors as used for HF, uranium concentrations at the proposed property boundary would be on the order of 1×10^{-4} microgram per cubic meter. While no Federal or Idaho ambient air standard is available for uranium with which to compare this level, it is more than five orders of magnitude below the NIOSH and OSHA occupational exposure limit of 50 micrograms per cubic meter (soluble uranium forms, 8-hour time weighted average) (NIOSH, 1996, 2005).

Occupational exposures would be expected to be low, but might be briefly elevated to some workers during cylinder connection and disconnection activities. Estimates of such "puff" emissions of UF_6 performed for the proposed American Centrifuge Plant in Piketon, Ohio, of up to 0.7 milligram per cubic meter (NRC, 2006) are similar to the short-term exposure limit of 0.6 milligram per cubic meter for uranium set by the American Conference of Governmental Industrial Hygienists (NIOSH, 1996), and well below the NIOSH "Immediately Dangerous to Life and Health" standard of 10 milligrams per cubic meter for exposures over a 1-hour period (NIOSH, 1996). At the proposed EREF, any such brief exposures would be mitigated with a gaseous effluent ventilation system (AES, 2010a), which would be expected to maintain levels below occupational health standards based on the similarity of the design of the proposed EREF to that of the American Centrifuge Plant (NRC, 2006).

Thus, due to low estimated concentrations of uranium and HF at public (proposed property boundary) and workplace receptor locations, the public and occupational health impacts due to exposures to hazardous chemicals during normal operations would be SMALL.

Radiological Exposures

Exposure to uranium may occur from routine operations as a result of small controlled releases to the atmosphere from the uranium enrichment process lines and decontamination and maintenance of equipment, releases of radioactive liquids to surface water, and as a result of direct radiation from the process lines, storage, and transportation of UF_6. Direct radiation and skyshine (radiation reflected from the atmosphere) in offsite areas due to operations within the SBMs is expected to be undetectable because most of the direct radiation associated with the uranium would be almost completely absorbed by the heavy process lines, walls, equipment, and tanks that would be employed at the proposed EREF, and would have to travel 8 kilometers to reach the nearest member of the public.

At the proposed EREF, the major source of occupational exposure would be from direct radiation from UF_6 with the largest exposure source being the empty Type 48Y cylinders with residual material, full Type 48Y cylinders containing either the feed material or depleted UF_6, Type 30B product cylinders, and various traps that help minimize UF_6 losses from the cascade (AES, 2010a). Atmospheric releases would be expected to be a source of public exposure. Such releases would be primarily controlled through the Technical Support Building and SBM gaseous effluent vent systems (AES, 2010a).

Radiological Sources

The estimated release of gaseous uranium from the proposed EREF would be less than 20 grams (0.7 ounces) per year (AES, 2010a). However, for conservatism, the radiological impacts to both workers and members of the public were modeled, using the CAP88-PC computer code (EPA, 2009d), on the basis of releases from a 1.5 million SWU plant described in NUREG-1484 (NRC, 1994), *Final Environmental Impact Statement for the Construction and Operation of Claiborne Enrichment Center, Homer, Louisiana*, linearly scaled up to a 6.6 million SWU facility resulting in an annual gaseous release of 743 grams (1.63 pounds) of uranium (AES, 2010a). This corresponds to an activity concentration of 19.5 megabecquerels (527 microcuries) (AES, 2010a).

During the time period when the proposed EREF is operational and construction activities continue, construction workers would be exposed to gaseous uranium effluents and external radiation from UF_6 cylinders. For conservatism, the same 19.5-megabecquerel (527-microcurie) annual release was used when estimating the dose from airborne releases during construction and operation. Two different release points were used to model doses to the construction workers during the period of expansion. One release point was associated with the Technical Service Building and the other release point was associated with the Separation Building Modules (AES, 2009b). For the external dose calculations, the construction workers were conservatively modeled, using the MCNP computer code (X5 Monte Carlo Team, 2003), as being positioned in the cylinder yard as if they were completing the last 20 percent of the cylinder pad, when the largest amount of material is in storage during construction, and thus were exposed to external radiation from stored UF_6 tails, full UF_6 feed, and empty cylinders (AES, 2009b).

Doses to members of the public were modeled, using CAP88-PC (EPA, 2009d), based on the same 19.5-megabecquerel (527-microcurie) annual release from the proposed EREF. Due to the distance (8000 m) of the nearest resident to the TSB and SBM, all releases were modeled as originating from a single source. For the external pathway it was conservatively assumed members of the public were exposed to a full cylinder storage pad (AES, 2010a). Table 4-16 provides the radiological sources used for the normal operation impact assessment for occupational workers and members of the public.

Occupational Exposure

Occupational exposure to radioactive material could result from releases to the atmosphere from the proposed EREF through stack releases from the Technical Support Buildings and SBMs gaseous effluent vent system and direct external radiation from the Cylinder Storage Pad.

The expected exposure pathways for the public include inhalation of airborne contaminants, direct exposure from material deposited on the ground, and external exposure associated with the stored UF_6 cylinders.

Two groups of workers were evaluated, the construction worker dose during the overlap period when construction is continuing at the proposed EREF and routine operations have begun, and the worker population supporting the proposed EREF during operations.

The construction worker population dose was modeled by considering 10 different receptor locations around the proposed EREF (AES, 2009b). Receptors 1 to 4 considered the construction workers at the SBMs and the UF_6 handling areas, and receptors 5 to 10 considered the storage pad workers completing the last 20 percent of the UF_6 Cylinder Storage Pad (AES, 2009b). Table 4-17 provides the atmospheric dispersion factors (χ/Q) used in the dose calculations for the collective construction worker population dose during the overlap period of construction and operations. Table 4-18 provides the worker population distribution and duration of exposure during this period of construction and operation overlap.

Table 4-19 provides a summary of the dose impacts to the construction workers during the overlap period of construction and operations. The collective construction worker annual population dose was estimated to be 0.376 person-sievert (37.6 person-rem) with over 99.99 percent of the radiation dose being attributable to the external dose associated with the stored UF_6 cylinders.

The most significant impact would be from direct radiation exposure to the construction workers completing the cylinder storage pads. The dose to an average construction worker completing the last 20 percent of the UF_6 cylinder pad is estimated to receive a dose of 1.96 millisieverts per year (196 millirem per year). Since this dose exceeds the limit specified in 10 CFR 20.1301, these workers should be part of a radiation dosimetry program and reclassified as radiation workers.

Table 4-16 Source Term Used for the Radiological Impact Assessment for Normal Operations[a]

Radionuclide	Wt %	Activity MBq (μCi)
^{234}U	5.5×10^{-3}	9.5 (260)
^{235}U	0.71	0.5 (10)
^{238}U	99.3	9.5 (260)
Total		19.5 (530)

[a] Members of the general public, 6.6-million-SWU facility. Annual uranium released: 760 grams, 19.5 MBq (530 μCi).
Source: Derived from AES, 2010a.

Table 4-20 provides estimated annual doses for representative workers within the proposed EREF, and Table 4-21 provides estimated dose rates for workers at several areas at the proposed EREF. Annual whole-body dose equivalents accrued by workers at an operating uranium enrichment plant are typically low and range from 0.22 to 0.44 millisievert (22 to 44 millirem) (URENCO, 2003, 2004, 2005, 2006, 2007). In general, annual doses to workers are expected to range from 0.050 millisievert per year (5 millirem per year) for general office staff to 3 millisieverts per year (300 millirem per year) for cylinder handlers. For the proposed EREF, AES has proposed an administrative limit of 0.01 sievert per year (1 rem per year) to any radiation worker. This limit is 20 percent of the limit provided in 10 CFR 20.1201. Impacts to workers at the proposed EREF are expected to be typical of similar facilities, and would be SMALL.

Public Exposure

Public exposure to radioactive material could result from releases to the atmosphere from the proposed EREF through stack releases from the Technical Support Building and SBM gaseous effluent vent systems. Also, although members of the public would not be expected to spend a significant amount of time at the property boundary closest to the Cylinder Storage Pad, this exposure possibility is considered in the impact assessment. The analysis estimated the potential radiation dose to the collective population residing within 80 kilometers (50 miles) of the proposed EREF, a hypothetical MEI located at the proposed EREF property boundary and the nearest resident who lives 8 kilometers (5 miles) from the proposed EREF.

The expected exposure pathways for the public include: inhalation of airborne contaminants, external exposure from material deposited on the ground, external exposure associated with the stored UF_6 cylinders, and ingestion of resuspended soil. In addition, members of the public may be exposed to uranium compounds that are incorporated into the edible portions of plants and animals. These additional exposure pathways include the ingestion of vegetables, the ingestion of locally produced meat, and the ingestion of locally produced milk. Table 4-22 provides the population distribution used to estimate the collective population dose for airborne releases associated with the proposed EREF. Table 4-23 provides the locations and exposure times for

Table 4-17 Locations and Annual Average Atmospheric Dispersion Factors χ/Q (s/m^3) for the Construction Workers during the Period of Construction and Operations Overlap

Receptor Location	1	2	3	4	5	6	7	8	9	10
Direction/distance from release point 1 to receptor location (m)[a]	WSW/ 202	WSW/101	SW/241	SW/173	N/310	NNW/317	NNW/349	N/504	N/515	NNE/533
Atmospheric dispersion factors (s/m^3)	1.18×10^{-4}	2.88×10^{-4}	7.84×10^{-5}	1.34×10^{-4}	5.65×10^{-5}	4.73×10^{-5}	3.93×10^{-5}	2.33×10^{-5}	2.24×10^{-5}	1.80×10^{-5}
Direction/distance from release point 2 to receptor location (m)[a]	W/252	WNW/151	WSW/252	WSW/158	N/389	NNW/414	NNE/410	N/587	NNW/605	NNE/601
Atmospheric dispersion factors (s/m^3)	5.70×10^{-5}	6.32×10^{-5}	8.29×10^{-5}	1.70×10^{-4}	3.76×10^{-5}	2.94×10^{-5}	2.93×10^{-5}	1.76×10^{-5}	1.47×10^{-5}	1.44×10^{-5}

[a] Source: AES, 2009b.

Table 4-18 Worker Population Distribution during the Period of Construction and Operations Overlap

Labor Craft	Plant Area	Craft Hours per Year	Persons
Civil/structural	UF_6 handling	109,174	54
	SBM	269,296	134
	Cylinder pad	24,729	12
Mechanical	UF_6 handling	65,504	32
	SBM	161,577	80
	Cylinder pad	14,837	7
Electrical	UF_6 handling	43,669	22
	SBM	107,718	53
	Cylinder pad	9891	5
Totals	UF_6 handling	218,348	108
	SBM	538,592	267
	Cylinder pad	49,459	24.5

Source: AES, 2009b.

the public receptors evaluated in the radiological impact assessment. The impacts of normal operations at the proposed EFEF to public health would be SMALL.

The most significant impact would be from direct radiation exposure to public receptors close to the storage of full feed, full tails, and empty Cylinder Storage Pads.

For conservatism the dose to the maximally exposed individual was calculated at the proposed northern site boundary since this was the location of both the maximum external and inhalation dose to a receptor. The dose was calculated assuming 2000 hours per year occupancy. The 2000 hours per year was selected as the exposure time assuming a 40-hour work week and that any developments adjacent to the proposed EREF would be commercial resulting in a person occupying the adjacent site part time (approximately 2,000 hours per year rather than a full time (8,760 hours per year). The dose equivalent for this exposure scenario was estimated to be 0.014 millisievert per year (1.4 millirem per year)

The collective population dose for persons living within 80 kilometers (50 miles) of the proposed EREF was estimated to be 1.7×10^{-5} person-sievert (1.7×10^{-3} person-rem). The dominant pathway is inhalation, which comprises approximately 88 percent of the total dose. Due to the large distance between the population and the stored UF_6 cylinders, the entire dose is due to atmospheric releases of uranium compounds during normal operations. Table 4-24 provides the calculated atmospheric dispersion factors (χ/Q) used in the dose calculations for members of the general public.

Table 4-19 Summary of Annual Radiological Impacts Associated with the Construction Workers during the Overlap Period of Construction and Operations at the Proposed EREF

Receptor	Atmospheric Dispersion Factors[a] (s/m^3)	Dose Associated with Air Releases person-Sv (person-rem) or mSv (mrem)	Dose Associated with Direct Radiation from Stored UF_6 Cylinders person-Sv (person-rem) or mSv (mrem)	Total Committed Effective Dose person-Sv (person-rem) or mSv (mrem)
Construction worker Population:				
SBM + UF_6 handling area		1.57×10^{-4} (1.57×10^{-2})	0.136[b] (13.6)	0.136 (13.6)
Storage pad		2.39×10^{-6} (2.39×10^{-4})	0.24[b] 24	0.24 24
Total		1.59×10^{-4} (1.59×10^{-2})	**0.376 (37.6)**	**0.376 (37.6)**
Construction pad worker	5.65×10^{-5} [c]	1.59×10^{-7} [d] (1.59×10^{-5})	1.96[b] (196)	1.96 (196)
Regulatory limit for Individual				0.1[e]: 1[f]: 5[g] (10:100:500)

[a] The atmospheric dispersion factors are provided in Table 4-16.
[b] Source: AES, 2009b.
[c] This represents the maximum atmospheric dispersion factor for the six areas (locations 5-10) that were modeled for the construction pad worker. See Table 4-16.
[d] For airborne releases, the construction worker is assumed to be present in the area yielding the largest inhalation dose.
[e] Source: 10 CFR 20.1101 (applies to airborne releases only).
[f] Source: 10 CFR Part 20, Subpart D.
[g] Source: 10 CFR Part 20, Subpart C.

Table 4-20 Estimated Occupational Annual Exposures for Various Occupations for the Proposed EREF

Position	Annual Dose Equivalent mSv (mrem)
General office staff	<0.05 (<5.0)
Typical operations and maintenance technician	1 (100)
Typical cylinder handler	3 (300)

Source: AES, 2010a.

Table 4-21 Estimated Dose Rates at Various Locations within the Proposed EREF

Position	Dose Rate mSv per hour (mrem per hour)
Plant general area	0.0001 (0.01)
Separation building cascade halls	0.0005 (0.05)
Separation building	0.001 (0.1)
Empty used UF_6 shipping cylinder	
on contact	0.1 (10)
At 1 meter (3.3 feet)	0.01 (1)
Full UF_6 shipping cylinder	
on contact	0.05 (5)
At 1 meter (3.3 feet)	0.002 (0.2)

Source: AES, 2010a.

The dose to the nearest resident was estimated to be 2.12×10^{-6} millisievert per year (2.12×10^{-4} millirem per year). Due to the large distance between the stored UF_6 cylinders and the receptor, only the dose contribution is associated with the airborne release. The dominant pathway is inhalation comprising 94 percent of the total dose. For comparative purposes, this dose is over 470,000 times lower than the 0.1 millisievert per year (10 mrem per year) dose limit for members of the public as codified in 10 CFR 20.1101 for airborne releases.

The dose to a member of the public at the proposed property boundary was estimated to be approximately 0.014 millisievert per year (1.4 millirem per year). Approximately 98.6 percent of the total dose to this individual is due to the external dose of the stored UF_6 cylinders. Since the vast majority of the dose is from external gamma radiation from the UF_6 cylinders, for comparative purposes, this dose is over 70 times lower than the 1 millisievert per year (100 mrem per year) dose limit for members of the public as codified in 10 CFR 20.1301.

Table 4-25 provides a summary of all radiological impacts to members of the general public associated with the proposed EREF. Because of the low doses involved, these impacts would be SMALL.

4.2.10.3 Mitigation Measures

Plant design features such as controls and processes for the proposed EREF have been identified by AES to minimize the gaseous and liquid effluent releases, and to maintain the impacts to workers and the surrounding population below regulatory limits (AES, 2010b). These would include:

- maintain system process pressures that are subatmospheric

- pass process gases through desublimers to solidify as much UF_6 as possible

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Table 4-22 Extrapolated Population Distribution within 80 km (50 miles) of the Proposed EREF

Direction	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.0 km (4-5 mi)	8.0-16 km (5-10 mi)	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)
S	0	0	0	0	0	0	169	20,589	3835	61,264
SSW	0	0	0	0	0	0	49	757	1172	3477
SW	0	0	0	0	0	0	49	55	5	38
WSW	0	0	0	0	0	0	0	33	9	6
W	0	0	0	0	0	0	0	0	10	2142
WNW	0	0	0	0	0	0	0	56	220	562
NW	0	0	0	0	0	0	0	0	0	84
NNW	0	0	0	0	0	0	53	299	58	18
N	0	0	0	0	0	0	921	223	146	70
NNE	0	0	0	0	0	0	290	559	157	831
NE	0	0	0	0	0	3	193	8	1365	4882
ENE	0	0	0	0	0	3	1561	9655	29,946	4229
E	0	0	0	0	0	17	1004	13,654	3436	37
ESE	0	0	0	0	0	14	12,744	68,188	421	0
SE	0	0	0	0	0	0	741	10,303	21	2
SSE	0	0	0	0	0	75	142	6214	78	114

Source: AES, 2010a.

Table 4-23 General Public Receptor Locations for Radiological Impact Assessment

Receptor	Direction from the Source to the Receptor	Distance from Source to Receptor (m)	Time Spent at the Location (hr)
Nearest resident[a]	Northeast	8000	8761
Hypothetical member of the public at the proposed site boundary:[b]			2000
Cylinder pad	North	760	
Atmospheric release	North	1100	

[a] Source: AES, 2010a.
[b] Derived from AES, 2010a.

- pass gaseous effluents through pre-filters, high-efficiency particulate air (HEPA) filters, and activated carbon filters to reduce the radioactivity in the final discharged effluent to very low concentrations

- investigate alternative solvents or apply control technologies for methylene chloride solvent use

- use administrative controls, practices, and procedures to assure compliance with the proposed EREF Health, Safety, and Environmental Program; design the program to ensure safe storage, use, and handling of chemicals to minimize the potential for worker exposure

- monitor all UF_6 process systems by instrumentation that will activate alarms in the Control Room and will either automatically shut down the facility to a safe condition or alert operators to take the appropriate action to prevent release in the event of operational problems

- put in place radiological practices and procedures to ensure compliance with the proposed EREF Radiation Protection Program; design the program to achieve and maintain radiological exposure to levels that are as low as reasonably achievable (ALARA)

- conduct routine facility radiation and radiological surveys to characterize and minimize potential radiological dose/exposure

- monitor all radiation workers by use of dosimeters and area air sampling to ensure that radiological doses remain within regulatory limits and are ALARA

- provide radiation monitors in the gaseous effluent vents to detect and alarm and effect the automatic safe shutdown of process equipment in the event contaminants are detected in the system exhaust; design systems to automatically shut down, switch trains, or rely on operator actions to mitigate the potential release

Table 4-24 Annual Average Atmospheric Dispersion Factors χ/Q (s/m^3) for the General Population

Direction	0-1.6 km (0-1 mi)	1.6-3.2 km (1-2 mi)	3.2-4.8 km (2-3 mi)	4.8-6.4 km (3-4 mi)	6.4-8.0 km (4-5 mi)	8.0-16 km (5-10 mi)	16-32 km (10-20 mi)	32-48 km (20-30 mi)	48-64 km (30-40 mi)	64-80 km (40-50 mi)
S	3.86×10^{-7}	1.92×10^{-7}	1.11×10^{-7}	7.54×10^{-8}	5.58×10^{-8}	3.02×10^{-8}	1.26×10^{-8}	6.60×10^{-9}	3.98×10^{-9}	2.53×10^{-9}
SSW	6.11×10^{-7}	2.90×10^{-7}	1.65×10^{-7}	1.12×10^{-7}	8.24×10^{-8}	4.48×10^{-8}	1.88×10^{-8}	1.00×10^{-8}	6.15×10^{-9}	4.00×10^{-9}
SW	4.85×10^{-7}	2.64×10^{-7}	1.60×10^{-7}	1.12×10^{-7}	8.50×10^{-8}	4.88×10^{-8}	2.15×10^{-8}	1.18×10^{-8}	7.42×10^{-9}	4.90×10^{-9}
WSW	2.05×10^{-7}	1.61×10^{-7}	1.08×10^{-7}	7.90×10^{-8}	6.26×10^{-8}	3.89×10^{-8}	1.81×10^{-8}	1.03×10^{-8}	6.59×10^{-9}	4.39×10^{-9}
W	1.16×10^{-7}	9.11×10^{-8}	6.14×10^{-8}	4.53×10^{-8}	3.63×10^{-8}	2.31×10^{-8}	1.07×10^{-8}	6.04×10^{-9}	3.79×10^{-9}	2.47×10^{-9}
WNW	8.35×10^{-8}	6.31×10^{-8}	4.16×10^{-8}	3.01×10^{-8}	2.35×10^{-8}	1.42×10^{-8}	6.22×10^{-9}	3.39×10^{-9}	2.04×10^{-9}	1.26×10^{-9}
NW	8.15×10^{-8}	6.59×10^{-8}	4.40×10^{-8}	3.19×10^{-8}	2.49×10^{-8}	1.50×10^{-8}	6.56×10^{-9}	3.60×10^{-9}	2.19×10^{-9}	1.37×10^{-9}
NNW	1.66×10^{-7}	1.38×10^{-7}	9.41×10^{-8}	6.93×10^{-8}	5.51×10^{-8}	3.42×10^{-8}	1.60×10^{-8}	9.21×10^{-9}	6.00×10^{-9}	4.09×10^{-9}
N	2.88×10^{-7}	2.06×10^{-7}	1.36×10^{-7}	9.82×10^{-8}	7.67×10^{-8}	4.61×10^{-8}	2.10×10^{-8}	1.19×10^{-8}	7.60×10^{-9}	5.08×10^{-9}
NNE	5.19×10^{-7}	2.75×10^{-7}	1.66×10^{-7}	1.16×10^{-7}	8.77×10^{-8}	5.03×10^{-8}	2.25×10^{-8}	1.26×10^{-8}	8.15×10^{-9}	5.59×10^{-9}
NE	6.45×10^{-7}	2.79×10^{-7}	1.58×10^{-7}	1.07×10^{-7}	7.89×10^{-8}	4.32×10^{-8}	1.87×10^{-8}	1.02×10^{-8}	6.52×10^{-9}	4.47×10^{-9}
ENE	4.24×10^{-7}	1.79×10^{-7}	9.87×10^{-8}	6.55×10^{-8}	4.79×10^{-8}	2.55×10^{-8}	1.06×10^{-8}	5.61×10^{-9}	3.47×10^{-9}	2.30×10^{-9}
E	2.29×10^{-7}	9.78×10^{-8}	5.49×10^{-8}	3.67×10^{-8}	2.68×10^{-8}	1.42×10^{-8}	5.67×10^{-9}	2.91×10^{-9}	1.72×10^{-9}	1.07×10^{-9}
ESE	2.31×10^{-7}	9.89×10^{-8}	5.58×10^{-8}	3.72×10^{-8}	2.72×10^{-8}	1.43×10^{-8}	5.61×10^{-9}	2.84×10^{-9}	1.65×10^{-9}	1.00×10^{-9}
SE	2.69×10^{-7}	1.14×10^{-7}	6.31×10^{-8}	4.18×10^{-8}	3.04×10^{-8}	1.59×10^{-8}	6.29×10^{-9}	3.20×10^{-9}	1.87×10^{-9}	1.15×10^{-9}
SSE	3.18×10^{-7}	1.49×10^{-7}	8.45×10^{-8}	5.67×10^{-8}	4.16×10^{-8}	2.22×10^{-8}	8.98×10^{-9}	4.64×10^{-9}	2.75×10^{-9}	1.72×10^{-9}

Table 4-25 Summary of Radiological Impacts for Members of the Public Associated with the Proposed EREF

Receptor	Atmospheric Dispersion Factors (s/m^3)	Dose Associated with Air Releases person-Sv (person-rem) or mSv (mrem)	Dose Associated with Direct Radiation from Stored UF_6 Cylinders person-Sv (person-rem) or mSv (mrem)	Total Committed Effective Dose person-Sv (person-rem) or mSv (mrem)
General population	See Table 4-24	1.74×10^{-5} (1.74×10^{-3})	~ 0	1.74×10^{-5} (1.74×10^{-3})
Nearest resident	1.26×10^{-7}	2.12×10^{-6} (2.12×10^{-4})	~0	2.12×10^{-6} (2.12×10^{-4})
Hypothetical member of the public at the proposed site boundary	5.39×10^{-6}	1.94×10^{-5} (1.94×10^{-3})	0.014[a] (1.4)	0.014 (1.4)
Regulatory limit for individual[b]				0.1[c]:1 (10:100)

[a] Source: AES, 2010a.
[b] Source: 10 CFR Part 20, Subpart D.
[c] Source: 10 CFR 20.1101 (applies to airborne releases only).

- design the proposed facility to delay and reduce UF_6 releases inside the buildings in a potential fire incident from reaching the outside environment, including automatic shutoff of room HVAC systems during a fire event

- move UF_6 cylinders only when cool and when UF_6 is in solid form, to minimize the risk of inadvertent release due to mishandling

- separate uranic compounds and various other heavy metals in waste material generated by decontamination of equipment and systems

- use liquid and solid waste handling systems and techniques to control wastes and effluent concentrations

- route process liquid waste to collection tanks and treat through a combination of precipitation, evaporation, and ion exchange to remove most of the radioactive material prior to a final evaporation step to preclude any liquid effluent release from the proposed facility

- to further mitigate radiation dose, implement an ALARA program in addition to routine radiological surveys and personnel monitoring

The NRC identified the following additional mitigation measure:

- store “empty” cylinders with heels in the middle of a storage pad between full tail cylinders to reduce external exposure to workers

4.2.11 Waste Management Impacts

This section describes the analysis and evaluation of the potential impacts of the solid, hazardous, and radioactive waste management program at the proposed EREF, and includes impacts resulting from temporary storage, conversion, and disposal of depleted UF_6. The impacts of gaseous effluent and wastewater releases are addressed in Sections 4.2.4, 4.2.6, and 4.2.10 of this EIS. Waste management impacts (not including depleted UF_6) would be SMALL due to the low volumes of waste generated by the proposed facility in comparison to the availability of disposal options and capacity for the various waste streams. Impacts from the conversion of depleted UF_6 from the proposed EREF at an offsite location would be SMALL.

Due to the nature, design, and operation of a gas centrifuge enrichment facility, the generation of waste materials can be categorized by three distinct facility operations: (1) preconstruction and construction, which generates typical construction wastes associated with an industrial facility; (2) enrichment process operations, which generate gaseous, liquid, and solid waste streams; and (3) generation and temporary storage of depleted UF_6. Section 4.2.16 of this chapter discusses decommissioning wastes. Waste materials include low-level radioactive waste (i.e., depleted UF_6 and material contaminated with UF_6), designated hazardous materials (as defined in 40 CFR Part 261), mixed (radioactive and hazardous), and nonhazardous materials (any other wastes not identified as radioactive or hazardous). Hazardous materials include any fluids, equipment, and piping contaminated as defined in 40 CFR Part 261 that would be generated due to preconstruction, construction, operation, and maintenance activities.

The handling and disposal of waste materials are governed by various Federal and State regulations. The proposed EREF waste management program is intended to minimize the generation of waste through reduction, reuse, or recycling, and includes systems for the collection, removal, and proper disposal of waste materials (AES, 2010a). This program would assist in identifying process changes that can be made to reduce or eliminate mixed wastes, methods to minimize the volume of regulated wastes through segregation of materials, and the substitution of nonhazardous materials as required under *Resource Conservation and Recovery Act* (RCRA) regulations.

4.2.11.1 Preconstruction and Construction

<u>Nonhazardous/Nonradioactive Solid Wastes</u>

Solid nonhazardous wastes generated during preconstruction and construction would be very similar to wastes generated from the construction sites of other industrial facilities. These wastes would be transported offsite to an approved local landfill (AES, 2010a).

Approximately 6116 cubic meters (8000 cubic yards) per year of noncompacted packing material, paper, and scrap lumber would be generated (AES, 2010a), based largely on projections for the National Enrichment Facility (NEF) in Lea County, New Mexico (LES, 2005). In addition, there would also be scrap structural steel, piping, and sheet metal that would not be expected to pose significant impacts on the surrounding environment because most could be recycled or directly placed in an offsite landfill.

Nonhazardous construction wastes would likely be transported to the Bonneville County Hatch Pit for disposal (AES, 2010a). The Hatch Pit is a former gravel mining site that is being reclaimed as a landfill. Upon opening in 1999, it was expected to reach capacity within 15 years (Bonneville County, 2006). Preconstruction and major construction activities at the proposed EREF site would begin in 2010 and last for approximately 8 years. Therefore, the Hatch Pit may reach capacity and stop accepting waste during construction of the proposed EREF, requiring the identification of an alternate disposal location for construction wastes in Bonneville County or a nearby county. Although detailed information on current waste acceptance rates are not available, the Bonneville Country Public Works Department has confirmed that a new construction and demolition waste disposal site will be permitted when the Hatch Pit nears capacity (Bonneville County, 2009).

Impacts from nonhazardous solid waste generation during preconstruction and construction would be SMALL due to the available current or future capacity at nearby disposal facilities.

Hazardous Wastes

Hazardous wastes (e.g., waste oil, greases, excess paints, and other chemicals) generated during preconstruction and facility construction (e.g., due to the maintenance of construction equipment and vehicles, painting, and cleaning) would be packaged and shipped offsite to a licensed TSDF in accordance with Federal and State environmental and occupational regulations (AES, 2010a). The local TSDF is the U.S. Ecology facility near Grandview, Idaho, which is permitted to receive at least 4.5 million cubic meters (5.9 million cubic yards) of hazardous waste (AES, 2010a). Table 4-26 shows the hazardous wastes that would be expected from preconstruction and construction of the proposed EREF, which are based largely on projections for the NEF in Lea County, New Mexico (LES, 2005). This quantity of hazardous waste totals approximately 26 tons and represents less than 0.005 percent of the hazardous waste received by the U.S. Ecology facility in 2009 (IDEQ, 2010). The quantity of hazardous waste generated during preconstruction and construction would result in SMALL impacts due to the available capacity.

Table 4-26 Hazardous Waste Types and Quantities Expected during Preconstruction and Facility Construction

Waste Type	Annual Quantity
Paints, solvents, thinners, organics	11,360 liters (3000 gallons)
Petroleum products, oils, lubricants	11,360 liters (3000 gallons)
Sulfuric acid (battery)	379 liters (100 gallons)
Adhesives, resins, sealers, caulking	910 kilograms (2000 pounds)
Lead (batteries)	91 kilograms (200 pounds)
Pesticides	379 liters (100 gallons)

Source: AES, 2010a.

Stormwater

As discussed in Section 4.2.6 (Water Resources Impacts), stormwater runoff during preconstruction and construction would be collected in a stormwater detention basin that would allow the water to evaporate or infiltrate the ground surface (with allowance for overflow runoff to downgradient terrain).

Due to the types of activities performed and the types of wastes generated during preconstruction and construction, the relative contributions to waste impacts are estimated to be 10 percent for preconstruction and 90 percent for construction.

4.2.11.2 Facility Operation

Gaseous effluents, liquid effluents, and solid wastes containing nonhazardous/nonradioactive, hazardous, and/or radioactive, and/or mixed waste materials would be generated onsite during normal operation of the proposed EREF. Appropriate treatment systems would be established to control releases or collect hazardous materials for onsite treatment or shipment offsite (AES, 2010a). Waste generation would be minimized, liquid wastes would be treated onsite, and solid wastes would be appropriately packaged and shipped offsite for further processing or final disposition (AES, 2010a). The impacts from gaseous and liquid effluents are described in Sections 4.2.4, 4.2.6, and 4.2.10. This section presents the onsite and offsite impacts from the management of solid and liquid wastes.

Solid Wastes

The operation of the proposed EREF would generate approximately 75,369 kilograms (165,812 pounds) of solid nonradioactive waste annually, including approximately 5062 kilograms (11,136 pounds) of hazardous wastes (AES, 2010a). Approximately 146,500 kilograms (322,300 pounds) of radiological and mixed waste would be generated annually, of which approximately 100 kilograms (220 pounds) would be mixed waste (AES, 2010a). The types and quantities of radioactive and mixed waste are shown in Table 4-27.

Solid wastes generated during operations would be segregated and processed based on whether the material could be classified as wet solid or dry solid wastes and segregated into industrial (nonhazardous/nonradioactive), radioactive, hazardous, or mixed-waste categories.

Radioactive solid wastes would be Class A low-level radioactive wastes as defined in 10 CFR Part 61, packaged per DOT standards, and shipped to a licensed commercial low-level radioactive waste disposal facility or for further processing for volume reduction (AES, 2010a). Wet solid radioactive waste would include uranic waste precipitate from the liquid waste treatment process (AES, 2010a) (see Section 4.2.6). In its most recent analysis of low-level radioactive waste disposal capacity, the U.S. Government Accountability Office (GAO) concluded that the availability of disposal capacity in the United States for Class A low-level radioactive waste is not considered to be a problem for the short or long term (GAO, 2004, 2007). Therefore, the impact of low-level radioactive waste generation would be SMALL on disposal facilities. Management of depleted UF_6 is discussed later in this section.

Table 4-27 Radiological and Mixed Waste Types and Quantities Expected during Facility Operation

Waste Type	Annual Quantity kg (lb)	Uranium Content kg (lb)
Activated carbon	600 (1323)	50 (110)
Activated alumina	4320 (9524)	4.4 (9.7)
Perfluoropolyether oil	2054 (4528)	10 (22)
Liquid waste treatment sludge[a]	2086 (4599)	114 (251)[b]
Activated sodium fluoride[c]	–	–
Assorted materials (paper, clothing, etc.)	4200 (9262)	60 (132)
Ventilation filters	92,196 (203,259)	11 (24)
Non-metallic components	10,000 (22,050)	Trace[d]
Miscellaneous mixed wastes (organic compounds)[e]	100 (220)	4 (8.8)
Combustible waste	7000 (15,436)	Trace[d]
Scrap metal	24,000 (52,920)	Trace[d]

[a] Sludge and evaporator concentrates.
[b] Value is composed of uranium in the citric acid and degreaser tanks, precipitated aqueous solutions, uranium in precipitated laboratory/miscellaneous effluents, and uranium in sludge from the citric acid and degreaser tanks.
[c] No wastes are produced on an annual basis. Sodium fluoride traps are not expected to saturate over the life of the plant.
[d] Not detectable above naturally occurring background concentrations.
[e] Representative organic compounds consist of acetone, toluene, ethanol, and petroleum ether.
Source: AES, 2010a.

As described in Sections 2.1.4.2 and 4.2.4.3, gaseous effluent from the GEVSs would pass through a pre-filter (to capture dust and other particulates), two sets of HEPA filters (to capture uranium particulates and aerosols), and an activated carbon filter (to capture HF). Similar filters would be used in the Centrifuge Test and Postmortem Facilities Exhaust Filtration System. After loaded filters are removed from service, they would be bagged to prevent the spread of contamination, sampled for ^{235}U content, and packaged for storage and eventual shipment to a volume reduction facility or low-level waste disposal facility (AES, 2010a).

Hazardous wastes (e.g., solvents, hydrocarbon sludge, chemicals, and empty hazardous material containers) generated at the proposed EREF would be collected at the point of generation, classified, packaged, and shipped offsite to a licensed TSDF in accordance with Federal and State environmental and occupational regulations. Hazardous wastes would not be treated, stored, or disposed of at the proposed EREF in a manner that requires a RCRA permit (AES, 2010a). The annual quantity of hazardous waste that would be generated by the proposed EREF represents approximately 0.001 percent of the hazardous waste received by the U.S. Ecology facility in 2009 (IDEQ, 2010). EPA and Idaho regulations, including the Idaho

Standards for Hazardous Waste (IAC, 2008), would guide the management of hazardous wastes (AES, 2010a).

Mixed wastes that can be processed to meet land disposal requirements would be treated, packaged per DOT requirements, and shipped to a licensed commercial low-level radioactive waste disposal facility (AES, 2010a). Other mixed wastes would be collected, packaged per DOT standards, and shipped to a licensed commercial TSDF (such as the EnergySolutions facilities in Clive, Utah or Oak Ridge, Tennessee). Mixed wastes would not be treated, stored, or disposed of at the proposed EREF in a manner that requires a RCRA permit (AES, 2010a). Due to the small quantity of mixed waste that would be generated, the impact of mixed waste generation would be SMALL on disposal facilities.

The annual volume of industrial wastes generated at the proposed EREF would require approximately 181 shipments per year to a local landfill for disposal (AES, 2010a). The Peterson Hill Landfill is Bonneville County's sole municipal landfill, accepting between 58,960 and 68,040 metric tons (65,000 and 75,000 tons) of waste annually. Based on current waste generation rates and service population, Bonneville County expects the landfill to have a lifetime of 130 years, which would adequately encompass the operating lifetime of the proposed EREF (AES, 2010a; Bonneville County, 2009). Based on the estimate of waste accepted by the landfill in 2007, industrial solid waste generation from operation of the proposed EREF would increase the volume of wastes impounded at the landfill by less than 0.1 percent. Based on the quantities of solid wastes generated, the application of industry-accepted procedures, and the availability of capacity at regional disposal facilities, the impacts from solid wastes generated during operation would be SMALL.

Liquid Wastes

As noted in Section 4.2.6.2, there would be no discharge of liquid effluents to surface water or groundwater during facility operation, and water quality impacts from facility operations are expected to be SMALL.

Liquid waste streams from facility operations would be processed by the Liquid Effluent Collection and Treatment System and would include laboratory effluent, degreaser water, citric acid, floor washings, miscellaneous condensates, and emergency hand washing and shower water from radiation areas. Most of these waste streams would be collected in the Miscellaneous Effluent Collection Tank, and some wastes (such as floor washings) would be sampled for uranic content prior to collection in the tank. Waste in this tank would be sampled for uranic content, treated by filtration and precipitation (if necessary), and vaporized in the Liquid Effluent Treatment System Evaporator to produce a chemically decontaminated gaseous effluent (see Section 4.2.10.2) (AES, 2010a).

Effluents containing uranium would be treated with potassium hydroxide to precipitate uranium and other precipitating agents (such as lime) to precipitate fluoride. Treated effluents would be sampled for uranium and fluoride content, and microfiltration and precipitation cycles would be repeated, as necessary. Uranium precipitate and calcium fluoride sludge would be removed by filtration and disposed of as low-level radioactive waste. Effluents meeting regulatory release levels for uranium and fluorine would be sent to the Liquid Effluent Treatment System

Evaporator. A small volume of liquid evaporator concentrate would be periodically removed, analyzed for uranium content, and disposed of as low-level radioactive waste (AES, 2010a).

The proposed EREF would not be connected to a publicly operated treatment works (POTW). All domestic sanitary sewage would be treated onsite to comply with 10 CFR 20.2003 and collected in the cylinder storage pad stormwater retention basins for evaporation to the atmosphere (AES, 2010a).

Stormwater runoff during facility operations would be collected in a Site Stormwater Detention Basin that would allow the water to evaporate or infiltrate the ground surface (with allowance for overflow runoff to downgradient terrain). Because this basin would only receive runoff from paved surfaces (not including the Cylinder Storage Pads), building roofs, and landscaped areas, no uranic content would be expected. Stormwater runoff from the Cylinder Storage Pads would be collected in two lined Cylinder Storage Pads Stormwater Retention Basins and allowed to evaporate. Because these basins would not receive process-related effluents, the only potential sources of radiological contamination would be residual contamination on the exterior of a cylinder or the accidental release of UF_6 from a leaking cylinder or handling accident. Therefore, no significant releases of uranic material to these basins would be expected (AES, 2010a). Although all three basins would not receive process-related effluents and would not be expected to contain uranium or hazardous constituents from other sources, stormwater and sediment from all three basins would be sampled quarterly as a part of the site environmental measurement and monitoring program (as described in Chapter 6).

Depleted UF_6 Waste Management

The proposed EREF is expected to generate 1222 cylinders of depleted UF_6 annually (AES, 2010a). As discussed in Section 2.1.3 of this EIS, until a conversion facility is available, depleted UF_6-filled Type 48Y cylinders would be temporarily stored on an outdoor Cylinder Storage Pad. Storage of depleted UF_6 cylinders at the proposed EREF would occur for the duration of the facility's 30-year operating lifetime and before final removal of depleted UF_6 from the proposed EREF site (AES, 2010a). However, AES has stated that depleted UF_6 cylinders would not be stored at the proposed EREF site beyond the facility's licensed lifetime (AES, 2010a).

The proposed EREF's Full Tails Cylinder Storage Pads are currently designed to accommodate up to 33,638 depleted UF_6 cylinders (AES, 2010a), which provide storage capacity for the expected lifetime generation of the facility in the event that a DOE conversion facility should be unavailable or delayed.

Temporary Depleted UF_6 Storage Impacts

Proper and active depleted UF_6 cylinder management, which includes routine inspections and maintaining the anticorrosion layer on the cylinder surface, has been shown to limit exterior corrosion or mechanical damage necessary for safe storage (DNFSB, 1995a,b, 1999). DOE has stored depleted UF_6 in Type 48Y or similar cylinders at the Paducah and Portsmouth Gaseous Diffusion Plants and the East Tennessee Technical Park in Oak Ridge, Tennessee, since the mid-1950s, and cylinder leaks due to corrosion led DOE to implement a cylinder management program (Biwer et al., 2001). Past evaluations and monitoring by the Defense

Nuclear Facility Safety Board (DNFSB) of DOE's cylinder maintenance program confirmed that DOE met all of the commitments in its cylinder maintenance implementation plan, particularly through the use of a systems engineering process to develop a workable and technically justifiable cylinder management program (DNFSB, 1999). AES intends to implement a similar cylinder management program at the proposed EREF (AES, 2010a), as a properly implemented cylinder maintenance program would assure the integrity of the depleted UF_6 cylinders for temporary onsite storage of depleted UF_6 on the Cylinder Storage Pads.

The principal impacts from temporary storage of depleted UF_6 would be the radiological exposure from an increasing quantity of depleted UF_6 temporarily stored in cylinders on the Full Tails Cylinder Storage Pad (up to the design capacity of 33,638 cylinders at the end of the facility's operating lifetime) under normal conditions and the potential release (slow or rapid) of depleted UF_6 from the depleted UF_6 cylinders due to an off-normal event or accidents (operational, external, or natural hazard phenomena events). These radiation exposure pathways are analyzed in Section 4.2.10, and based on these results, the impacts from temporary storage of depleted UF_6 would be SMALL. The annual impacts from temporary storage would continue until the depleted UF_6 cylinders are removed from the proposed EREF site.

Offsite Disposal Impacts

For the offsite disposal of the depleted UF_6, AES has proposed that the Type 48Y cylinders would be transported to either of the DOE's conversion facilities at Paducah, Kentucky, or Portsmouth, Ohio, for conversion to triuranium octaoxide (U_3O_8) (AES, 2010a). Following conversion, the U_3O_8 would be stored for potential future use or transported to a licensed disposal facility (DOE, 2004a,b). The transportation of the Type 48Y cylinders from the proposed EREF to either of the conversion facilities would have environmental impacts that are included in the transportation analysis presented in Section 4.2.9.2.

If the DOE conversion facility could not immediately process the depleted UF_6 cylinders upon arrival, potential impacts would include radiological impacts proportional to the time of temporary storage at the conversion facility. DOE has previously assessed the impacts of depleted UF_6 cylinder storage during the operation of a depleted UF_6 conversion facility (DOE, 2004a,b), which bounds the impacts of temporary storage of EREF-originated depleted UF_6 cylinders at the conversion facility site. At the Paducah and Portsmouth conversion facilities, the maximum collective dose to workers (i.e., workers at the cylinder yards) would be 0.055 person-sieverts (5.5 person-rem) per year and 0.03 person-sievert (3 person-rem) per year, respectively considering the existing stored inventories of depleted UF_6 (DOE, 2004a,b). There would be negligible exposure to noninvolved workers or the public due to their distance from the cylinder yards and because air emissions from the cylinder preparation and maintenance activities would be negligible (DOE, 2004a,b).

The Paducah conversion facility would operate for approximately 25 years to process the 436,400 metric tons (481,000 tons) that were in storage prior to anticipated startup of the conversion facility in 2006 (DOE, 2004a). Similarly, the Portsmouth conversion facility would operate for 18 years to process 243,000 metric tons (268,000 tons) (DOE, 2004b). The projected lifetime production of depleted UF_6 by the proposed EREF (321,235 metric tons [354,101 tons]) would represent approximately 74 percent and 132 percent of the initial

Paducah and Portsmouth inventories, respectively. The proposed EREF would produce (and provide for conversion) approximately 7635 metric tons (8418 tons) of depleted UF_6 per year at full production capacity (AES, 2010a), which represents approximately 47 percent of the annual conversion capacity of the Paducah facility (18,000 metric tons [20,000 tons]) and approximately 62 percent of the annual conversion capacity of the Portsmouth facility (13,500 metric tons [15,000 tons]). The proposed EREF's projected lifetime production of depleted UF_6 inventory, if processed by either the Paducah or Portsmouth conversion facility, could extend the potential duration of conversion facility operation by approximately 18 years or 24 years, respectively.

With routine facility and equipment maintenance, and periodic equipment replacements or upgrades, DOE indicated that the Paducah and Portsmouth conversion facilities could be operated safely beyond their proposed operational lifetimes to process the depleted UF_6 such as that originating at the proposed EREF (DOE, 2004a,b). In addition, DOE indicated the estimated impacts that would occur from prior conversion facility operations would remain the same when processing depleted UF_6 such as the proposed EREF wastes (DOE, 2004a,b). The overall cumulative impacts from the operation of a DOE conversion facility would increase proportionately with the increased life of the facility (DOE, 2004a,b).

Additional conversion processing capacity could also be achieved through increased efficiency of the Paducah and Portsmouth conversion plants and the possibility of a commercial conversion plant being constructed. International Isotopes, Inc. submitted a license application to the NRC on December 31, 2009, to construct and operate a depleted UF_6 conversion facility near Hobbs, New Mexico (the NRC staff is currently conducting environmental and safety reviews of the application) (NRC, 2010d).

To meet the increased demand for enriched uranium, as discussed in Section 1.3.1, three other uranium enrichment facilities are planned or under construction. These facilities would also generate depleted UF_6, in addition to the currently operating gaseous diffusion enrichment plant at Paducah, that would also require conversion and disposal. Should all of the facilities become operational, extended storage times for the depleted UF_6 cylinders at conversion facilities may be necessary and could result in the need for an additional conversion facility.

The above assumptions and data indicate that environmental impacts from the conversion of depleted UF_6 from the proposed EREF at an offsite location such as Portsmouth or Paducah would be SMALL.

The impacts from transportation of U_3O_8 (from the conversion of depleted UF_6) to potential disposal sites have been previously evaluated for the depleted UF_6 stored at the Paducah and Portsmouth sites (DOE, 2004a,b). Transportation impacts relating to the shipment of EREF-originated U_3O_8 from the DOE conversion facilities to a potential disposal site would be SMALL.

4.2.11.3 Mitigation Measures

Measures identified by AES to mitigate waste management impacts during preconstruction activities, construction, and facility operation include (AES, 2010a):

- develop a construction phase recycling program

- design system features to minimize the generation of solid waste, liquid waste, and gaseous effluent (gaseous effluent design features are described above under Public and Occupational Health)

- store waste in designated areas of the facility until an administrative limit is reached, then ship offsite to a licensed disposal facility; no disposal of waste onsite

- dispose of all radioactive and mixed wastes at offsite licensed facilities

- maintain a cylinder management program to monitor storage conditions on the Full Tails Cylinder Storage Pads, to monitor cylinder integrity by conducting routine inspections for breaches and to perform cylinder maintenance and repairs as needed

- store all tails cylinders filled with depleted UF_6 on saddles of concrete, or other suitable material, that do not cause corrosion of the cylinders; place saddles on a concrete pad

- segregate the storage pad areas from the rest of the enrichment facility by barriers, such as vehicle guard rails

- double-stack depleted uranium tails cylinders on the storage pad, arrayed to permit easy visual inspection of all cylinders

- survey depleted uranium tails cylinders for external contamination (wipe test) prior to being placed on a Full Tails Cylinder Storage Pad or transported offsite

- fit depleted uranium tails cylinder valves with valve guards to protect the cylinder valves during transfer and storage

- make provisions to ensure that depleted uranium tails cylinders will not have defective valves (identified in NRC Bulletin 2003-03, "Potentially Defective 1-inch Valves for Uranium Hexafluoride Cylinders") (NRC, 2003c) installed

- perform touch-up application of paint coating on depleted uranium tails cylinders if coating damage is discovered during inspection (UF_6 cylinder manufacturing will include abrasive blasting and coating with anticorrosion primer/paint, as required by specification)

- allow only designated vehicles, operated by trained and qualified personnel, on the Full Tails Cylinder Storage Pads, Full Feed Cylinder Storage Pads, Full Product Cylinder Storage Pad, and the Empty Cylinder Storage Pad (refer to the Integrated Safety Analysis [ISA] Summary, Section 3.8, for controls associated with vehicle fires on or near the Cylinder Storage Pads)

- inspect depleted uranium tails cylinders for damage prior to placing a filled cylinder on a storage pad. Annually reinspect depleted uranium tails cylinders for damage or surface coating defects. These inspections will verify that:
  - lifting points are free from distortion and cracking
  - cylinder skirts and stiffener rings are free from distortion and cracking
  - cylinder surfaces are free from bulges, dents, gouges, cracks, or significant corrosion

  - cylinder valves are fitted with the correct protector and cap
  - cylinders are inspected to confirm that the valve is straight and not distorted, two to six threads are visible, and the square head of the valve stem is undamaged
  - cylinder plugs are undamaged and not leaking

- if inspection of a depleted uranium tails cylinder reveals significant deterioration or other conditions that may affect the safe use of the cylinder, transfer the contents of the affected cylinder to another cylinder in good condition and discard the defective cylinder; determine the root cause of any significant deterioration and, if necessary, make additional inspections of cylinders

- make available onsite proper documentation on the status of each depleted uranium tails cylinder, including content and inspection dates

- use the lined Cylinder Storage Pads Stormwater Retention Basins to capture stormwater runoff from the Full Tails Cylinder Storage Pads

- minimize power usage by efficient design of lighting systems, selection of high-efficiency motors, and use of proper insulation materials

- control process effluents by means of the following liquid and solid waste handling systems and techniques:
  - follow careful application of basic principles for waste handling in all of the systems and processes
  - collect different waste types in separate containers to minimize contamination of one waste type with another; carefully package materials that can cause airborne contamination; provide ventilation and filtration of the air in the area as necessary; confine liquid wastes to piping, tanks, and other containers; use curbing, pits, and sumps to collect and contain leaks and spills
  - store hazardous wastes in designated areas in carefully labeled containers; also contain and store mixed wastes separately
  - neutralize strong acids and caustics before they enter an effluent stream
  - decontaminate and/or reuse radioactively contaminated wastes to reduce waste volume as far as possible
  - reduce the volume of collected waste such as trash, compressible dry waste, scrap metals, and other candidate wastes at a centralized waste processing facility
  - include administrative procedures and practices in waste management systems that provide for the collection, temporary storage, processing, and disposal of categorized solid waste in accordance with regulatory requirements
  - design handling and treatment processes to limit wastes and effluent; perform sampling and monitoring to assure that plant administrative and regulatory limits will not be exceeded
  - monitor gaseous effluent for HF and radioactive contamination before release
  - sample and/or monitor liquid wastes in liquid waste treatment systems
  - sample and/or monitor solid wastes prior to offsite treatment and disposal
  - return process system samples to their source, where feasible, to minimize input to waste streams

- implement a spill control program for accidental oil spills; prepare a Spill Prevention Control and Countermeasure (SPCC) Plan prior to the start of operation of the facility or prior to the storage of oil on the proposed site in excess of *de minimis* quantities, which will contain the following information:
  – identification of potential significant sources of spills and a prediction of the direction and quantity of flow that will likely result from a spill from each source
  – identification of the use of containment or diversionary structures such as dikes, berms, culverts, booms, sumps, and diversion ponds, at the facility to control discharged oil
  – procedures for inspection of potential sources of spills and spill containment/diversion structures
  – assigned responsibilities for implementing the plan, inspections, and reporting
  – as part of the SPCC Plan, other measures will include control of drainage of rain water from diked areas, containment of oil and diesel fuel in bulk storage tanks, aboveground tank integrity testing, and oil and diesel fuel transfer operational safeguards

- implement a nonhazardous materials waste recycling plan during operation; perform a waste assessment to identify waste reduction opportunities and to determine which materials will be recycled; contact brokers and haulers to find an end-market for the materials; perform employee training on the recycling program so that employees will know which materials are to be recycled; purchase and clearly label recycling bins and containers; periodically evaluate the recycling program (i.e., waste management expenses and savings, recycling and disposal quantities) and report the results to the employees

4.2.12 Socioeconomic Impacts

This section provides an analysis of the socioeconomic impacts associated with preconstruction, construction, and operation of the proposed EREF. Wage and salary spending and expenditures associated with materials, equipment, and supplies would produce income and employment and local and State tax revenue, while the migration of workers and their families into the area would affect housing availability, area community services such as schools, education, and law enforcement, and the availability and cost of public utilities such as electricity, water, sanitary services, and roads. The economic impacts of the proposed EREF project are evaluated for an 11-county region of influence (ROI) in Idaho – including Bannock, Bingham, Blaine, Bonneville, Butte, Caribou, Clark, Fremont, Jefferson, Madison, and Power Counties – which encompasses the area that is expected to be the primary source of labor for each phase of the proposed project and where workers employed during preconstruction, construction, and operation of the proposed EREF are expected to live and spend most of their salary. The 11-county ROI is also the area in which a significant portion of site purchase and non-payroll expenditures are expected to occur. The majority of the economic impacts of the proposed facility are expected to occur in two of these counties, Bingham and Bonneville. It is anticipated that a number of workers will move into the area during each phase of the proposed project, with the majority of the demographic and social impacts likely to occur in Bingham and Bonneville Counties. The impacts of the proposed EREF on population, housing, and community services are assessed for a two-county ROI, consisting of Bingham and Bonneville Counties. The impacts of preconstruction, construction, and facility operation would be SMALL.

4.2.12.1 Methodology

This analysis of socioeconomic impacts includes impacts on employment, income, State tax revenues, population, housing, and community and social services.

Employment impacts are evaluated by estimating the level of direct and indirect employment associated with the proposed facility. Direct employment is created by preconstruction and construction activities and facility operations, while indirect employment is created in the 11-county ROI to support the needs of the workers directly employed by the proposed EREF and jobs created to support site purchase and non-payroll expenditures. The number of direct jobs created in each stage is estimated based on anticipated labor inputs for various engineering and construction activities. Indirect employment is estimated using economic multipliers from the RIMS-II input-output model, developed by the U.S. Bureau for Economic Analysis (BEA, 2010), which accounts for inter-industry relationships within regions.

State income tax revenue impacts are estimated by applying State income tax rates to project-related construction and operations earnings. State and local sales tax revenues are estimated by applying appropriate State and local sales tax rates to after-tax income generated by construction and operations employees, spent within the 11-county ROI. Impacts on population characteristics are evaluated by estimating the fraction of direct and indirect jobs that would be filled by in-migrating workers from outside the two-county ROI. The average family size and age profiles of in-migrating families are estimated using appropriate demographic assumptions based on U.S. Census Bureau statistics. Impacts on area housing resources are estimated by comparing rental and owner-occupied vacancy statistics with estimated population in-migration into the two-county ROI during the preconstruction, construction, and operations phases of the proposed project.

Impacts on community and social services are assessed by estimating the number of additional local community service employees that would be required to maintain existing levels of service of education, law enforcement, and fire services, given the number of in-migrating workers expected into the two-county ROI during the various phases of the proposed project. Although Bingham and Bonneville Counties are expected to be the primary sources of labor for the proposed EREF, some labor in-migration is expected during each phase of the proposed project. The number of in-migrating workers used in the analysis was assumed to be small, with the majority of craft skills available in the two-county ROI. Sixty-five percent of in-migrating workers were assumed to be accompanied by their families, which would consist of an additional adult and one school-age child (AES, 2010a).

There are large differences between the indirect (offsite) impact of the proposed EREF during the operations phase and during other phases of the proposed project. These differences are due to the relatively minor role in the economy of the 11-county ROI of suppliers of capital equipment, materials, and services provided to the proposed project during construction, compared to other phases of the proposed project, particularly operations (AES, 2010a).

As no detailed data on the preconstruction share of total construction employment or total construction expenditures were available for the proposed EREF, payroll expenditure data provided for the proposed Global Laser Enrichment, (GLE) Facility in North Carolina (GLE, 2009) were used as a basis for estimating the impacts of preconstruction and construction activities for the proposed EREF. The proposed GLE Facility is another proposed nuclear fuel fabrication facility, with proposed preconstruction activities similar in nature, and on a similar scale, to those for the proposed EREF. Income data for Idaho Falls, Idaho, are estimated using data presented in the AES Environmental Report (AES, 2010a). Based on this information, preconstruction activities at the proposed EREF would contribute 5 percent of the impacts during the preconstruction period (2010–2011), and construction activities would contribute 95 percent (2012–2022).

Impacts for each phase of the proposed project are summarized in Table 4-28, and are based on data provided in the AES Environmental Report (AES, 2010a). These impacts are discussed in the following sections. The NRC has reviewed and verified the data and methodology.

4.2.12.2 Preconstruction and Construction

Preconstruction

Preconstruction activities in 2010–2011 would create 108 direct jobs at the proposed EREF site (AES, 2010a). An additional 200 indirect jobs would be created in the 11-county ROI with the procurement of material and equipment and the spending of direct worker wages and salaries (Table 4-28). Preconstruction would produce $4.4 million in income in the 11-county ROI. Preconstruction would produce $0.1 million in direct State income taxes and $0.9 million in direct State sales taxes (AES, 2010a). Preconstruction activities would constitute less than 1 percent of total two-county ROI employment (see Section 3.12.2); the economic impact of preconstruction of the proposed EREF would be SMALL.

Given the likelihood of a lack of local worker availability in the required occupational categories, EREF preconstruction would require some in-migration of workers and their families from outside the two-county ROI, with an estimated 49 persons in-migrating into the two-county ROI during the peak of preconstruction (AES, 2010a). Although in-migration may potentially impact local housing markets, the relatively small number of in-migrants and the availability of temporary accommodation (hotels, motels, and mobile home parks) would mean that the impact of preconstruction on the number of vacant rental housing units is not expected to be large, with 21 additional rental units being expected to be occupied in the two-county ROI during preconstruction (AES, 2010a). These occupancy rates would represent less than 0.1 percent of the vacant rental units expected to be available in the two-county ROI during preconstruction; the impact of EREF preconstruction on housing would, therefore, be SMALL.

In addition to the potential impact on housing markets, in-migration would also affect local community and educational services employment to maintain existing levels of service in the two-county ROI. Accordingly, less than one additional police officer and less than one additional firefighter would be required during the preconstruction period (AES, 2010a). Assuming that a certain number of workers are accompanied by their families during preconstruction, 14 additional school-age children would be expected in the two-county ROI during the preconstruction period, meaning that one additional teacher would be required to maintain existing student–teacher ratios in the local school system (AES, 2010a). These staffing increases would represent less than 0.1 percent of community service employment in each employment category expected in the two-county ROI; the impact of EREF preconstruction on community and educational services employment would be SMALL.

Table 4-28 Socioeconomic Effects of the Proposed EREF[a]

Parameter	Preconstruction	Peak Facility Construction	Construction-Operations Overlap Period	Operations
Employment (number of jobs)				
Direct	108	590	275	550
Indirect	200	1097	1370	2739
Total	308	1687	1645	3289
Income ($m 2008 $)				
Direct	4.4	23.9	14.1	28.2
Indirect	7.5	41.2	32.1	64.2
Total	11.9	65.0	46.2	92.4
Tax Revenues				
Income Taxes ($m 2008 $)	0.1	0.7	0.7	1.3
Sales and use Taxes ($m 2008 $)	0.9	5.1	NA[b]	NA
Property Taxes ($m 2008 $)	NA	NA	1.8	3.5
Population (number of new residents)	49	266	124	199
Housing (number of units required)	21	112	52	87
Public Service Employment (number of new employees)				
Police officers	<1	<1	<1	<1
Firefighters	<1	<1	<1	<1
Teachers	1	4	2	3

[a] Impacts are shown for preconstruction (2011), the peak year of construction (2012), the first year of start-up (2014) and the first year of operations (2022). Employment, income and tax impacts are estimated for the 11-county ROI; population, housing and public service employment impacts are estimated for the two-county ROI.
[b] NA = not applicable.
Sources: AES, 2010a; direct preconstruction figures based on information in GLE, 2009.

Facility Construction

Construction activities in the peak year (2012) would create 590 direct jobs at the proposed EREF site (AES, 2010a). An additional 1097 indirect jobs would be created in the 11-county ROI with the procurement of material and equipment and the spending of direct worker wages and salaries (Table 4-28). Facility construction would produce $65.0 million in income in the 11-county ROI in 2012. Construction would produce $0.7 million in direct State income taxes and $5.1 million in direct State sales taxes (AES, 2010a). Peak year construction activities would constitute less than 1 percent of total two-county ROI employment in 2012 (see Section 3.12.2); the economic impact of constructing the proposed EREF would be SMALL.

Given the scale of construction activities and the likelihood of local worker availability in the required occupational categories, EREF construction would mean that some in-migration of workers and their families from outside the two-county ROI would be required, with 266 persons in-migrating into the two-county ROI during the peak year of construction (AES, 2010a). Although in-migration may potentially impact local housing markets, the relatively small number of in-migrants and the availability of temporary accommodation (hotels, motels, and mobile home parks) would mean that the impact of facility construction on the number of vacant rental housing units is not expected to be large, with 112 additional rental units expected to be occupied in the two-county ROI during construction (AES, 2010a). These occupancy rates would represent less than 0.1 percent of the vacant rental units expected to be available in the two-county ROI in 2012; the impact of EREF construction on housing would be SMALL.

In addition to the potential impact on housing markets, in-migration would also affect local community and educational services employment to maintain existing levels of service in the two-county ROI. Accordingly, less than one police officer and less than one firefighter would be required in the peak construction year, 2012 (AES, 2010a). During construction, 76 additional school-age children would be expected in the two-county ROI in 2012, meaning four additional teachers would be required to maintain existing student–teacher ratios in the local school system (AES, 2010a). These staffing increases would represent less than 0.1 percent of community service employment in each employment category expected in the two-county ROI in 2012; the impact of EREF construction on community and educational service employment would be SMALL.

4.2.12.3 Facility Operation

Facility Construction/Operations Startup Overlap Period

Full production at the proposed EREF would not occur until 2022 when final construction would be completed. However, limited production of enriched uranium would begin with the opening of the first cascade in 2014 because of the modular nature of the proposed EREF. Enriched uranium production would increase and heavy construction would continue until 2018 when all major building structures would be completed and SBMs 1 and 2 would be fully operational. During this period, construction employment is expected to decline from levels reached in the peak construction year (2012) and startup employment would likely remain at the level established in 2014 until full facility operation commences in 2022 with the completion of the cascades in SBM 4 (AES, 2010a).

Startup activities in the first year (2014) would create 275 direct jobs at the proposed EREF (AES, 2010a). An additional 1370 indirect jobs would be created in the 11-county ROI with the procurement of material and equipment and the spending of direct worker wages and salaries (Table 4-28). Facility startup would produce $46.2 million in income in the 11-county ROI in 2014 and $0.7 million in direct State income taxes (AES, 2010a). Property taxes payable to Bonneville County would amount to $1.8 million annually between 2015 and 2017. Startup activities would constitute less than 1 percent of total two-county ROI employment in 2014 (see Section 3.12.2); the economic impact during the period of construction/operations overlap of the proposed EREF would be SMALL.

Given the scale of startup activities and the likelihood of local worker availability in the required occupational categories, startup of the proposed EREF would result in some in-migration of workers and their families from outside the two-county ROI, with 124 persons in-migrating into the two-county ROI during the first year of startup (AES, 2010a). Although in-migration may potentially impact local housing markets, there would be a relatively small number of in-migrants, and temporary accommodation (hotels, motels, and mobile home parks) would be available. Approximately 52 additional rental units would be expected to be occupied in the two-county ROI during this period (AES, 2010a). These occupancy rates would represent less than 0.1 percent of the vacant rental units expected to be available in the two-county ROI in 2014; therefore, the impact of the proposed EREF project on housing during the construction/operations overlap period would be SMALL.

In addition, in-migration would also affect local community and educational services employment to maintain existing levels of service in the two-county ROI. Accordingly, less than one police officer and less than one firefighter would be required in the first year, 2014, when operations begin. During startup, 35 additional school-age children would be expected in the two-county ROI in 2014, meaning two additional teachers would be required to maintain existing student–teacher ratios in the local school system (AES, 2010a). These staffing increases would represent less than 0.1 percent of community service employment in each employment category expected in the two-county ROI in 2012; therefore, the impact of the proposed EREF project on community and educational service employment during the construction/operations overlap period would be SMALL.

Full Operation

Operations activities in the first full year (2022) would create 550 direct jobs at the proposed EREF site itself (AES, 2010a). An additional 2739 indirect jobs would be created in the 11-county ROI with the procurement of material and equipment and the spending of direct worker wages and salaries (Table 4-28). Facility operations would produce $92.4 million in income in the 11-county ROI in 2022. Operations would produce $1.3 million in direct State income taxes and $3.5 million in direct property taxes (AES, 2010a). Property taxes would be payable to Bonneville County. Operations activities would constitute less than 1 percent of total two-county ROI employment in 2022 (see Section 3.12.2); the economic impact of operating the proposed EREF would be SMALL.

Given the scale of operations activities and the likelihood of local worker availability in the required occupational categories, EREF operation would result in some in-migration of workers and their families from outside the two-county ROI, with 199 persons in-migrating into the two-county ROI during the first year of operation (AES, 2010a). Although in-migration may potentially impact local housing markets, the relatively small number of in-migrants and the availability of temporary accommodation (hotels, motels, and mobile home parks) would mean that the impact of facility operation on the number of vacant owner-occupied housing units is not expected to be large, with 87 rental units expected to be occupied in the two-county ROI during operations (AES, 2010a). These occupancy rates would represent less than 0.1 percent of the vacant owner-occupied units expected to be available in the two-county ROI in 2022; the impact of EREF operations on housing would be SMALL.

In addition to the potential impact on housing markets, in-migration would also affect local community, and educational services employment to maintain existing levels of service in the two-county ROI. Accordingly, less than one police officer and less than one firefighter would be required in the first year of operations, 2022 (AES, 2010a). Fifty-seven additional school-age children would be expected in the two-county ROI in 2022, meaning an additional three teachers would be required to maintain existing student–teacher ratios in the local school system (AES, 2010a). These staffing increases would represent less than 0.1 percent of community service employment in each employment category expected in the two-county ROI in 2022; the impact of EREF operations on community and educational services employment would be SMALL.

4.2.12.4 Potential Effect on Property Values

Because it is not possible to accurately predict the response in regional property markets to the construction and operation of the proposed EREF, this section discusses how a facility such as the proposed EREF might affect property values based on findings from potentially hazardous facilities elsewhere in the United States. In general, potentially hazardous facilities have the potential to affect property values in two ways (Clark et al., 1997). First, negative perceptions associated with these facilities may reduce property values if potential buyers believe that any given facility poses a potential health risk. Negative perceptions may be based on individual sensitivities regarding risks associated with proximity to these facilities, and also on sensitivities at the community level that the presence of such a facility may adversely affect the prospects for local economic development. Even though potential buyers may not personally fear a potentially hazardous facility, they may offer less for a property in the vicinity of a facility if there is fear that the facility will reduce the rate of appreciation of housing in the area. Second, there may be a positive influence on property values associated with workplace accessibility for workers at the facility, with workers offering more for property close to the facility to minimize commuting times. Workers directly associated with the facility are likely to have considerably less fear of the technology and operations at the facility than the population as a whole. The importance of this influence on property values will vary with the size of the workforce involved.

While there is no evidence that uranium enrichment facilities impact local property values, a number of studies have assessed the impact of other potentially hazardous facilities on local property markets, including facilities such as nuclear power plants and spent nuclear fuel facilities (Clark and Nieves, 1994; Clark et al., 1997) and hazardous material and municipal waste incinerators and landfills (Kohlhase, 1991; Kiel and McClain, 1995). Many of these studies use a hedonic modeling approach[14] to take into account the wide range of spatial influences on property values near noxious facilities, including crime (Thaler, 1978), fiscal factors (Stull and Stull, 1991), and noise and air quality (Nelson, 1979). The general conclusion from these studies is that while there may be a small negative effect on property in the

[14] Hedonic modeling of property markets is a form of multivariate regression analysis that incorporates numerous potential influences on housing values, including housing quality and location, distance to regional employment and retail centers, the quality of regional transportation networks, and the quality and fiscal characteristics of regional educational and public service providers.

immediate vicinity of noxious facilities (i.e., less than 1 mile), this effect is often temporary, often coming with announcements related to specific project phases, such as site selection, the start of construction, the start of operations, etc. At larger distances and over the longer duration of the each project, no significant enduring negative property value effects have been found in these studies. Given these findings, it is unlikely that the proposed EREF would have a significant impact on local property values in the long term.

4.2.13 Environmental Justice Impacts

As described in Sections 4.2.1 through 4.2.12 above and in Section 4.2.15 below, the impacts of the proposed EREF would mostly be SMALL for the resource areas evaluated. For these resources areas, the impacts on all human populations would be SMALL. The NRC staff has concluded that potential impacts would be SMALL to MODERATE or MODERATE in a few cases, which could potentially affect environmental justice populations; and there would be LARGE, though intermittent, short-term impacts from fugitive dust during preconstruction. However, as there are no low-income or minority populations within the 4-mile area around the proposed facility, these impacts would not be disproportionately high and adverse for these population groups.

A brief description of impacts potentially affecting the general population in each resource area follows:

- *Land Use.* As described in Section 4.2.1, the proposed EREF would be located entirely on private land. The operation of a uranium enrichment facility is consistent with the county's zoning. Current agricultural uses of the proposed EREF property would be curtailed, but similar activities would continue over large land areas surrounding the proposed EREF property and vicinity. For example, it is not anticipated that EREF preconstruction, construction, and operation would have any effect on the current land uses found on the surrounding Federal lands administered by the U.S. Bureau of Land Management. Land use impacts resulting from preconstruction, construction, and operation would be SMALL.

- *Historic and Cultural Resources.* As described in Section 4.2.2, there are 13 cultural resource sites in the immediate vicinity of the proposed EREF. Only one of these sites is eligible for listing on the *National Register of Historic Places*, the John Leopard Homestead (site MW004). This site is within the construction footprint of the proposed EREF. Preconstruction activities would destroy site MW004, and the resulting impacts would be LARGE, but were considered MODERATE because the appropriate mitigation involving professional excavation of, and data recovery at, site MW004 was implemented by AES and other homestead sites of this type exist in the region (WCRM, 2010; Idaho SHPO, 2010b; Gilbert, 2010). Other than for site MW004, the impacts of the proposed project on historic and cultural resources would be SMALL.

- *Visual and Scenic Resources.* As described in Section 4.2.3, preconstruction and construction equipment and the industrial character of the proposed EREF buildings would create significant contrast with the surrounding visual environment of the primarily agricultural and undeveloped rangeland. The proposed facility would be approximately 2.4 kilometers (1.5 miles) from public viewing areas such as US 20 and the Hell's Half Acre Wildlife Study Area (WSA), thus the impact on views would be SMALL to MODERATE.

- *Air Quality*. As described in Section 4.2.4, preconstruction and construction traffic and operation of construction equipment are projected to cause a temporary increase in the concentrations of particulate matter. These impacts would be SMALL. However, fugitive dust from land clearing and grading operations could result in large releases of particulate matter for temporary periods of time. Such impacts would be MODERATE to LARGE during certain preconstruction periods and activities. Facility operations could produce small gaseous releases associated with operation of the process that could contain uranium compounds and hydrogen fluoride. Small amounts of nonradioactive air emissions consisting of carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM), volatile organic compounds (VOCs), and sulfur dioxide (SO_2). Air quality impacts during operations would be SMALL.

- *Geology and Soil.* As described in Section 4.2.5, impacts would result primarily during preconstruction and construction from surface grading and excavation activities that loosen soil and increase the potential for erosion by wind and water. Soil compaction as a result of heavy vehicle traffic would also increase the potential for soil erosion by increasing surface runoff. Spills and inadvertent releases during all project phases could contaminate site soils. Implementation of mitigation measures identified by AES would ensure that these impacts would be SMALL.

- *Water Resources*. As described in Section 4.2.6, the water supply for the proposed facility would be from onsite wells, and water usage would be within the water appropriation for the proposed EREF property. The plant would also have no discharges to surface water or groundwater. The impact of the proposed EREF on water resources would be SMALL.

- *Ecological Impacts*. As described in Section 4.2.7, impacts would occur primarily as a result of preconstruction and construction activities, which would mean the removal of shrub vegetation and the relocation and displacement of wildlife presently on the proposed site as a result of noise, lighting, traffic, and human presence. Collisions with vehicles, construction equipment, and fences may cause some wildlife mortality. No rare or unique communities or habitats or Federally-listed threatened or endangered species have been found or are known to occur on the proposed site. The impact of the proposed EREF on ecological resources would be SMALL to MODERATE.

- *Noise*. As described in Section 4.2.8, increased noise associated with the operation of construction machinery is expected during preconstruction and construction, with noise levels of between 80 to 95 dBA at the highway entrances, access roads, and the Visitor Center. Construction noise would be temporary and would be reduced to about 51 to 66 dBA at the nearest hiking trail point on the Hell's Half Acre WSA. Impacts would be SMALL. Impacts during the operation of the proposed facility itself would also be SMALL.

- *Transportation*. As described in Section 4.2.9, the primary impact of preconstruction, construction and operation on transportation resources is expected to be increased traffic on nearby roads and highways due to truck shipments and site worker commuting. Transportation impacts during preconstruction and construction, and during facility operation would be SMALL to MODERATE on adjacent local roads (due to the potentially significant increase in average daily traffic), but regional impacts would be SMALL.

- *Public and Occupational Health*. As described in Section 4.2.10, the analysis of nonradiological impacts during preconstruction and construction includes estimated numbers of injuries and illnesses incurred by workers and an evaluation of impacts due to exposure to chemicals and other nonradiological substances, such as particulate matter (dust) and vehicle exhaust. All such potential nonradiological impacts would be SMALL. No radiological impacts are expected during preconstruction and initial facility construction, prior to radiological materials being brought onsite. Operation of the proposed EREF could release of small quantities of UF_6 during normal operations. Total uranium released to the environment via airborne effluent discharges is anticipated to be less than 10 grams (6.84 µCi or 0.253 MBq) per year. No liquid effluent wastes are expected from facility operation. For a hypothetical member of the public at the proposed property boundary, the annual dose was estimated to be approximately 0.014 millisievert per year (1.4 millirem per year). Doses attributable to normal operation of the proposed EREF would be small compared to the normal background dose range of 2.0 to 3.0 millisievert (200 to 300 millirem). Radiological impacts during operations would be SMALL.

- *Waste Management*. As described in Section 4.2.11, small amounts of hazardous waste and approximately 6116 cubic meters (8000 cubic yards) of nonhazardous and nonradioactive wastes would be generated during preconstruction and construction activities. During operations, approximately 75,369 kilograms (165,812 pounds) of solid nonradioactive waste would be generated annually, including approximately 5062 kilograms (11,136 pounds) of hazardous wastes. Approximately 146,500 kilograms (322,300 pounds) of radiological and mixed waste would be generated annually, of which approximately 100 kilograms (220 pounds) would be mixed waste. All wastes would be transferred offsite to licensed waste facilities with adequate disposal capacity for the wastes from the proposed EREF. Overall, impacts would be SMALL.

- *Socioeconomics*. As described in Section 4.2.12, there would be increases in regional employment and income and tax revenue during preconstruction, construction, and operation. Although these impacts would be SMALL compared to the 11-county economic baseline, they are generally considered to be positive. Impacts on housing and local community services, which could be negative if significant in-migration were to occur, would also be SMALL.

- *Accidents*. As described in Section 4.2.15, six accident scenarios were evaluated in this EIS as a representative selection of the types of accidents that are possible at the proposed EREF. The representative accident scenarios selected vary in severity from high- to intermediate-consequence events and include accidents initiated by natural phenomena (earthquake), operator error, and equipment failure. The consequence of a criticality accident would be high (fatality) for a worker in close proximity. Worker health consequences are low to high from the other five accidents that involve the release of UF_6. Radiological consequences to a maximally exposed individual (MEI) at the Controlled Area Boundary (proposed EREF property boundary) are low for all six accidents including the criticality accident. Uranium chemical exposure to the MEI is high for one accident and low for the remainder. For HF exposure to an MEI at the proposed property boundary, the consequence of three accidents is intermediate, with a low consequence estimated for the remainder. All accident scenarios predict consequences to the collective offsite public of less than one lifetime cancer fatality. Impacts from accidents would be SMALL to MODERATE.

4.2.14 Separation of Preconstruction and Construction Impacts

As described in Section 1.4.1, the NRC has granted an exemption for AES to conduct certain preconstruction activities, and previous sections have provided estimates (where applicable) of the fractions of such impacts that are attributable to preconstruction and construction. Table 4-29 summarizes those estimates and compares the environmental impacts of preconstruction (which is not part of the proposed action) and construction (which is part of the proposed action).

4.2.15 Accident Impacts

The operation of the proposed EREF would involve risks to workers, the public, and the environment from potential accidents. The regulations in 10 CFR Part 70, Subpart H, "Additional Requirements for Certain Licensees Authorized to Possess a Critical Mass of Special Nuclear Material," require that each applicant or licensee evaluate, in an ISA, its compliance with certain performance requirements. The NRC staff has conducted a confirmatory analysis (NRC, 2010f) to independently evaluate the consequences of potential accidents identified in AES's ISA (AES, 2010c). The accidents evaluated are a representative selection of the types of accidents that are possible at the proposed EREF.

The analytical methods used in this consequence assessment are based on NRC guidance for analysis of nuclear fuel-cycle facility accidents (NRC, 1990, 1991, 1998, 2003b). The NRC staff analyzed accidents that involve the release of UF_6 liquid and/or gas from process systems, components, and containers. Such accidents, if unmitigated, pose a chemical and radiological risk to workers, the public, and the environment. A generic nuclear criticality accident was also analyzed.

4.2.15.1 Accidents Considered

AES's ISA (AES, 2010c) and its Emergency Plan (AES, 2010d) describe potential accidents that could occur at the proposed EREF. Accident descriptions are provided for two groups of events according to the severity of the accident consequences: high-consequence events and intermediate-consequence events.

The NRC selected a range of possible accidents for detailed evaluation to assess the potential human health impacts associated with accidents. The representative accident scenarios selected vary in severity from high- to intermediate-consequence events and include accidents initiated by natural phenomena (earthquake), operator error, and equipment failure. The ISA considered all credible accidents at the proposed EREF. Evaluation of most accident sequences resulted in identification of design bases and design features that prevent criticality events or chemical releases to the environment. The accident scenarios evaluated were as follows:

- Generic Inadvertent Nuclear Criticality

Table 4-29 Summary and Comparison of Environmental Impacts from Preconstruction and Construction

Resource Area	Preconstruction	Construction
Land Use	SMALL. Restrictions on land use would begin when preconstruction begins, when all grazing and agriculture would cease on the proposed EREF property. This constitutes 90 percent of the impacts to land use. The loss of the grazing and agricultural land is not considered a major impact due to the large amount of land locally available for agriculture and grazing.	SMALL. Most impacts to land use (i.e., restricting land use) would have already occurred during preconstruction. Access restrictions would only increase during construction. Land use impacts from construction are expected to be a continuation of those from preconstruction. Only 10 percent of the land use impacts are expected during construction.
Historic and Cultural Resources	MODERATE. The greatest potential for impacts on historic and cultural resources would occur during initial ground-disturbing activities, and constitutes 90 percent of the impacts on these resources. Site MW004, located within the footprint of the proposed EREF, was found to be eligible for listing on the NRHP. It would not be possible to avoid this site during preconstruction. With proper mitigation, the impact on historical and cultural resources would be MODERATE.	SMALL. The majority of impacts to historic and cultural resources in the proposed EREF site would have occurred during preconstruction, when most of the ground disturbances would occur. It is estimated that 10 percent of the impacts would occur during construction.
Visual and Scenic Resources	SMALL. Visual impacts could result from increased traffic entering the proposed site. Fugitive dust could also create visual impacts along US 20. Because preconstruction activities would not significantly alter the overall appearance of the area, impacts would be SMALL. Only 20 percent of the impacts on visual and scenic resources are expected during preconstruction because most activities will occur at ground level.	SMALL to MODERATE. Visual impacts would result from increased traffic entering the proposed site. Fugitive dust would also create visual impacts along US 20. Eighty percent of the impacts on visual and scenic resources would occur during construction because the tallest and most visible components of the proposed project (i.e., industrial buildings) would be constructed at this time.

Table 4-29 Summary and Comparison of Environmental Impacts from Preconstruction and Construction (Cont.)

Resource Area	Preconstruction	Construction
Air Quality	SMALL to LARGE. Impacts on ambient air quality from preconstruction would be SMALL for all HAPs and all criteria pollutants except particulates, but would be MODERATE to LARGE for particulates during certain periods of preconstruction, despite application of appropriate mitigations. Collectively, preconstruction activities are expected to constitute as much as 90 percent of the overall air quality impacts from preconstruction and construction.	SMALL. Impacts on ambient air quality from construction would be SMALL for all HAPs and all criteria pollutants. Because construction activities are expected to occur on a relatively small disturbed land area and utilize a much reduced construction workforce, and with the major pollutant-emitting activities being completed during preconstruction, construction activities are expected to constitute 10 percent of the overall impacts from preconstruction and construction.
Geology and Soils	SMALL. The terrain change on the proposed site, from gently sloping to flat, would result in SMALL impacts on soils. Short-term impacts such as an increase in soil erosion and compaction of soils would be SMALL. The majority of soil-disturbing activities (e.g., blasting and mass rock excavation) would occur during the preconstruction period; therefore, it is estimated that about 95 percent of the impacts on geology and soils would be attributed to the preconstruction phase of development.	SMALL. Because the majority of soil-disturbing activities would have occurred during the preconstruction period, it is estimated that about 5 percent of the impacts on geology and soils would be attributed to the construction phase of development.
Water Resources	SMALL. The preconstruction period is estimated to occur during an 8-month period within the first year of the overall construction period; therefore, it is estimated that about 10 percent of the impacts on water resources would be attributed to the preconstruction phase of development.	SMALL. During the 7 years of heavy construction, the annual maximum usage rate would be within the annual water right appropriation that has been transferred to the proposed EREF property for use as industrial water. As a result, impacts on the groundwater supply would be SMALL. About 90 percent of the impacts on water resources would be attributed to the construction phase of development.

Table 4-29 Summary and Comparison of Environmental Impacts from Preconstruction and Construction (Cont.)

Resource Area	Preconstruction	Construction
Ecological Resources	MODERATE. Preconstruction would result in direct impacts due to habitat loss and wildlife mortality as well as indirect impacts primarily from fugitive dust and wildlife disturbance. Preconstruction activities on the proposed site would result in most (95 percent) of the habitat losses associated with development of the proposed EREF. The development of the proposed facility is expected to extend over an 84-month time period, with the preconstruction phase estimated to comprise 10 percent of that period. Because the greatest ecological impacts during facility development would be attributable to habitat loss and mortality associated with preconstruction activities, the estimated contribution from preconstruction would be 80 percent.	SMALL. Impacts associated with construction of facility components would primarily include wildlife disturbance and fugitive dust. Approximately 5 percent of habitat loss would be attributable to the construction of facility components. Facility component construction would comprise 90 percent of the 84-month construction period. Some impacts, such as wildlife disturbance due to noise and human presence, would occur throughout the long facility construction phase. The estimated contribution from facility construction to overall ecological impacts during the construction period would be 20 percent.
Noise	SMALL. Construction noise from the proposed EREF would be highest during construction of the highway entrances, access roads, and visitor center, and would range from 80 to 95 dBA. Construction noise would be temporary and would be reduced to about 51 to 66 dBA at the nearest hiking trail point on the Hell's Half Acre Wilderness Study Area. Noise resulting from highway interchange, proposed site access road, and visitor center construction may occur at offsite locations at levels above values suggested in Federal standards as acceptable, albeit for relatively short periods. Notwithstanding short-term noise impulse events such as blasting, adequate mitigation controls would ensure noise impacts during preconstruction would all be below recommended standards at the closest human receptor. Most of the major noise-producing activities would occur during preconstruction.	SMALL. Construction noise emanating from activities within the industrial footprint is expected to be attenuated to acceptable levels at the proposed facility boundaries. Adequate mitigation controls would ensure noise impacts during facility construction would all be below recommended standards at the closest human receptor.

Table 4-29 Summary and Comparison of Environmental Impacts from Preconstruction and Construction (Cont.)

Resource Area	Preconstruction	Construction
Transportation	SMALL to MODERATE. The primary impact on transportation resources is expected to be increased traffic on nearby roads. Impacts from access road construction would be SMALL but temporary (i.e., occurring only during the period of access road construction). Approximately 10 percent of estimated transportation impacts would be attributable to preconstruction activities.	SMALL to MODERATE. Construction activities at the proposed EREF would result in a 55 percent increase in traffic volume over current levels (including the period when construction and operations overlap). Approximately 90 percent of estimated transportation impacts would be attributable to construction activities.
Public and Occupational Health	SMALL. No radiological impacts are expected during the preconstruction period. Approximately 10 percent of the total occupational injury and nonradiological impacts would occur from preconstruction activities. This value is based on AES's estimate that preconstruction activities would be completed within the first 8 months of a total 84-month construction schedule. This 10 percent estimate is likely an upper bound, as fewer workers would be expected to be involved during preconstruction than during the main construction phase.	SMALL. No radiological impacts are expected during the initial phase of facility construction. Some radiological impacts to construction workers would occur during the time period when construction and operations overlap. Approximately 90 percent of the total occupational injury and nonradiological impacts would occur from facility construction activities.
Waste Management	SMALL. Solid nonhazardous wastes generated during preconstruction would be very similar to wastes from other construction sites of industrial facilities. These wastes would be transported offsite to an approved local landfill with sufficient capacity. Approximately 10 percent of estimated waste impacts would be attributable to preconstruction activities.	SMALL. Solid nonhazardous wastes generated during construction would be very similar to wastes from other construction sites of industrial facilities and would be transported offsite to an approved local landfill. The hazardous wastes generated in association with the construction of the proposed facility due to the maintenance of construction equipment and vehicles, painting, and cleaning would be packaged and shipped offsite to licensed facilities in accordance with Federal and State environmental and occupational regulations. Approximately 90 percent of estimated waste impacts would be attributable to construction activities.

Table 4-29 Summary and Comparison of Environmental Impacts from Preconstruction and Construction (Cont.)

Resource Area	Preconstruction	Construction
Socioeconomics	SMALL. Wage and salary spending and expenditures associated with materials, equipment, and supplies would produce income and employment and local and State tax revenue, while the migration of workers and their families into a community would affect housing availability, area community services such as healthcare, schools, and law enforcement, and the availability and cost of public utilities such as electricity, water, sanitary services, and roads. Preconstruction activities would produce total (direct and indirect) employment of 308 jobs and $11.9 million in income. Preconstruction activities would constitute less than 1 percent of total two-county ROI employment. Proposed EREF preconstruction activities (2010–2011) would contribute 5 percent of the impacts during preconstruction and construction.	SMALL. Wage and salary spending and expenditures associated with materials, equipment, and supplies would produce income and employment and local and State tax revenue, while the migration of workers and their families into a community would affect housing availability, area community services, and the availability and cost of public utilities. Construction would create 1687 jobs and $65.0 million in income the peak year. Peak year construction activities would constitute less than 1 percent of total two-county ROI employment. Proposed EREF construction activities would contribute 95 percent (2012–2022) of the impacts during preconstruction and construction.
Environmental Justice	SMALL. The environmental impacts associated with preconstruction of the proposed EREF would be mostly SMALL, and generally would be mitigated. For these resources areas, the impacts on all human populations would be SMALL. Potential impacts would be SMALL to MODERATE or MODERATE in a few cases, which could potentially affect environmental justice populations; and there would be LARGE, though intermittent, short-term impacts from fugitive dust during preconstruction. However, as there are no low-income or minority populations within the 4-mile area around the proposed facility, these impacts would not be disproportionately high and adverse for these population groups.	SMALL. For the same reasons discussed in the Preconstruction column, construction of the proposed EREF is not expected to result in disproportionately high or adverse impacts on minority or low-income populations.

- Heater Controller Failure (Hydraulic Rupture of Vessel) in the Centrifuge Test Facility

- Natural Phenomena Hazard – Earthquake

- Sampling Manifold Release of UF_6 to Room

- Large Facility Fire Propagating between Areas

- Sampling Cylinder Release

Due to its nature, inadvertent nuclear criticality is the only one of the accidents that does not involve a significant release of UF_6. The accident analysis does not include an estimate of the probability of occurrence of accidents, which, in combination with consequences, would reflect the overall importance of accident types; rather, analyzed accidents are assumed to occur.

4.2.15.2 Accident Consequences

Accidents involving release of UF_6 liquids or vapors were analyzed, in general, by identifying the quantity of a containerized material at risk inside the proposed facility, the amount of material released into a room as vapor or particulates under the accident scenario, the fraction of released material that is of respirable size, and the fraction of material exhausted to the atmosphere through an available pathway, typically a building ventilation system. The dispersion of released material in the atmosphere and transport to onsite locations were calculated using guidance provided in Regulatory Guide 1.111 (NRC, 1977). Dispersion and transport to offsite locations were then analyzed using the GENII computer model (PNNL, 2007) with conservative inputs for exposure parameters and atmospheric transport factors. These methods estimated direct exposures to members of the public from an airborne plume, as well as exposures over a year's time from deposited uranium materials, to determine accident consequences to the public. Impacts on the public from a criticality accident were analyzed similarly, but for radioactive gases that would be released from a criticality event in a vessel inside the proposed facility, including fission products and radioiodine.

The performance requirements in 10 CFR Part 70, Subpart H, define acceptable levels of risk of accidents at nuclear fuel-cycle facilities, such as the proposed facility. The regulations in Subpart H require that the applicant reduce the risks of credible high-consequence and intermediate-consequence events, and assure that under normal and credible abnormal conditions, all nuclear processes are subcritical. Threshold consequence values that define the high- and intermediate-consequence events, except for criticality events, are described in Table 4-30 as taken from AES's Safety Analysis Report (SAR) (AES, 2010b).

Receptors located at the Restricted Area Boundary (RAB) within the proposed site and at the Controlled Area Boundary (CAB) (property boundary) represent worst-case exposures to nonradiological workers at the proposed facility and members of the public, respectively.

Table 4-30 Definition of High- and Intermediate-Consequence Events

Receptor	Intermediate Consequence[a]	High Consequence
Worker – radiological	>25 rem (0.25 Sv)	>100 rem (1 Sv)
Worker – chemical (10-minute exposure)	>AEGL-2 for UF_6 >AEGL-2 for HF (>19 mg U/m^3)[b] (>78 mg HF/m^3) = (95 ppm)	>AEGL-3 for UF_6 >AEGL-3 for HF (>147 mg U/m^3) (>139 mg HF/m^3) = (170 ppm)
Environment at the restricted area boundary	>24-hour average release greater than 5000 times the values in Table 2 of Appendix B of 10 CFR Part 20 (=1.5 × 10^{-8} µCi/mL)	NA[b]
Individual at the controlled area boundary – radiological	>5 rem (0.05 Sv)	>25 rem (0.25 Sv)
Individual at the controlled area boundary – chemical (30-minute exposure)	>4.06 mg soluble U intake >AEGL-1 for HF (>2.4 mg U/m^3) (>0.8 mg HF/m^3) = (0.98 ppm)	>21 mg soluble U intake >AEGL-2 for HF (>13 mg U/m^3) (>28 mg HF/m^3) = (34.23 ppm)

[a] AEGL: Acute Exposure Guideline Levels are public and private sector derived consensus values intended to describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals (EPA at http://www.epa.gov/oppt/aegl/).
[b] U = uranium; NA = not applicable.

Table 4-31 presents the consequences from the hypothetical accidents. Consequences were evaluated against the above criteria. For the criticality accident, a worker within a few feet of the event would likely be killed. A maximally exposed individual at the CAB would receive a radiation dose of 5.7 millisieverts (0.57 rem) total effective dose equivalent, which represents a low consequence to an individual (<0.05 sievert [<5 rem]). The collective dose to the offsite population to the east-southeast, as determined using GENII (PNNL, 2007), is estimated to be 4.51 person-sieverts (451 person-rem). This population dose would cause an estimated 0.3 lifetime cancer fatalities, or less than one fatality. Thus, the risk of health effects to the offsite public from this accident would be MODERATE.

The consequences of the five accident scenarios involving a release of UF_6 vary widely, as shown in Table 4-31. Worker consequences are intermediate (between 0.05 and 0.25 sievert [5 and 25 rem]) for the scenario involving a hydraulic rupture of a Centrifuge Test Facility (CTF) feed vessel and high for the scenario involving a sampling cylinder release (>0.25 Sv [25 rem]).

Consequences to the maximally exposed member of the public located at the CAB would be low for the hydraulic rupture of a feed vessel scenario and for the sampling manifold release scenario (<2.5 milligrams per cubic meter uranium and <0.8 milligrams per cubic meter HF). Consequences to this receptor are intermediate for the earthquake and facility-wide fire scenarios on the basis of HF exposure (between 0.8 and 28 milligrams per cubic meter), but low for uranium exposure (<2.4 milligrams per cubic meter). Consequences to this receptor are high for the sampling cylinder release on the basis of uranium exposure (>13 milligrams per cubic meter) and intermediate for HF exposure (between 0.8 and 28 milligrams per cubic meter).

Table 4-31 Summary of Health Effects Resulting from Accidents[a]

Accident	Worker[b]		Environment at RAB	Individual at CAB,		Collective Dose		
	U, mg/m^3 (rem)	HF, mg/m^3	µCi/mL	U, mg/m^3 (rem)	HF, mg/m^3	Direction	Person-rem	LCFs
Inadvertent nuclear criticality	(High[c])	Not applicable	18.4[d] (ratio >1)	(0.57)[e]	NA	ESE	451	0.3
Hydraulic rupture of a CTF feed vessel[f]	2.03×10^4 (14.2)	6.83×10^3	4.23×10^{-9}	1.43 (0.006)	0.54	ESE	0.632	4×10^{-4}
Earthquake	9.59 (0.136)	32.2	1.28×10^{-9}	0.274 (0.001)	2.08	ESE	0.47	3×10^{-4}
Facility-wide fire	13 (0.805)	4.36	2.57×10^{-9}	0.549 (0.002)	2.08	ESE	0.94	6×10^{-4}
Sampling manifold release	89 (0.062)	29.9	2.85×10^{-10}	4.07×10^{-2} (<0.001)	1.54×10^{-2}	ESE	4.27×10^{-2}	3×10^{-5}
Sampling cylinder release	1.74×10^5 (122)	5.85×10^4	4.82×10^{-7}	69.8 (0.293)	26.4	ESE	72	4×10^{-2}

[a] A safety evaluation (NRC, 2010f) has been conducted as part of the facility licensing process to identify Items Relied On For Safety (IROFS) for which changes in facility design may be required. Health effect impact estimates are based on calculations assuming the current design prior to any IROFS determinations. These results will be used to identify which, if any, IROFS are to be incorporated into facility designs or procedures to reduce the risks to workers, the public, and the environment to acceptably low levels.

[b] Worker exits after 5 minutes in all cases but the earthquake in which the exit is assumed to occur in 2.5 minutes. U = uranium.

[c] High consequence could lead to a fatality.

[d] Pursuant to 10 CFR 70.61(c)(3), this value is the sum of the fractions of individual fission product radionuclide concentrations over 5000 times the concentration limits that appear in 10 CFR Part 20, Appendix B, Table 2.

[e] The dose to the individual at the CAB is the sum of internal and external doses from fission products released from the criticality.

[f] Though the consequences of the rupture of a liquid-filled UF_6 vessel would be high, redundant heater-controller trips would make this event highly unlikely to occur.

Total consequences to the public in terms of radiation dose to the population in the east-southeast direction (toward Idaho Falls) and resultant total lifetime cancer fatalities are given under Collective Dose in Table 4-31. All the accident scenarios predict less than one lifetime cancer fatality in this population.

Of the accident scenarios analyzed by the NRC staff, the most significant accident consequences are those associated with the release of UF_6 caused by rupturing an overfilled or overheated cylinder and a nuclear criticality. Facility design reduces the risk (likelihood) of the rupture event by using redundant heater controller trips. In addition, the proposed facility Emergency Plan (AES, 2010d) addresses this type of event and all other lower-risk, high- and intermediate-consequence events. The NRC staff concludes that through the combination of plant design, passive and active engineered controls (Items Relied on for Safety [IROFS]), administrative controls, and management of these controls, accidents at the proposed facility pose an acceptably low risk to workers, the environment, and the public.

4.2.15.3 Mitigation Measures

NRC regulations and AES's operating procedures for the proposed EREF are designed to ensure that the high and intermediate accident scenarios would be highly unlikely (10 CFR Part 70, Subpart H, and AES [2010f]). The NRC staff assesses the safety features and operating procedures required to reduce the risks from accidents. The combination of responses by IROFS that mitigate or prevent emergency conditions and the implementation of emergency procedures and protective actions in accordance with the proposed EREF Emergency Plan (AES, 2010d) would limit the consequences and reduce the likelihood of accidents that could otherwise extend beyond the proposed EREF site and property boundaries. The following mitigation measures have been identified by AES to reduce the risks posed by accidents at the proposed EREF (AES, 2010c).

Preventative and mitigative measures within the proposed facility relevant to a fire/explosion and UF_6 release scenario would include: (1) fire alarm and detection systems, possibly including a fire suppression system; (2) fire barriers preventing propagation of fires into and out of areas holding quantities of uranium materials; (3) reliable protection features to prevent overheating of UF_6 cylinders; and (4) explicit design bases to minimize the impacts of initiating events, such as those for a seismic event. Preventative measures to guard against a criticality accident include the use of safe-by-design components (AES, 2010c).

Mitigative measures relevant to radiological accidents would include: (1) radiation protection systems to alert workers and isolate systems when parameters exceed set limits; (2) physical separation of areas within the facility designed to prevent or reduce exposure; (3) controlled positive or negative air pressures within designated areas to control air flow; (4) carbon absorbers, HEPA filters, and automatic trips on ventilation systems to prevent releases outside of affected areas; and (5) limited building leakage paths to the outside environment through appropriate door and building design. These features are designed to contain UF_6 vapors within specified building areas and attenuate any release to the environment. Preventative controls for a nuclear criticality accident would include maintaining a safe geometry of all vessels, containers, and equipment that contain fissile material and ensuring that the amount of such material in these vessels does not exceed set limits. Mitigative controls would include criticality monitoring and alarm systems and emergency response training (AES, 2010a).

4.2.16 Decontamination and Decommissioning Impacts

This section summarizes the potential environmental impacts of decontamination and decommissioning of the proposed EREF site through comparison with normal operational impacts. Decontamination and decommissioning would involve the removal and disposal of all operating equipment while leaving the structures and most support equipment decontaminated to free release levels in accordance with 10 CFR Part 20.

Decommissioning activities are generally described in Section 2.1.4.3 of this EIS based on the information provided by AES in the SAR (AES, 2010b). However, a complete description of actions taken to decommission the proposed EREF at the expiration of its NRC license period cannot be fully determined at this time. In accordance with 10 CFR 70.38, AES must prepare and submit a decommissioning plan to the NRC at least 12 months prior to the expiration of the NRC license for the proposed EREF. AES would submit a final decommissioning plan to the NRC prior to the start of decommissioning. This plan would be the subject of further NEPA review, as appropriate, at the time the decommissioning plan is submitted to the NRC. Decontamination and decommissioning activities would be conducted to comply with all applicable Federal and State regulations in effect at the time of these activities.

The decommissioning process is expected to occur over a 9-year period. The SBMs would be decommissioned in the first 8 years, and there would be one additional year for final site surveys and activities (AES, 2010b). SBM 1 is scheduled to be the first to operate and would be the first to undergo decontamination and decommissioning. The other SBMs would follow in turn. A single SBM is assumed by AES to take 4.5 years to decommission, with 3 years for decommissioning of the centrifuges and associated equipment and 1.5 years for decontamination of the structure (AES, 2010b). SBM 4 would be the last module to operate and to be decommissioned. The remaining plant systems and buildings would be decommissioned after final shutdown of SBM 4.

The decontamination and decommissioning would include:

- installation of decontamination facilities
- purging of process systems
- dismantling and removal of equipment
- decontamination and destruction of confidential and secret restricted data material
- sales of salvaged materials
- disposal of wastes
- completion of a final radiation survey

The primary environmental impacts of the decontamination and decommissioning of the proposed EREF site include changes in releases to the atmosphere and surrounding environment and disposal of industrial trash and decontaminated equipment. The types of impacts that may occur during decontamination and decommissioning would be similar to many of those that would occur during the initial construction of the proposed facility. Some impacts, such as water usage and the number of truck trips, could increase during the decontamination and disposal phase of the decommissioning but would be less than during the construction phase; thus they would be bounded by the impacts in Sections 4.2.4 through 4.2.9.

4.2.16.1 Land Use

As discussed in Section 4.2.1, the proposed AES property is zoned for uses such as the proposed EREF. The potential for impacts on land use is greatest during preconstruction and construction of the proposed EREF. The decontamination and decommissioning of the proposed facility would not be expected to result in a change in land use from operation. The land use would remain restricted to industrial uses. Since decontamination and decommissioning is not expected to affect land use, the impacts would be SMALL.

4.2.16.2 Historic and Cultural Resources

Ground-disturbing activities have the greatest potential for impacting historic and cultural resources. Ground disturbance at the proposed EREF site affecting cultural resources would have occurred during preconstruction for the proposed EREF. Any area disturbed during decontamination and decommissioning would be expected to no longer have the potential for historic and cultural resources. Therefore, it is not expected that any historic and cultural resources would be affected by decontamination and decommissioning of the proposed EREF; therefore, the impact would be SMALL.

4.2.16.3 Visual and Scenic Resources

The decontamination and decommissioning of the proposed EREF would have little additional effect on visual and scenic resources. Many buildings and the perimeter lighting would remain in place as part of the decontamination and decommissioning. Thus, the overall visual and scenic landscape would not be altered drastically from operations. Therefore, the impacts on visual and scenic resources of decontamination and decommissioning would be SMALL to MODERATE.

4.2.16.4 Air Quality

Decontamination and decommissioning activities would result in air quality impacts similar to those resulting from preconstruction and construction, although to a lesser magnitude and for a substantially shorter duration. Primary sources of air impacts during decontamination and decommissioning would include the operation of various construction equipment, onsite fueling and maintenance of construction equipment, the use of explosives to remove foundations if necessary, material handling and stockpiling, commuting to the proposed site (by a workforce that is expected to be substantially smaller than the initial construction workforce), and offsite transfer of recyclable materials and equipment and wastes destined for offsite treatment and disposal facilities. The most significant sources of fugitive dust expected in preconstruction and construction, cut-and-fill operations and travel on unpaved onsite roads, would either not be operative during decontamination and decommissioning or would be undertaken at substantially reduced levels. Unique aspects of the decontamination and decommissioning plan, such as whether buried utilities and improvements are removed or abandoned in place, can be expected to have incremental impacts on associated air quality impacts.

The absence of a specific decontamination and decommissioning plan prevents a quantitative analysis of decontamination and decommissioning impacts on air quality. The NRC staff concludes that air impacts from preconstruction and construction would be bounding (see Tables 4-1 through 4-3 in Section 4.2.4.1 of this EIS) and that air impacts from decontamination and decommissioning would be less. The NRC staff therefore concludes that air impacts from decontamination and decommissioning would be SMALL.

4.2.16.5 Geology and Soils

Impacts to geology and soils during the decontamination and decommissioning phase would result from short-term disturbances of land (e.g., clearing and grading) for equipment laydown and disassembly. Land disturbance could temporarily increase the potential for soil erosion at the proposed EREF site, resulting in impacts similar to (but less than) those described for the preconstruction/construction phase (see Section 4.2.5.1). Mitigation measures would be implemented to minimize soil erosion and to control fugitive dust. Thus, impacts to geology and soils due to decontamination and decommissioning activities would be SMALL.

4.2.16.6 Water Resources

The water supply for the decontamination and decommissioning of the proposed EREF would be obtained from one or more onsite wells already completed in the ESRP aquifer. No surface water sources would be used. During this phase, water would be consumed for potable and sanitary needs, and for building and equipment rinsing (decontamination). Other water uses would include dust control, compaction of fill, and watering of vegetation. None of this water would be returned to its original source.

Water use rates would vary during the 9-year decontamination and decommissioning period but would not exceed annual usage during normal operations, because less than half as many workers would be onsite during decontamination and decommissioning (AES, 2010a) and water usage would be within the capacity of the water right appropriation throughout this phase. Liquid effluent quantities from decontamination and decommissioning activities are expected to be higher than during normal operations (AES, 2009b). All liquid effluents, including the spent citric acid solution used for building and equipment rinsing, would be treated and discharged by evaporation to the atmosphere in the Liquid Effluent Treatment System Evaporator. Once the Liquid Effluent Collection and Treatment System is removed from service, temporary skid-mounted systems would be used to process any remaining liquid wastes. No process effluents would be discharged to the stormwater retention/detention basins or into surface water (AES, 2009b).

Runoff from paved areas and building roofs would continue to be diverted to three stormwater detention/retention basins for evaporation during the decontamination and decommissioning phase. At the end of this phase, mud or soil in the bottom of these basins would be tested for contamination and disposed of accordingly. The basins and berms would then be leveled to restore the land to its natural contour.

The Liquid Effluent Treatment System Evaporator would remain in operation throughout most of the decontamination and decommissioning phase. Liquids used to clean and decontaminate buildings and equipment would be treated and discharged by evaporation to the atmosphere in the system evaporator. Once the decontamination process has concluded and all effluents have evaporated, sludge and soil in the bottom of the evaporator would be tested and disposed of in accordance with regulatory requirements and in such as way as to meet the standards for releasing the proposed site for unrestricted use, as defined in 10 CFR 20.1402.

Since the usage and discharge impacts to water resources during the decontamination and decommissioning phase would be similar to those during operations, the impacts to water resources would be SMALL.

4.2.16.7 Ecological Resources

Plant communities and wildlife that became established near the proposed facility during the operational period could be affected by decontamination and decommissioning activities. Although the structures of the proposed EREF would be left in place, vegetation would be removed from land areas disturbed during decontamination and decommissioning activities, such as regraded basin areas. During the decontamination and decommissioning period, wildlife in the vicinity of the proposed facility would be disturbed by noise associated with decommissioning activities, and many species would be displaced to adjacent habitats. Noise levels generated by decommissioning would likely be similar to those during preconstruction and initial facility construction. Wildlife use of the proposed site would increase following the termination of decommissioning activities. Ecological impacts from decontamination and decommissioning would be SMALL.

4.2.16.8 Noise

Noise sources and levels would be similar to noise during site preconstruction and construction, and peaking noise levels would be expected to occur for short durations, primarily during preconstruction. Although a detailed decontamination and decommissioning plan has not yet been developed, major noise sources can be expected to include: the operation of heavy-duty construction equipment; traffic noise resulting from the commuting decontamination and decommissioning workforce and delivery vehicles used to transport disassembled components and waste materials to offsite facilities for redeployment, recycling, or disposal; the potential use of explosives or impact hammers to break up some structures if necessary, such as foundations, roads, and pavements; excavations of buried utilities and components; and cut-and-fill operations designed to return the proposed site to its original grades and contours in some areas.

Offsite noise impacts can be expected to be similar to those for preconstruction and construction (see Section 4.2.8.1). Noise associated with excavation and removal of buried utilities would not occur for those belowground components that are abandoned in place. Based on detailed information currently available, the NRC staff concludes that noise impacts from decommissioning would be less than those expected to occur in the preconstruction and construction phases and would therefore be SMALL.

4.2.16.9 Transportation

Traffic during the initial portion of the decontamination and decommissioning activities would be approximately the same as during the period when construction and facility operation overlap (AES, 2010a). Traffic after the cessation of facility operation would be less than the volume experienced during either construction or operation. Site roads, if properly maintained, would be adequate to accommodate the additional traffic volume, and the increased traffic would have a SMALL to MODERATE impact on the current traffic on US 20. However, the number of heavy trucks would be substantial for brief periods of time as waste materials were removed; therefore, transportation impacts for construction would be bounding.

If the depleted UF_6 has not been removed prior to the cessation of operations, it would be shipped offsite during the decommissioning phase. As shown in Table 2-2 in Section 2.1.4.2 of this EIS, the operation of the proposed EREF would generate up to 25,718 Type 48Y cylinders of depleted UF_6 tails during its operational lifetime. Type 48Y cylinders would be shipped one cylinder per truck for disposal. Assuming that all of the material is shipped during the first 8 years of decommissioning (the final radiation survey and decontamination would occur during the final year of decommissioning), approximately 4205 truckloads per year would be shipped from the proposed EREF. If the trucks are limited to weekday, nonholiday shipments, approximately 17 trucks per day would leave the proposed site for the depleted UF_6 conversion facility. Section 4.2.9 presents the impacts of shipping depleted UF_6 to the conversion facility, which would be SMALL.

4.2.16.10 Public and Occupational Health

__Occupational Injuries and Illnesses__

Occupational injuries and illnesses would be expected to be incurred during decontamination and decommissioning of the proposed EREF. The staged decommissioning is expected to take 9 years to complete. The nature of decontamination and decommissioning activities, which would involve dismantling some structures and equipment, would be similar to those for preconstruction and construction of the proposed facility, while the job classification used to estimate construction injuries in Section 4.2.12.1, North American Industry Classification System Code 237, “Other Heavy and Civil Engineering Construction,” should also apply to dismantlement. In addition, the expected 9-year duration for decontamination and decommissioning is similar to the expected 7-year heavy construction period, and impacts from occupational injuries and illnesses during decontamination and decommissioning would be similar to those during construction. Chemical exposures would be controlled to below levels of concern through removal of hazardous chemicals from process lines and equipment. Thus, public and occupational health impacts would be SMALL.

__Radiological Impacts__

Exposures during decontamination and decommissioning would be bounded by the potential exposures during operation because standard quantities of uranium material (i.e., UF_6 in Type 48Y cylinders) would be handled during the portion of the decontamination and decommissioning operations that purges the gaseous centrifuge cascades of UF_6. Once this decontamination operation is completed, UF_6 would be present only in residual amounts and handled significantly less than during operations. Because systems containing residual UF_6 would be opened, decontaminated (with the removed radioactive material processed and packaged for disposal), and dismantled, an active environmental monitoring and dosimetry (external and internal) program would be conducted to maintain ALARA doses and doses to individual members of the public as required by 10 CFR Part 20. Therefore, the impacts to public and occupational health would be SMALL.

4.2.16.11 Waste Management

The waste management and recycling programs used during operations would also apply to decontamination and decommissioning. Materials eligible for recycling would be sampled or surveyed to ensure that contaminant levels would be below release limits. Enrichment equipment would be removed, depleted UF_6 would be transported to a conversion facility, buildings and other structures would be decontaminated, and debris would be shipped offsite for disposal. Radioactive material from decontamination and contaminated equipment would be packaged and shipped offsite to an appropriately licensed facility. Staging and laydown areas would be segregated and managed to prevent contamination of the environment and creation of additional wastes. Long-term storage and monitoring of wastes at the proposed EREF site would be avoided, as the generated wastes would not require delayed removal from the site. Disposal volumes of the various waste streams are anticipated to be similar to those for the NEF, including 7700 cubic meters (10,070 cubic yards) of low-level radioactive waste (AES, 2010a). Due to the availability of adequate disposal capacity for Class A low-level radioactive waste over the long term (GAO, 2004), the waste management impacts of decontamination and decommissioning would be SMALL.

4.2.16.12 Socioeconomics

Decontamination and decommissioning of the proposed EREF would provide continuing employment opportunities for some of the existing operations workforce and for other residents of the 11-county ROI. Additional specialized decommissioning workers would be required from outside the 11-county ROI. Although at a lower level than during operations, expenditures on salaries and materials would contribute to the area economy, and the State would continue to collect sales tax and income tax revenues. As was the case with the preconstruction, construction, and operations phases of the proposed project, the socioeconomic impact of decommissioning activities would be SMALL.

4.2.16.13 Environmental Justice

As described in Sections 4.2.16.1 through 4.2.16.12, the impacts of the proposed action during decontamination and decommissioning would be SMALL for all of the resource areas evaluated, and would not potentially affect environmental justice populations. Even where environmental impacts would be SMALL, the behaviors of some subpopulations may lead to disproportionate exposure through inhalation or ingestion (e.g., higher participation in outdoor recreation, home gardening, and subsistence fishing). However, because impacts on the general population would be SMALL, and because there are no Census block groups in which the low-income population either exceeds 50 percent of the total population and/or is more than 20 percentage points higher than the State or county percentage, decontamination and decommissioning of the proposed facility would not, therefore, produce any environmental justice concerns.

Overall, therefore, decontamination and decommissioning of the proposed EREF is not expected to result in disproportionately high or adverse impacts on minority or low-income populations.

4.2.16.14 Mitigation Measures

AES identified the measures listed below to mitigate impacts of decontamination and decommissioning activities (AES, 2010a). These measures should be considered preliminary because decontamination and decommissioning would occur more than 20 years in the future.

- *Ecological resources*: Mitigation measures would be taken to protect migratory birds during decommissioning, e.g., clearing or removal of habitat, such as sagebrush, including buffer zones, would be performed outside of the migratory bird breeding and nesting season; additional areas to be cleared would be surveyed for active nests during migratory bird breeding and nesting season; activities would be avoided in areas containing active nests of migratory birds; the FWS would be consulted to determine the appropriate actions regarding the taking of migratory birds, if needed.

- *Noise*: Mitigation of noise impacts from decommissioning would include sequencing noise-producing activities to minimize the overall noise and vibration impacts.

- *Public and occupational health*: Mitigation measures during decontamination and decommissioning operations are similar to those for the operational period. The goal of the mitigation measures would be to reduce the spread of radioactive contamination which would then reduce the unnecessary exposure or overexposure. These mitigation measures would be implemented by adapting design concepts that would minimize/prevent the spread of contamination from room to room. In addition, the creation of unrestricted and restricted areas would possibly reduce the spread of contamination by limiting the numbers of personnel within the work area. In addition, the creation of design features such as providing curbing and other barriers around tanks and other components containing liquids in order to limit spills would possibly reduce the spread of contamination.

4.2.17 Greenhouse Gas Emissions Associated with the Proposed EREF

This section presents an assessment of the effect preconstruction, construction, operation, and decommissioning of the proposed EREF can be expected to have on carbon dioxide and other greenhouse gas emissions.

4.2.17.1 Greenhouse Gases

Greenhouse gases (GHGs) include those gases, such as carbon dioxide (CO_2), water vapor, nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6), that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation from the earth's surface. The net effect over time is a trapping of absorbed radiation and a tendency to warm the planet's surface and the boundary layer of the earth's atmosphere, which constitute the "greenhouse effect" (IPCC, 2007). Some direct GHGs [15] (CO_2, CH_4, and N_2O) are both naturally occurring and the product of industrial activities, while others such as the hydrofluorocarbons are man-made and are present in the atmosphere exclusively due to human activities. Each GHG has a different radiative forcing potential

[15] Direct GHGs are those gases that can directly affect global warming once they are released into the atmosphere.

(the ability to affect a change in climatic conditions in the troposphere, expressed as the amount of thermal energy [in watts] trapped by the gas per square meter of the earth's surface) (IPCC, 2007). The radiative efficiency of a GHG is directly related to its concentration in the atmosphere.

As a way to compare the radiative forcing potentials of various GHGs without directly calculating changes in their atmospheric concentrations, an index known as the Global Warming Potential (GWP) (IPCC, 2007) has been established with CO_2, the most abundant of GHGs released to the atmosphere (after water vapor),[16] established as the reference point. GWPs are calculated as the ratio of the radiative forcing that would result from the emission of 1 kilogram (2.2 pounds) of a GHG to that which would result from the emission of 1 kilogram (2.2 pounds) of CO_2 over a fixed period of time. GWPs represent the combined effect of the amount of time each GHG remains in the atmosphere and its ability to absorb outgoing thermal infrared radiation. As the reference point in this index, CO_2 has a GWP of 1. On the basis of a 100-year time horizon, GWPs for other key GHGs are as follows: 21 for CH_4, 310 for N_2O, 11,700 for HFC-23, and 23,900 for SF_6 (IPCC, 2007).

Indirect GHGs, carbon monoxide (CO), nitrogen oxides (NO_x),[17] nonmethane volatile organic compounds (NMVOCs), and sulfur dioxide (SO_2), indirectly affect terrestrial solar radiation absorption by influencing the formation and destruction of tropospheric and stratospheric ozone or, in the case of SO_2, by affecting the absorptive characteristics of the atmosphere.

4.2.17.2 Greenhouse Gas Emissions and Sinks in the United States

The EPA is responsible for preparation and maintenance of the official U.S. Inventory of Greenhouse Gas Emissions and Sinks[18] to comply with existing commitments under the United Nations Framework Convention on Climate Change (UNFCCC). GHG emissions[19] are reported in sectors, using the GWPs established in the Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).[20] Preconstruction, construction, operation, and decommissioning of the proposed EREF would result in the release of GHGs as a result of the same human activities that were identified by EPA as the sources of GHGs in the

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[16] Water vapor is the most abundant and most dominant greenhouse gas in the atmosphere. However, it is neither long-lived nor well mixed in the atmosphere, varying spatially from 0 to 2 percent.

[17] NO_x represents all thermodynamically stable oxides of nitrogen, excluding nitrous oxide (N_2O).

[18] GHG sinks are those activities or processes that can remove GHGs from the atmosphere.

[19] In keeping with the GWP convention that names CO_2 as the reference gas, assigning it a GWP of 1, GWPs of other direct GHGs are expressed as equivalents (Eq.) of CO_2, expressed in teragrams (Tg) of CO_2 equivalent (Tg CO_2 Eq.). One teragram is equal to 10^{12} grams, or one million metric tons (1.12 million tons).

[20] IPCC assessment reports are a compilation of separate reports of the various working groups that are established by the Panel. IGCC periodically updates assessment reports to incorporate newly established data, including revisions to GWPs and radiative forcing potentials of GHGs. The latest is the Fourth Assessment Report, published in 2007. Revised GWPs are contained in the report of Working Group I (IPCC, 2007). However, to provide for the analysis of trends of GHG emissions and sinks over time, nations responsible for GHG inventories continue to use the GHG GWPs established in the Second Assessment Report published in 1996.

U.S. Inventory. Results of the most recent report on the U.S. Inventory of GHG Emissions and Sinks (EPA, 2009b) for direct GHGs that are most relevant to the proposed EREF include:

- The primary GHG emitted by human activities in the United States was CO_2, representing approximately 85.4 percent of the total GHG emissions.

- In 2007, total U.S. GHG emissions were 7150.1 Tg CO_2 Eq., an increase of 17 percent from 1990.

- Overall emissions of GHGs rose from 2006 to 2007 by 1.4 percent (9 Tg CO_2 Eq.).

- CO_2 emissions for 2007 were 6103.4 Tg CO_2 Eq., 5735.8 of which was the result of combustion of fossil fuel primarily related to electricity generation (2397.2), transportation (1887.4), industrial applications (845.4), residential heating (340.6), and commercial applications (214.4).

- Sixty percent of the CO_2 emissions related to transportation were the result of consumption of gasoline in privately owned vehicles; the remainder was from combustion of fuels in diesel trucks and aircraft.

- Emissions of methane in 2007 as a result of combustion of fossil fuels in mobile sources were 2.3 Tg CO_2 Eq.

- Emissions of nitrous oxide in 2007 as a result of combustion of fossil fuels in mobile sources were 30.1 Tg CO_2 Eq.

- Emissions of HFCs (released from equipment) in 2007 were 108.3 Tg CO_2 Eq.

- Emissions of SF_6 in 2007 as a result of electrical transmission and distribution[21] were 12.7 Tg CO_2 Eq.

- The primary GHG sinks functional in 2007 included carbon sequestration in forests, trees in urban areas, agricultural soils, and landfilled yard trimmings and food scraps, all of which, in aggregate, offset 14.9 percent of the total GHG emissions in 2007.

- The most significant emissions of indirect GHGs in 2007 included:

  - 14,250 Tg CO_2 Eq. of NO_x primarily from mobile fossil fuel combustion (7831), stationary fuel combustion (5445), and industrial processes (520).
  - 63,875 Tg CO_2 Eq. of CO primarily from mobile fossil fuel combustion (54,678), stationary fossil fuel combustion (4792), and industrial processes (1743).
  - 13,747 Tg CO_2 Eq. of NMVOCs primarily from mobile fossil fuel combustion (5672), solvent use (3855), industrial processes (1878), and stationary fossil fuel combustion (1470).

[21] SF_6 is a gas at standard conditions and is used as a dielectric medium in high-voltage electrical equipment.

– 11,725 Tg CO_2 Eq. of SO_2 primarily from stationary fossil fuel combustion (10,211), industrial processes (839), and mobile fossil fuel combustion (442).

As noted above, consumption of fossil fuels for electricity generation represents the single greatest source of CO_2 emissions in 2007 (5735.8 Tg CO_2 Eq.). The CO_2 equivalents represented in the electricity that was delivered to end users in four sectors in 2007 include: transportation (1892.2), industrial (1553.4), residential (1198.0), and commercial (1041.4). The total gross GHG emissions in the United States from all sectors in 2007 were 7150 Tg CO_2 Eq. Net emissions (including all emissions and sinks) were 6087.5 Tg CO_2 Eq.

4.2.17.3 Greenhouse Gas Emissions and Sinks in Idaho

A review of statewide emissions of GHGs can provide an understanding of the impact anticipated GHG emissions from the proposed EREF would have in a regional context. Among States, Idaho ranks 47th with respect to emissions of GHGs and 39th in population (based on 2003 data) (NextGenerationEarth, 2009). However, Idaho's emissions of GHGs increased by 31 percent over the period 1990 to 2005 while GHG emissions on a national level increased by only 16 percent (IDEQ, 2009). The Idaho Department of Environmental Quality, in collaboration with the Center for Climate Strategies (CCS),[22] published a report in the spring of 2008 on Idaho's Greenhouse Gas Inventory and Reference Case projections for the period 1990–2020 (CCS, 2008). The relevant data from that report appear in Table 4-32. Table 4-33 provides the most recent comparison of GHG inventories by sector in Idaho vs. the United States for calendar year 2000.

4.2.17.4 Projected Impacts from Preconstruction, Construction, Operation, and Decommissioning of the Proposed EREF on Carbon Dioxide and Other Greenhouse Gases

Preconstruction, construction, operation, and decommissioning of the proposed EREF can be expected to result in emissions of CO_2 and other GHGs through various mechanisms, primarily from combustion of fossil fuels in both mobile and stationary sources. Individual contributions of preconstruction, construction, operation, and decommissioning are discussed below. Transportation volumes used in the following sections were established in Section 4.2.10 and are applied here without modification.

Estimated GHG Emissions during Preconstruction and Construction

During preconstruction and construction, fossil fuels would be consumed onsite to support construction vehicles and equipment, as a result of commuting to and from the proposed site by the construction workforce and by delivery vehicles bringing materials and equipment to the proposed site and removing construction-related wastes from the proposed site to area landfills and treatment/disposal facilities.

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[22] The Center for Climate Strategies is a public-purpose, nonprofit, nonpartisan 501(c)(3) partnership organization established in 2004 to assist in climate policy development at the Federal and State levels.

Table 4-32 Idaho Historical and Reference Case GHG Emissions, by Sector[a]

Sector	Carbon Dioxide Equivalents (million metric tons)				
	1990	2000	2005	2010	2020
Energy	**16.6**	**22.2**	**22.1**	**23.4**	**26.8**
Electricity production	0.0	0.1	0.6	0.6	0.9
Coal	0.00	0.00	0.00	0.00	0.00
Natural gas	0.00	0.09	0.62	0.64	0.92
Oil	0.00	0.00	0.00	0.00	0.00
Net imported electricity	3.9	4.8	4.7	4.6	5.5
Electricity consumption based	**3.9**	**4.9**	**5.3**	**5.2**	**6.4**
Residential/commercial/industrial (RCI) fuel use	**5.1**	**6.8**	**6.1**	**6.7**	**7.7**
Coal	0.96	1.29	0.96	1.01	1.00
Natural gas	2.17	3.47	3.09	3.42	4.05
Wood (CH_4 and N_2O)	0.05	0.06	0.05	0.06	0.06
Transportation	7.3	10.1	10.2	11.0	12.2
Motor gasoline	5.25	7.13	6.98	7.25	7.67
Diesel	1.47	2.48	2.79	3.29	4.01
Natural gas, LPG, other	0.07	0.07	0.07	0.07	0.09
Jet fuel and aviation gasoline	0.46	0.36	0.35	0.37	0.38
Fossil fuel industry	**0.3**	**0.4**	**0.4**	**0.5**	**0.6**
Natural gas industry	0.32	0.45	0.42	0.46	0.55
Oil industry	0.00	0.00	0.00	0.00	0.00
Coal mining (methane)	0.00	0.00	0.00	0.00	0.00
Industrial processes	**0.4**	**0.8**	**1.1**	**1.3**	**1.9**
Cement manufacture (CO_2)	0.06	0.06	0.13	0.14	0.16
Lime manufacture (CO_2)	0.03	0.03	0.06	0.07	0.08
Limestone & dolomite use (CO_2)	0.00	0.00	0.01	0.01	0.01
Soda Ash (CO_2)	0.01	0.01	0.01	0.01	0.01
ODS substitutes (HFC, PFC, and SF_6)	0.08	0.21	0.13	0.09	0.05
Semiconductor manufacturing (HFC, PFC, and SF_6)	0.08	0.21	0.13	0.09	0.05
Electric power T&D (SF_6)	0.19	0.11	0.09	0.07	0.04

Table 4-32 Idaho Historical and Reference Case GHG Emissions, by Sector[a] (Cont.)

Sector	Carbon Dioxide Equivalents (million metric tons)				
	1990	2000	2005	2010	2020
Waste management	**1.0**	**1.2**	**1.4**	**1.5**	**1.8**
Solid waste management	0.85	1.09	1.19	1.31	1.59
Wastewater management	0.13	0.16	0.17	0.18	0.21
Agriculture	**6.8**	**9.0**	**9.1**	**9.9**	**10.0**
Enteric fermentation	2.26	2.81	3.19	3.52	3.52
Manure management	0.70	1.50	1.97	2.33	2.33
Soils and residue burning	3.88	4.66	3.97	4.04	4.15
Forestry and land use	**3.6**	**3.6**	**3.6**	**3.6**	**3.6**
Total gross emissions	**28.4**	**36.8**	**37.2**	**39.6**	**44.1**
Increase relative to 1990		30%	31%	40%	56%
Agriculture soils	**–1.2**	**–1.2**	**–1.2**	**–1.2**	**–1.2**
Net emissions (including sinks)	**27.2**	**35.6**	**36.0**	**38.4**	**42.9**

[a] Totals may not equal exact sum of subtotals shown in this table due to independent rounding. LPG = liquefied petroleum gas; ODS = ozone-depleting substance; T&D = transmission and distribution; SF_6 = sulfur hexafluoride.
Source: CCS, 2008.

AES (2010a) has estimated that over the 7-year period of preconstruction and heavy construction when the most construction activity would take place (50 weeks per year, 250 days per year), gasoline and diesel fuel would be consumed at rates of 1325 liters (350 gallons) per week and 37,854 liters (10,000 gallons) per week, respectively (assumed to be an average over each year of the 7-year preconstruction and heavy construction period). Total amounts of fuels consumed throughout the expected 350 weeks of the preconstruction and heavy construction period were then estimated to be 463,713 liters (122,500 gallons) of gasoline and 13,248,941 liters (3,500,000 gallons) of diesel (AES, 2010a). Following the IPCC guidelines for calculating emission inventories,[23] gasoline combustion is expected to occur at 99 percent efficiency, each gallon releasing 8.8 kilograms (19.4 pounds) of CO_2. Likewise, diesel fuel burned at the same combustion efficiency would release 10.0 kilograms (22.2 pounds) of CO_2 per gallon. The resulting CO_2 emissions from onsite consumption of fossil fuels are shown in Table 4-34.

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[23] IPCC guidelines for emission calculations can be found at the following EPA Web sites: http://www.epa.gov/OMS/climate/420f05001.htm and http://www.epa.gov/otaq/climate/index.htm. Consumption of one gallon of gasoline will result in the release of 8.8 kilograms (19.4 pounds) of CO_2; one gallon of diesel fuel will yield 10.4 kilograms (22.2 pounds) of CO_2 (EPA, 2005b).

Table 4-33 Comparison of Idaho vs. U.S. GHG Emissions by Sector[a]

Sector	% of State Total GHG Emissions	% of U.S. GHG Emissions
Transportation	27	26
Agriculture	24	7
Electricity consumption	13	32
Industrial fuel use	11	14
Forestry	10	NA[b]
Residential/commercial fuel use	7.8	9
Waste	3.4	4
Industrial processes	2.1	5
Fossil fuel industry (CH_4)	1.2	3

[a] All data, calendar year 2000.
[b] At a national level, forests act as a net GHG sink (i.e., absorbing more GHG than they emit) and thus are not displayed as a national GHG emission source.
Sources: CCS, 2008; EPA, 2009b.

During each of the 3 peak years of heavy construction, an estimated 590 workers would commute to and from the proposed site an average daily trip distance of 80.5 kilometers (50 miles) for 250 days each year. Over the 3-year peak construction period, workforce commuting would amount to 35,606,736 kilometers (22,125,000 miles). To calculate the resulting CO_2 emissions associated with workforce commuting, it is assumed that 80 percent of the vehicles used will be gasoline-fueled with an average mileage of 20 miles per gallon (mpg) (accounting for 472 daily round trips) and 20 percent of the commuting vehicles will be diesel-fueled with an average mileage of 15 mpg (118 daily round trips) and that no credit is extended for busing or carpooling. During each of the 3 peak years, delivery trucks (presumed to be diesel-fueled long-haul semi-trailer trucks averaging 10 mpg) would make 31 delivery trips per day (at an average round trip distance of 80.5 kilometers [50 miles]) to transport materials and equipment and remove wastes, making for 7720 delivery and waste trips for each of the 3 peak activity years, and traveling a total of 1,870,862 kilometers (1,162,500 miles) over the 3-year peak heavy construction period. Table 4-35 shows the total amount of CO_2 released from commuting of the workforce and as a result of delivery vehicle activities.

Finally, onsite storage and dispensing of fuels during the period of preconstruction and construction will result in minor GHG emissions as NMVOCs. AES (2010a) estimates that approximately 150 gallons each of gasoline and diesel fuels would be dispensed each week during this period. Applying the EPA algorithm for estimating GHG emissions from fuel handling (EPA, 2005b) results in estimated annual CO_2 emissions of 73 tons (66 metric tons [MT]) and 83 tons (76 MT) for gasoline and diesel, respectively.

Table 4-34 CO_2 Emissions from Onsite Fuel Consumption over the Preconstruction and Heavy Construction Period

		Fuel Consumption Rate		Total Fuel Consumption		CO_2 Emission Factor		Total CO_2 Emissions (7 years)		Annual CO_2 Emissions	
Activity	**Fuel Type**	**(gal/wk)**	**(liter/wk)**	**(gal)**	**(liter)**	**(lb/gal)**	**(kg/liter)**	**(ton)**	**(MT)**	**(ton)**	**(MT)**
Heavy equipment	Gasoline	350	1327	122,500	464,275	19.4	2.3	1188	1078	170	154
	Diesel	10,000	37,900	3,500,000	13,265,000	22.2	2.7	38,850	35,318	5550	5046
Subtotal for onsite fuel consumption								40,038	36,396	5720	5200

Table 4-35 Emissions from Workforce Commuting and Delivery Activities over the Preconstruction and Construction Period

Activity	Fuel Type	Total Distances for 3 Peak Yrs (mi)	Total Distances for 3 Peak Yrs (km)	Total Fuel Consumption (gal)	Total Fuel Consumption (liter)	CO_2 Emission Factor (lb/gal)	CO_2 Emission Factor (kg/liter)	Total CO_2 Emissions (3 years of peak construction) (ton)	Total CO_2 Emissions (3 years of peak construction) (MT)	Annual CO_2 Emissions (entire 7-year preconstruction/ construction period) [a] (ton)	Annual CO_2 Emissions (entire 7-year preconstruction/ construction period) [a] (MT)
Commuting traffic	Gasoline	17,700,000	28,485,389	885,000	3,350,089	19.4	2.3	8585	7788	1840	1669
	Diesel	4,425,000	7,121,347	295,000	1,116,696	22.2	2.7	3275	2977	702	638
Delivery truck traffic	Diesel	1,162,500	1,870,862	116,250	440,054	22.2	2.7	1290	1173	277	252
Subtotal for workforce commuting and deliveries		22,125,000	35,606,736	1,180,000	4,466,786			13,149	11,938	2818	2559

[a] To calculate an annual average over the entire 7-year preconstruction and heavy construction period, it is assumed that that the 2 years following the 3-year peak construction period will have activity levels (including workforce reductions) approximately 50 percent of peak years, and the last 2 years of heavy construction will have activity levels (including workforce reductions) 25 percent of peak construction years.

Therefore, the total CO_2 emissions expected during preconstruction and heavy construction are:

- 5720 tons (5189 MT) per year (averaged) from onsite fuel consumption
- 2818 tons (2556 MT) per year from workforce commuting and materials/equipment deliveries and waste removals during preconstruction and heavy construction
- 8537 tons (7745 MT) per year (averaged) for each year of the 7-year preconstruction and heavy construction period
- 59,759 tons (54,215 MT) over the entire 7-year preconstruction and heavy construction period.

<u>Estimated GHG Emissions during Operation</u>

During operation, GHG emissions would result from commuting of the operational workforce, deliveries of feedstock to the proposed facility, deliveries of enriched product to fuel fabrication facilities, return of empty feedstock containers to their points of origin, and delivery of operational wastes to designated offsite disposal facilities. An incidental amount of GHG emissions also results from the onsite storage and dispensing of fossil fuels to support operations.

A workforce of 550 is assumed to commute a round-trip distance of 80.5 kilometers (50 miles), assuming 250 round trips per year and no credit for carpooling or busing, with a commuting vehicle fleet comprised of 90 percent gasoline-fueled vehicles averaging 20 miles per gallon (mpg) and 10 percent diesel-fueled vehicles averaging 15 mpg. The resulting annual travel distances are 9,957,816 kilometers (6,187,500 miles) for the gasoline-fueled vehicles and 1,106,424 kilometers (687,500 miles) for the diesel-fueled vehicles. The total fuels consumed are estimated to be 1,171,112 liters (309,375 gallons) of gasoline and 173,498 liters (45,833 gallons) of diesel.

Daily deliveries to support facility operation include deliveries of nonradiological materials from vendors in the local area and shipments of nonradiological solid wastes to area landfills; deliveries of (natural) UF_6 feedstock from UF_6 production facilities in Metropolis, Illinois, and Port Hope, Ontario, Canada; delivery of enriched UF_6 product to any of three fuel fabrication facilities in Richland Washington; Wilmington, North Carolina; or Columbia, South Carolina; and shipments of low-level radioactive (process) wastes (LLRW) to the waste disposal facility at Portsmouth, Ohio.[24] Because it is difficult to anticipate the proportion of shipments among the three feedstock suppliers and the three recipients of enriched product, and in order to establish a conservative (worst-case, bounding) scenario of deliveries and shipments with respect to GHG emissions, it is presumed that the longest routes would always be selected, maximizing the total distance traveled by delivery trucks.[25] It is further assumed that separate shipments would be initiated to return empty cylinders and waste containers to their points of origin and that all delivery vehicles will be diesel-fueled with an average mileage of 10 mpg.

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[24] Process-related waste will also be delivered to Oak Ridge, Tennessee; however, those shipments are not included in these GHG emission calculations because the quantities would be very small.

[25] See distances between EREF and each facility in Appendix D, Table D-7.

In addition to deliveries and shipments, fossil fuels would be consumed onsite to support miscellaneous activities: 568 liters (150 gallons) per week each of gasoline and diesel, making for 28,391 liters (7500 gallons) per year,[26] and a small amount of GHG will be emitted from the onsite storage and dispensing of fossil fuels. Applications of the operational parameters offered by AES and the assumptions discussed above result in the estimates of CO_2 emissions during operation from workforce commuting and deliveries shown in Tables 4-36 and 4-37, respectively. It is assumed that onsite gasoline and diesel fuel dispensing will occur on approximately 50 days each year for each fuel, resulting in emissions of 66 MT (73 tons) of CO_2 from gasoline dispensing and 76 MT (83 tons) of CO_2 from diesel fuel dispensing for an annual total of 142 MT (156 tons) of NMVOCs released during each year of operation as a result of onsite fossil fuel handling.

The estimated annual emissions of CO_2 from EREF operation, therefore, are 26,136 MT (28,809 tons).

Estimated GHG Emissions during Decommissioning

Activities associated with decommissioning are generally described in Section 2.1.4.3. GHG emissions associated with decommissioning would result primarily from three activities: (1) the onsite consumption of fossil fuels in vehicles and equipment used to dismantle and in some cases demolish existing structures or excavate buried utilities and components, (2) the transportation of waste materials and salvage materials from the proposed site to appropriate offsite disposal or recycling facilities, and (3) the commuting to the proposed site of the decommissioning workforce. The absence of a detailed decommissioning plan[27] precludes detailed quantification of GHG emissions associated with decommissioning. However, AES's general descriptions of the expected decommissioning strategy and schedule can provide some insight into potential GHG impacts and allow for the application of conservative assumptions to estimate bounding conditions.

AES has indicated that decommissioning would take approximately 8 years, including a brief period at the start of decommissioning when limited facility operation is still ongoing. In its Final SAR (AES, 2010b), AES further estimated the volume of LLRW that would be generated to be approximately 7700 cubic meters (10,070 cubic yards)[28] and estimated the workforce in the overlap period to be approximately the same as the operating workforce, 590 individuals.

[26] The onsite storage of fossil fuels would also result in the release of insignificantly small amounts of NMVOCs from the normal venting of the storage tanks. However, because neither the specific volume nor the chemical speciation of these evaporative losses can be firmly known, resulting GHG emissions cannot be estimated.

[27] A detailed decommissioning plan will be submitted to the NRC near the end of the operating license, in accordance with 10 CFR 70.38.

[28] AES anticipates processing some wastes for the purposes of volume reduction prior to shipments to offsite disposal or recycling facilities (AES, 2010b). However, specific details were not provided and no credit is therefore extended for any anticipated waste volume reductions in this GHG analysis.

Table 4-36 Annual CO_2 Emissions as a Result of Workforce Commuting during EREF Operation

Activity	Fuel Type	Total Workers	RT Distance (mi)	RT Distance (km)	Working Days/y	Total Distances per Year (mi)	Total Distances per Year (km)	Total Fuel Consumption (gal)	Total Fuel Consumption (liter)	Annual CO_2 Emissions (ton)	Annual CO_2 Emissions (MT)
Commuting traffic	Gasoline	495	50	80.5	250	6,187,500	9,957,816	309,375	1,171,112	3001	2722
	Diesel	55	50	80.5	250	687,500	1,106,424	45,833	173,498	509	462
Subtotal of CO_2 emissions from workforce commuting		550				6,875,000	11,064,240	355,208	1,344,610	3510	3184

Table 4-37 Annual CO_2 Emissions as a Result of Deliveries during EREF Operation

Material	Origin/ Destination	One-way Trip Distance (mi)	One-way Trip Distance (km)	Annual Number of Trips	Annual Traveled Distance (mi)	Annual Traveled Distance (km)	Fuel Consumption @10 mpg (gal)	Fuel Consumption @10 mpg (liter)	Annual CO_2 Emissions (ton)	Annual CO_2 Emissions (MT)
Process-related nonradiological, nonhazardous wastes	Local vendors/ Idaho Falls and vicinity	25	40	3889	194,450	312,937	19,445	73,607	216	196
(Natural) UF_6 feedstock	Port Pope, Ontario, Canada	2314	3724	1424	6,590,272	10,606,015	659,027	2,494,689	7315	6636
Enriched UF_6 product	Columbia, SC	2359	3796	516	2,434,488	3,917,929	243,449	921,554	2702	2451
Depleted UF_6 tails	Portsmouth, OH	2101	3381	1222	5,134,844	8,263,730	513,484	1,943,750	5700	5171
LLRW	Licensed TSDFs (Oak Ridge, TN)	1907	3068	16	30,512	49,088	3051	11,533	34	31
Empty feedstock cylinders	Port Pope, Ontario, Canada	2314	3724	712	3,295,136	5,303,007	329,514	1,247,345	3658	3318
Empty product cylinders	Colombia, SC	2359	3796	516	2,434,488	3,917,929	243,449	921,554	2702	2451
Empty tails containers	Portsmouth, OH	2101	3381	611	2,567,422	4,131,865	256,742	971,875	2850	2585
Subtotal of CO_2 emissions related to deliveries				8906	22,651,900	36,454,699	2,265,190	8,574,677	25,177	22,840

The following are conservative reasonable assumptions that can be made relative to EREF decommissioning and that can be used to estimate GHG impacts associated with decommissioning:

- CO_2 emissions from shipments of enriched uranium product and operational waste shipments still occurring during the initial period of decommissioning are treated as operational GHG impacts.

- Shipments of wastes or recycling materials would occur by diesel-fueled trucks averaging 10 mpg.

- Annual CO_2 emissions from onsite consumption of fossil fuels is expected to be less than the average annual emissions of CO_2 experienced during facility preconstruction and construction, as presented in Table 4-34 above.

- LLRW resulting from decontamination activities would be substantially greater in volume than LLRW resulting from routine EREF operation.

- Assuming an average density for the decommissioning waste and an expected weight for individual shipments, an estimated 4205 shipments of LLRW will occur annually over the 8-year period of decommissioning, for an annual total of 33,640 trip miles to the LLRW treatment, storage, and disposal facility (TSDF) in Oak Ridge, Tennessee. This will result in total trip length of 206,415,040 kilometers (128,302,960 miles) and the consumption of 484,985,188 liters (12,830,296 gallons) of diesel fuel, and estimated CO_2 emissions of 129,469 MT (142,416 tons) over the entire decommissioning period.

- All nonradioactive and nonhazardous solid wastes are presumed to be delivered to the same area landfills and treatment facilities that received wastes of similar nature during EREF operation. Assuming successful decontamination of the majority of EREF equipment and structures, a significantly higher number of annual trips would occur throughout the 8-year decommissioning phase than would have occurred annually during EREF operation, and the resulting CO_2 emissions would be at least an order of magnitude greater than the values for such waste shipments appearing in Table 4-37.

- All nonradioactive hazardous waste generated during EREF operations would already have been delivered to permitted TSDFs, and the CO_2 emissions of such deliveries would be credited to the EREF operational phase. The amount of nonradioactive hazardous waste newly generated as a result of decommissioning activities is expected to be very small and would likely be delivered to the same TSDF that received similar waste during EREF operation. It is further assumed that an appropriately permitted TSDF will be located within a reasonable distance from the proposed EREF, resulting in limited amounts of GHG emissions from transport.

- Except for the brief period at the beginning of decommissioning when some operations are still ongoing, the decommissioning workforce is expected to be similar in size to the operational workforce – 550 individuals. For the early years of decommissioning, parameters of workforce commuting are therefore assumed to be the same as those described above for commuting impacts during operation, resulting in an annual release of

CO_2 related to workforce commuting similar in magnitude to the values displayed in Table 4-36 above, 3184 MT (3510 tons). In the early years when operations and decommissioning are coincident, CO_2 emissions from workforce commuting are expected to be proportionally higher.

Indirect Positive Impacts from EREF Facility Operation

Nuclear power generated with fuel fabricated from the enriched uranium generated at the proposed EREF would indirectly displace GHG emissions that would otherwise be released from fossil-fueled power plants. Accordingly, enriched UF_6 produced at the proposed EREF can be thought of as indirectly helping to avoid GHG emissions. AES estimates that, at full production, the proposed EREF would produce approximately 2252 metric tons (2482 tons) of enriched UF_6 annually, which would be equivalent to 1727 metric tons (1904 tons) of UO_2 fuel. A typical 1100-MWe pressurized water reactor (PWR) would have approximately 98 MT (108 tons) of UO_2 in its core (Nero, 1979). Thus, annual production of the proposed EREF could replace the fuel cores of 17.9 PWRs. Operating at a capacity factor of 95 percent, each PWR would be capable of producing 8322 megawatt hours per year (MWh/yr). Thus the total amount of power associated with the proposed EREF's annual enriched UF_6 production would be 146,467 MWh/yr.

In 2005, emission factors for CO_2 from coal-burning power plants ranged from a minimum of 1341.64 pounds per megawatt hour to a maximum of 2449.43 pounds per megawatt hour, with the U.S. composite value (representing an average of all operating coal plants) of 2134.64 pounds per megawatt hour (EPA, 2009b).[30] Thus, displacing power from coal-burning power plants with an equivalent amount of power produced in nuclear reactors from fuel fabricated from an annual amount of EREF-enriched UF_6 would have prevented the release of 3117×10^6 pounds of CO_2, or 1.42 million metric tons (1.56 million tons).

Carbon Dioxide and Other GHG Emissions Summary

Using calendar year 2005 as a reference point (the latest year for which Idaho GHG emission data are available), and as shown in Table 4-33, total net CO_2 emissions for Idaho for the year 2005 were 36.0 million metric tons of CO_2 equivalents. For the United States for that same year, total net CO_2 emissions were 5985.9 million metric tons (6584.5 million tons) (EPA, 2009a). By comparison, during all of the 3 peak activity years of construction, EREF CO_2 emissions are projected to be 11,929 metric tons (13,149 tons), or 0.03 percent of Idaho's statewide output and 0.0002 percent of the projected nationwide CO_2 emissions for the same period.

During any typical year of EREF operation, CO_2 emissions are projected to be 26,136 MT (28,809 tons), approximately 0.07 percent of the Idaho statewide output or 0.00044 percent of the nationwide emissions for calendar year 2005. The NRC staff concludes that, even without giving credit to the proposed EREF for contributing to the avoidance of CO_2 emissions as

[30] Coal-burning power plants in Idaho had the lowest CO_2 emission factor in 2005; however, because fuel fabricated from EREF-enriched uranium could conceivably be installed in any nuclear reactor operating within the North American Electric Reliability Corporation (NERC) geographic area of authority, the composite emission factor is the most representative value for use in this comparison.

discussed above, impacts from the preconstruction, construction, operation, and decommissioning of the proposed EREF from the emissions of CO_2 and other GHGs would be SMALL.

4.2.18 Terrorism Consideration

This section discusses the potential environmental impacts of a hypothetical terrorist attack at the proposed EREF. The terrorism threats that were considered are associated with releases to the environment of radioactive and hazardous material at the proposed EREF and of radioactive and hazardous material transported to and from the proposed EREF. In this terrorism analysis, radioactive and hazardous material includes natural, enriched, and depleted uranium (all as UF_6) that would be present in large quantities during onsite storage and shipment to and from the proposed EREF site.

4.2.18.1 Background Information

In its *Notice of Hearing and Order* in the matter of the proposed AES EREF (74 FR 38052, July 30, 2009) (NRC, 2009c), the Commission directed, and provided relevant guidance to, the NRC staff to address in the EIS the environmental impacts of a terrorist attack at the proposed EREF. Consistent with the Commission's guidance, the terrorism consideration presented herein has been developed using available information in agency records and other available information on the proposed EREF design, mitigations, and security arrangements that have a bearing on likely environmental consequences, in accordance with the requirements of NEPA and the regulations for the protection of sensitive unclassified and classified information.

Also, consistent with the Commission's guidance, this terrorism consideration relies on as much publicly available information as practicable and makes public as much of its environmental analysis as feasible recognizing, however, that it may prove necessary to withhold certain NRC staff findings and conclusions as sensitive unclassified and classified information. In addition, the analysis relies, where appropriate, on qualitative rather than quantitative considerations.

In the case of the proposed EREF, the terrorism consideration uses publicly available information from accident analyses conducted for the proposed facility and similar facilities, as well as certain security-related information not available to the public. Whether the release of radioactive and hazardous material into the environment occurs because of an explosion or other cause due to an accidental sequence of events or to a series of premeditated terrorist activities, the results would be similar given an explosion or other incident of the same magnitude and the same amount of material involved, regardless of the initiating event. Thus, a range of potential impacts from hypothetical terrorist acts can be estimated from a range of potential accidents with similar characteristics and consequences, as further discussed below.

Section 4.2.18.2 discusses potential terrorism impacts, and Section 4.2.18.3 discusses mitigative measures intended to defeat a terrorist attack and reduce potential consequences.

4.2.18.2 Potential Impacts of Terrorist Events

Terrorist events leading to the dispersion of radioactive and hazardous material into the environment could occur during transportation of such materials to or from the proposed EREF or at the proposed EREF site. In either case, impacts ranging from minor incidents to wider spread releases of contamination are possible. As discussed below, the resulting quantities of radioactive and hazardous material potentially released by a terrorist event would be similar to those for transportation accidents as analyzed in this EIS in Section 4.2.9.2 and in Appendix D, Section D.5, and for facility accidents as analyzed in Section 4.2.15.

Unlike the accident analysis, which considers potential accidents with some likelihood of occurrence, the consideration of terrorist events provides an estimate of the potential consequences of such events without attempting to assess the likelihood that any one specific scenario would be attempted or would succeed. There are limitless potential scenarios involving a specific initiating event whereby radioactive and hazardous material could be released as a result of a terrorist attack. The likelihood of occurrence of any terrorist scenario is speculative and cannot be determined. However, there are certain classes of events that may be identified and qualitatively analyzed to provide estimates of a potential range of impacts. In addition, any estimate of the likelihood of a terrorist attack would not account for any security measures that might be implemented to assist in the prevention of such attacks. Thus, the comparison of terrorist events with accidents in the following sections addresses the potential consequences should a terrorist act occur and does not discuss the likelihood of such events.

As part of the analysis, a literature review of available studies by the NRC and DOE was conducted, which considered potential accidents at current or proposed uranium enrichment facilities. The consequences associated with these potential accidents were reviewed and compared against potential consequences from terrorist attacks at the proposed EREF and at other uranium enrichment facilities.

Transportation Impacts

A terrorist attack on vehicles transporting radioactive and hazardous material to and from the proposed EREF would result in the threat for partial or complete release of transported material to the environment. The consequences of such a terrorist act depend on the quantity of material that could be released, on the chemical, radiological, and physical properties of the material involved, how it is packaged, and its ease of dispersion. Consequences also depend on the surrounding environment, land use, and population density in the vicinity of the event. Radioactive and hazardous material would be transported through areas of varying population density and land use, to the proposed EREF as natural uranium in 14-ton 48Y cylinders and from the proposed EREF as enriched uranium in 2.5-ton 30B cylinders (in protective Type B overpacks) and depleted uranium in 48Y cylinders.

A number of studies have been published by DOE on the potential impacts should these types of shipments become involved in a serious accident (DOE, 1999, 2004a,b). In these studies, accident scenarios were characterized by extreme mechanical and thermal forces. In all cases, these accidents would result in a release of radioactive and hazardous material to the environment. The accidents corresponding to those with the highest accident severity represent low-probability, high-consequence accident events. Regardless of the initiating event, the highest potential impacts from terrorist acts would be similar to severe transportation accident impacts.

To account for terrorist events that could occur in a range of population densities, the impacts have been estimated for generic rural, suburban, and urban locations with assumed population densities of 6 persons/km^2, 719 persons/km^2, and 1600 persons/km^2, respectively. From accident consequence estimates (DOE, 2004a), the collective population dose from a single, 14-ton 48Y cylinder shipment of depleted UF_6 (one cylinder per truck) involved in a severe accident in a highly populated urban area corresponds roughly to one latent cancer fatality. Impacts in rural and suburban areas would be lower because of their lower population densities (DOE, 2004a). Acute fatalities from radioactive exposure to depleted UF_6 are not expected under any scenario. Impacts from a similar incident involving a natural uranium shipment are expected to be approximately the same because natural uranium is also shipped in 48Y cylinders (one per truck).

In addition, a severe transportation incident would restrict the use of the affected road and of surrounding land, homes, and businesses that would have been contaminated from the incident. Use of the land, housing, or businesses would resume after completion of cleanup activities and permission for use is allowed by authorities.

Socioeconomic impacts will depend on the location of the event along the transportation route within a generic rural, suburban, and urban area. The specific use of the area (e.g., agricultural, retail, service, commercial, industrial (manufacturing), residential, or mixed use) will determine the specific socioeconomic impacts in the affected area. The temporary closing of businesses will have direct and indirect impacts on the employment from these businesses, which is expected to last until cleanup activities are complete. In addition to loss of employment, other impacts could occur. For example, in the case of manufacturing or agricultural areas, the loss of material goods or produce that would have been generated during the cleanup period could result in higher cost of goods in the area due to a loss in supply; contaminated housing could result in relocation of residents until cleanup efforts are complete; or a contaminated transportation link (e.g., a subway station) could result in disruption of the commuter network while cleanup activities are under way.

Acute chemical fatalities from exposure to HF formed following a release of UF_6 would be possible, depending on the proximity of the nearest individuals. For the same potential incident, DOE (2004a) estimated that as many as several to several hundred or more adverse impacts could occur, but only up to three irreversible adverse health effects were estimated. Adverse effects range from mild and transient effects, such as respiratory irritation or skin rash (associated with lower chemical concentrations), to irreversible (permanent) effects which could include death or impaired organ function (associated with higher chemical concentrations). For exposures to uranium and HF, it was estimated that the number of fatalities occurring would be about 1 percent of the number of irreversible adverse effects (DOE, 1999); therefore, in this case no fatalities are expected.

Similar impacts would be expected from terrorist events involving shipments of natural or enriched uranium. The UF_6 enrichment results in no additional effect on any potential chemical-related impacts, nor is it expected to have any significant effects on the radiological impacts, because of the relatively small amount of U-235 compared to that of U-238.

According to AES (2010a), shipments involving enriched uranium would occur with two cylinders per truck in smaller (2.5-ton) Type 30B cylinders in protective Type B overpacks, resulting in a reduced amount of UF_6 released as the result of a severe terrorist incident. Therefore, the results from a terrorist act involving a shipment of natural or enriched uranium is expected to be less than that from a depleted uranium shipment. Appendix D of this EIS includes a discussion of the differences between the shipping configurations for the different types of cylinders.

Facility Impacts

Section 4.2.15 of this EIS discusses potential accidents considered at the proposed EREF and the resulting health effects. The accidents evaluated are representative of the types of accidents that are possible at a uranium enrichment facility, covering a range of initiating events. The consequences of these events are directly affected by the type and amount of material released at different locations at the proposed EREF. Therefore, similar consequences are expected from similar incidents involving the same material resulting from a terrorist attack. Thus, consequences from potential accidents discussed in Section 4.2.15, including health effects to workers and the public, are also applicable to potential terrorist attacks.

Chemical impacts to workers at the proposed EREF associated with a potential terrorist attack could range from no adverse effects to adverse effects to the majority of workers. Similarly, DOE (1999) estimated that chemical impacts to members of the general public could range from no adverse health effects to adverse health effects to less than 1900 members of the public. However, it is expected that much fewer than 1900 members of the public could be affected in the vicinity of the proposed EREF because the DOE analysis was for a location with a higher population density (>34,000 people within 16 kilometers [10 miles]) than that of the proposed EREF location, which has no appreciable population within 16 kilometers [10 miles] (see Table 4-22).

A terrorist attack on the proposed EREF that causes a release of UF_6 to the air would result in an airborne contamination plume in the prevailing wind direction during the release. The plume would eventually precipitate and settle on the ground surface. The resulting areal extent of the ground contamination would depend on the wind speed and degree of vertical mixing (stability class) during the release. In any case, the extent of the plume containing uranium compounds and ground contamination would be limited by the expected high deposition rate of uranium in any chemical form. UF_6 would be rapidly converted to particulate uranyl fluoride (UF_2O_2) through reaction with moisture in the air. HF, which is also produced in this reaction, would not have any residual effects following an incident because of its relatively low concentration and because it will quickly react in air or upon deposition. However, dependent on the amount of UF_6 released, the airborne HF plume generated in the vicinity of the release point could cause fatality to humans and animals from inhalation, but would rapidly disperse downwind. Lethal air concentrations of HF immediately following a release of UF_6 would not be expected at the proposed EREF site boundary as supported by the results of the accident analysis in Section 4.2.15.

Uranium contamination deposited on the ground would be initially confined to a thin surface layer on vegetation and surface soil. Uranium concentrations in soil and vegetation near the release point would be expected to be similar to those measured following the accidental rupture of 14-ton cylinders containing liquid UF_6 at fuel cycle facilities (DOE, 1978; NRC, 1986). Based on this historical data and supported by atmospheric dispersion models, a plume might be expected to extend on the order of 1 to 2 kilometers (0.6 to 1.2 miles) in the primary wind direction, with rapidly decreasing contaminant concentrations moving away from the source. For the proposed EREF, the highest ground and vegetation concentrations would be expected to be confined to the proposed EREF property because of the large distance from the proposed facility to the property boundary. The resultant environmental concentrations beyond a few tens of meters from the release point after the plume has passed by and deposition has occurred would not be expected to cause any long-term chemical or radiological effects to humans, wildlife, or vegetation. In the short term, resuspension of uranium particulates could result in a small inhalation hazard, but weathering processes (e.g., wind and precipitation) would be expected to reduce average concentration levels. However, some concentration of the uranium could occur in certain areas due to preferential flow of water runoff during heavy precipitation events.

The actual extent of any plume would be determined with high precision using appropriate radiation surveys following an incident. The amounts of uranium and HF directly deposited on plants near the release point would be measured and the consumption of vegetation by humans and/or animals restricted as necessary (NRC, 1986). The restrictions in consumption would occur for a defined time interval and would be removed after new measurements indicate safe use of vegetation by humans and/or animals. In addition, if necessary, exposures to the public would be prevented by restricting access. Survey data would be used to compute risks to the public and environment, and appropriate cleanup actions would be taken. Exposure analysis would include direct and indirect pathways, including food chain analyses.

Cleanup conducted in a timely manner would minimize migration of contamination to greater soil depths or to surface water or groundwater. Little or no surface water exists in area of the proposed EREF, which is primarily rangeland and farmland. Depending on the extent of the contamination, cleanup could include decontamination and repair of damaged equipment and buildings, possible excavation of a thin surface layer of soil, and removal of vegetation. Wastes from cleanup activities would be shipped offsite for disposal at a licensed low-level waste facility. Such cleanup would reduce residual risks to acceptably low levels, likely to background levels if soil were removed. Depending on the extent of the contamination and damage, cleanup costs could reach into the tens of millions of dollars or more for decontamination and cleanup of the local area, costs for repair of damaged facilities, (DOE, 2007; see Appendix H for construction costs), and remediation of the surrounding area, if uranium and soil concentrations in soil and vegetation are considered excessive.

A terrorist act would interrupt facility operations until the essential cleanup activities are complete. This would have an impact on the economic activity in the area because people would be out of work for the duration of the cleanup activities. At the same time, some economic activity will take place, such as employment of workers to conduct the cleanup activities. The duration of these cleanup activities and the number of personnel required would depend on the severity of the contamination.

4.2.18.3 Mitigative Measures

Mitigative measures proposed for potential releases under accident conditions as described in Section 4.2.15.3 would also be applied, as appropriate, as mitigative measures against terrorist attack. Such measures identified by AES include, but are not limited to, process system(s) and building construction designed to minimize the quantity of radioactive material at any given location and to isolate that material from the outside environment and detection and alarm systems for radiation and fire hazards, in conjunction with barriers designed to prevent the spread of material within the proposed facility (AES, 2010c). While adversaries might seek to defeat some of the listed elements of the mitigative controls, the protective system would be designed to provide defense-in-depth and would be robust to limited degradation.

Prior to operation of the proposed EREF, AES would also be required to fully implement security measures required by 10 CFR Parts 73, 74, and 95 of the regulations and additional security requirements issued by order. The NRC anticipates imposing additional security measures on AES to address the current threat environment (NRC, 2010e). Under the additional security measures, AES would need to identify critical target areas, if any, and provide a means for protecting these areas. Critical target areas would be determined based on hazards related to licensed radioactive materials. In addition, these measures would include, for example, information protection, personnel trustworthiness and access authorization, material control and accounting, and physical protection systems and programs. Compliance with these security measures would mitigate potential consequences of adversary actions.

4.3 Cumulative Impacts

The CEQ regulations implementing NEPA define cumulative impacts, or effects, as "the impact on the environment which results from the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). In the following analysis, cumulative impacts are assessed from the anticipated impacts of the proposed EREF project when added to other identified projects, facilities, or activities in the region that have impacts that affect the same resources or human populations. Effects from the various sources may be direct or indirect and they may be additive or interactive. Such effects are assessed that, when on their own, may be minor, but in combination with other effects may produce a cumulative effect that is of greater concern.

To identify the activities in the region that could contribute to cumulative impacts, an ROI was defined for each resource that is expected to be impacted by the proposed EREF project. An ROI for a particular resource is the size of the surrounding area within which impacts from multiple sources may be additive or interactive. The sizes of the ROIs may be different for various resources, and some resources may be remote from the proposed site, such as a waste disposal facility or a receiving water body downstream of the proposed project. Still others might cover large areas, such as a watershed or airshed. The resource ROIs are discussed further later in this section. For the proposed EREF, an ROI radius of 16 kilometers (10 miles) was identified for all resources except socioeconomics, for which an ROI radius of 80 kilometers (50 miles) was identified. Impacts on the full extent of the resources affected, such as an ecoregion, were analyzed, even if the resource extends beyond the identified ROIs.

A search was conducted to identify projects or activities in the region that would contribute to cumulative effects. This review included existing activities in the region that would affect the same resources as the proposed EREF project, known past impacts on these resources, and reasonably foreseeable proposed new projects, activities, or facilities that would impact these resources. Foreseeable development in the region was assessed through consultation with local development boards and agencies with which proposed plans for projects must be filed. Past impacts have resulted primarily from the development of agriculture in the region and the development of the INL near the proposed project site. The main INL facilities lie outside the 16-kilometer (10-mile) ROI, but within the 80-kilometer (50-mile) ROI for socioeconomics.

Impacts from preconstruction activities for the proposed EREF are addressed as cumulative impacts in this EIS, as these actions are not part of the proposed action. These impacts are discussed within the various resource area discussions in Section 4.2 so that they can be presented alongside similar impacts from construction of the proposed facility, which are part of the proposed action. For the purposes of cumulative impacts analysis in this EIS, preconstruction activities are considered past activities because they occur prior to the main aspects of facility construction and prior to facility operation.

Also considered in this section is the construction and operation of the proposed 161-kilovolt (kV) electrical transmission line and associated substation installation and upgrades to provide electrical power for the operation of the proposed EREF. Rocky Mountain Power (RMP) proposes to build a 161-kV transmission line that would extend westward from the existing Bonneville Substation 14.5 kilometers (9 miles) along an existing 69-kV transmission line ROW to the existing Kettle Substation near the proposed EREF site and continue a total 7.6 kilometers (4.75 miles) further to the proposed new Twin Buttes Substation within the proposed EREF property, a total length of 22.1 kilometers (13.75 miles). This proposed project would involve a rebuild/replacement of the 14.5-kilometer (9-mile) long 69-kV line portion to include a double circuit line, with one side energized at 69 kV and the other side at 161 kV to provide service to the proposed Twin Buttes Substation. The proposed Twin Buttes Substation will be located within a 15-acre area on the proposed EREF site that would be excavated during preconstruction activities. The proposed project would also include modifications at the Bonneville Substation. The details of the route as well as other critical parameters of the transmission line construction that would impact air quality are contained in Appendix H to the EREF ER (AES, 2010a), and the proposed transmission line is further described in Section 2.1.3.2.

No additional ongoing or planned developments were identified within 16 kilometers (10 miles) ROI of the proposed project location. However, several ongoing and proposed developments within 80 kilometers (50 miles) have been identified that could contribute to a regional socioeconomic impact in combination with the proposed project. A listing of these projects and potential cumulative socioeconomic impacts are presented in Section 4.3.12 below. Among these is the proposed Mountain States Transmission Intertie, a proposed 500-kV transmission line running between western Montana and southeastern Idaho (NorthWestern Energy, 2008). The project is currently undergoing environmental review under NEPA. The preferred route lies approximately 40 kilometers (25 miles) to the west of the proposed EREF site, running north-south. Two alternate routes lie closer, the nearest running adjacent to the western boundary of the proposed EREF property just outside of INL property, and the other route crossing US 20 about 10 miles east of the proposed EREF site. Construction of this transmission line is planned to begin in 2010 and be completed in early 2013, with service starting in 2013. Assuming that the preferred route will be selected, cumulative impacts would occur only to socioeconomics in the region. If one of the closer alternative routes is selected, cumulative impacts on other resources would have to be considered.

The following sections present assessments of the potential cumulative impacts of the construction and operation of the proposed EREF for each resource area. Under the no-action alternative, the proposed site would continue to be used for agriculture and cumulative impacts would be equivalent to current impacts and generally less than those for the proposed action, except in terms of local job creation. Therefore, except for socioeconomic impacts, the cumulative impacts of the no-action alternative are not discussed in detail.

4.3.1 Land Use

The EREF is being proposed on private land located in a remote location. The area is zoned for grazing, which in Bonneville County allows for industrial activities such as construction and operation of a uranium enrichment facility. Cumulative land use impacts would result if land use designations were altered through incremental development. The proposed EREF project is consistent with other development that has occurred in the county on INL land under the current zoning. No future development activities are reasonably foreseeable that would result in a cumulative alteration to land use designations. Therefore, cumulative land use impacts would be SMALL.

The proposed installation of the 161-kV transmission line to power the proposed EREF would be entirely on private land (AES, 2010a). Current land use within the proposed transmission line corridor is agricultural and open rangeland (USGS, 2009), and is not expected to be restricted as a result of the installation of the transmission line. Cumulative land use impacts associated with the construction and operation of the proposed transmission line would be SMALL.

4.3.2 Historic and Cultural Resources

The proposed EREF would be constructed on private land in a remote location. No additional development is currently known for the region. The Wasden Complex archaeological site is located in the general vicinity of the proposed EREF. In the event that additional development did take place, there could be the potential for impacts to occur to the viewshed associated with this significant historic and cultural resource. Cumulative impacts could also occur to historic and cultural resources if a particular site type was systematically removed. The significant cultural resource site known on the proposed EREF site, site MW004, is a historic homestead. This site type is found throughout the region (Gilbert, 2010), and the potential for this site type to be removed entirely from the region is unlikely. Therefore, cumulative impacts to historic and cultural resources would be SMALL.

The Area of Potential Effect (APE) for the proposed 161-kV transmission line project is 202.3 hectares (500 acres) for the line itself. The fenced area at the proposed modified Bonneville Substation is 1.3 hectares (3.1 acres), and the proposed new Twin Buttes Substation on the proposed EREF site itself would occupy a 2.1-hectare (5.2-acre) fenced area. Portions of the proposed Twin Buttes Substation and of the proposed transmission line adjacent to the proposed EREF were surveyed previously as part of the survey for the main portion of the proposed EREF site (Ringoff et al., 2008). Site MW004 was identified during this survey near the location of the proposed Twin Buttes Substation. See Section 4.2.2.1 for a discussion of the effects on the site MW004 and the mitigation approach. The ROW for the proposed 161-kV transmission line has been surveyed for the presence of historic and cultural resources

(Harding, 2010). The survey examined the 202.3-hectare (500-acre) APE which is derived from the 22.12-kilometer (13.74-mile) transmission line and 45.72 meters (150 feet) on either side of the centerline (91.4-meter [300-foot] total width). No historic and cultural resources were identified in these surveys. It is currently unclear whether additional areas would be needed for some aspects of the transmission line construction (e.g., pulling and tensioning sites). AES has stated that an unanticipated discoveries and monitoring plan will be in place during construction (AES, 2010e). Consultation between the NRC and the Idaho SHPO is ongoing concerning historic and cultural resources along the proposed transmission line ROW and at the substations (NRC, 2010b). The Shoshone-Bannock Tribes was also contacted to determine if it had issues of importance to the tribe concerning the proposed transmission line project (NRC, 2010c).

4.3.3 Visual and Scenic Resources

Cumulative impacts to visual and scenic resources would occur if additional development resulted in a significant change in the visual qualities of the region. No additional development is planned for the region. In the event that additional industrial development occurred in the vicinity of the proposed EREF, it could have a negative impact on the scenic qualities of the Wasden Complex archaeological site and the Hell's Half Acre WSA. The natural character of the area is currently intact. A series of industrial developments could alter the visual qualities of the area, which would not be consistent with the BLM VRM class currently in place for the Hell's Half Acre WSA. However, no additional development is reasonably foreseeable for the area; therefore, the cumulative impact would be SMALL.

The proposed transmission line to be constructed for the proposed EREF has the potential to affect visual and scenic resources. The proposed transmission line largely follows an existing ROW for an existing 69-kV line. The proposed transmission line is a 161-kV line that will replace the 69-kV line. It will be mounted on poles that can be as much as 24.4 meters (80 feet) tall (AES, 2010a). The new transmission line would be plainly visible from US 20. However, there are no specific key observation points along most of the route. The closest key observation point is the trailhead for the Twenty Mile Trail at the Hell's Half Acre WSA, but most of the proposed transmission line would not be visible from this trailhead. The only portion of the proposed line that would be visible is where this line enters the proposed EREF site. The cumulative visual impact from the proposed transmission line would be SMALL.

4.3.4 Air Quality

Some expansions of local businesses can be expected to occur in support of construction and operation of the proposed EREF. However, the air impacts from such expansions are expected to be negligible. No other major facility is expected to be constructed in the local area specifically to support, or as a direct result of, EREF operations. However, operation of the proposed EREF would result in increased energy requirements for the local area. Air impacts could result from expansions of existing sources of energy generation or construction of new energy generating sources to meet increased electricity demands or as a result of modifications to electricity distribution networks. However, no specific plans are known to exist for any such activities, so it is not possible to quantify the air impacts to the local airshed. Activities at the preexisting major sources of air pollution in the four-county area (see Section 3.5.3.2) are not expected to be affected by the construction and operation of the proposed EREF, and extant emissions of criteria pollutants from those major sources are expected to remain unchanged.

To provide electrical power to the proposed EREF, RMP proposes to build a 161-kV transmission line as discussed earlier in Section 2.1.3.2. Air quality impacts associated with construction of this transmission line would include the release of criteria pollutants from the operation of reciprocating internal combustion engines of the construction vehicles and equipment, the delivery trucks that bring components to the job site, and the vehicles used by the construction workforce to commute to and from the job site (AES, 2010a). Fugitive dust would be created during construction of access roads, vegetation clearing of the proposed transmission line ROW and ground clearing and/or grading to create equipment laydown areas and staging areas for cranes and conductor pulling/tensioning equipment, and ground clearing and excavations associated with constructing foundations for the support towers. Similar impacts would occur during construction of new or modified substations. Some additional criteria pollutant emissions and fugitive dust would be associated with ancillary activities such as production of concrete for foundations. During operation, air impacts would result from vehicles traveling to and within the ROW for regular inspections, repairs, and occasional component replacements and from corona discharges from the conductors that would produce negligible amounts of ozone and nitrogen oxides (AES, 2010a).

According to AES (2010a), critical aspects of the planned construction from an air quality perspective include: a relatively small workforce (6–8 persons), a relatively short construction time frame (4 months for the proposed transmission line, 6 months to complete construction of the proposed Twin Buttes Substation and necessary upgrades to the Bonneville Substation), the relatively short commute of the workforce (from a hotel in Idaho Falls, a distance of 25 miles or less to any point along the proposed route or to a substation location), foundations for towers constructed with minimal ground surface disturbance (augered holes, backfilled with excavated materials and without concrete) (AES, 2010a). Also, RMP has proposed the use of mitigative measures such as watering the disturbed ground in construction areas and the unpaved access roads to reduce fugitive dust generation. Finally, except for one new unpaved 500-foot (152.4-meter) access road, existing paved roads and construction roads on the proposed EREF property would provide sufficient access to the ROW. Given the topography of the proposed route, the amount of grade alteration that would be required to create level areas for staging of cranes and conductor pulling/tensioning equipment is expected to be minimal. All of the scheduled construction activities that would result in air impacts are of relatively modest proportion and limited duration. Further, many of the air impacting activities typically associated with transmission line construction such as access road construction would occur to a very limited extent. The NRC staff concludes, therefore, that the air impacts from construction of the proposed transmission line would be of short duration and would be SMALL.

According to AES (2010a), during operation the proposed transmission line would undergo scheduled visual inspection once every two years with inspectors traveling from Shelly, Idaho, eight miles southwest of Idaho Falls. Maintenance actions would also result in the release of criteria pollutants and fugitive dust resulting from vehicle travel on access roads and within the ROW. Pole inspections would occur on a 10-year interval (AES, 2010a). It is reasonable to assume that pole replacements (similar in air impacts to initial construction) would occur only rarely, when found to be necessary. Given the nominal voltage of the line (161 kV), corona discharges that would result in the formation of ozone and nitrogen oxides would be negligible.

The NRC staff concludes that air impacts associated with operation of the proposed transmission line would be SMALL.

The NRC staff concludes that cumulative impacts to air quality from the construction and operation of the proposed EREF and from construction and operation of the proposed transmission line serving the proposed site would be SMALL.

4.3.5 Geology and Soils

The proposed EREF site is located in a region predominantly used for irrigated crops and grazing. Contamination of soils and the underlying aquifer have been reported at the INL site, just to the northwest of the proposed site (EPA, 2009c). Other sources of contamination in the region include animal feedlots, land applications (fertilizer, pesticide, wastewater, and sludge), storage tanks, waste tailings, landfills, and industrial facilities. Excessive irrigation in the region increases the potential for soil contaminant leaching and runoff (Shumar et al., 2007). Because of these concerns, the U.S. Department of Agriculture and the State of Idaho have partnered to create the Conservation Reserve Enhancement Program (CREP) to provide incentives to farmers who volunteer to take cropland and marginal pastureland out of agricultural production (USDA, 2006).

Potential soil contamination resulting from preconstruction, construction, and operation of the proposed EREF could be avoided or minimized by implementing BMPs and mitigation measures, such as those that would be described in the proposed facility's SPCC Plan (to be prepared by AES). Mitigation measures would also be implemented during all project phases to minimize soil erosion and control fugitive dust (AES, 2010a). In addition, potentially contaminated runoff from the storage pads would discharge only to lined stormwater retention basins, and solids carried in process effluents from plant operations would remain within the Liquid Effluent Treatment System Evaporator (AES, 2010a). For these reasons, NRC staff concludes that the proposed EREF project's contribution to cumulative impacts on soils would be SMALL.

For construction of the proposed 161-kV transmission line, soil impacts such as increased potential for erosion and compaction could result from soil-disturbing activities at pulling and tensioning sites, construction and staging yards, and structure sites, and along the new access road and substation construction site. Because soil impacts would occur primarily during the construction phase, they would be short in duration. Disturbance-related impacts could be avoided or minimized by implementing standard BMPs and mitigation measures, such as those that would be described in the proposed facility's SPCC Plan. Mitigation measures would also be implemented during all project phases to minimize soil erosion and control fugitive dust (AES, 2010a). Limiting heavy equipment and vehicles to designated areas (roads and staging areas) would minimize the extent of soil compaction. For these reasons, the NRC staff concludes that the proposed transmission line project's contribution to cumulative impacts on soils would be SMALL.

4.3.6 Water Resources

The ESRP aquifer is the source of water for the proposed EREF. Because it is the principal source of drinking water for southeastern and south-central Idaho, the ESRP aquifer was designated as a sole source aquifer in 1991 (EPA, 2009e). The IDEQ estimated that the ESRP aquifer contains as much as 1233 billion cubic meters (1 billion acre-feet) of water (IDEQ, 2005). Use of the regional water supply is regulated by the IDWR through appropriations that are granted by water rights. Water rights permit their holders to divert public waters for beneficial uses (IDWR, 2010).

The proposed EREF would be expected to use about 837,000 cubic meters (221 million gallons) of water during its first 12 years (see Table 4-10) and an average of 24,900 cubic meters (6.6 million gallons) of water annually during years 13 through 30 (AES, 2009a). Based on these projections, the total water usage would be as high as 1.3 million cubic meters (340 million gallons or 1043 acre-feet) of ESRP aquifer waters over the 30-year life of the proposed facility, taking into account industrial usage during preconstruction, construction, and operations (AES, 2010a). This constitutes a very small portion, less than 1 percent, of the 1233 billion cubic meters (1 billion acre-feet) of the ESRP aquifer reserves in the State of Idaho (IDEQ, 2006). Therefore, the NRC staff concludes that the proposed EREF project's contribution to cumulative impacts on the region's groundwater supply would be SMALL.

Portions of the ESRP aquifer have been contaminated, mainly as a result of the disposal operations at the INL site (Shumer et al., 2007; EPA, 2009c). Recent multilevel groundwater monitoring of INL wells conducted by the USGS INL project office indicates that contamination in the aquifer varies with depth and that wastewater constituents originating from INL (such as tritium and various VOCs) tend to sink to greater depths as groundwater moves to the southwest (downgradient). These data are consistent with models predicting that contaminants downgradient of the INL boundary are most concentrated in deeper zones of the aquifer, at depths beyond those of residential wells in southeastern Idaho (Roy Bartholomay as quoted in Lundquist, 2010). The vertical distribution of contaminants in the ESRP aquifer is attributed to variability in groundwater movement, which is influenced locally by geologic conditions and patterns of recharge (e.g., precipitation, wastewater returns, streamflow infiltration, irrigation infiltration, inflow from adjoining drainage basins, underflow from drainage basins, and groundwater upwelling) and discharge, including heavy pumpage for irrigation (Bartholomay and Twining, 2010).

Land applications of fertilizer and pesticides and excessive irrigation are the main causes of contamination in shallow aquifers, and present a future concern for the ESRP aquifer (Shumer et al., 2007). Potential groundwater contamination resulting from the operation of the proposed EREF could be avoided or minimized by implementing BMPs and mitigation measures, such as those that would be described in the proposed facility's SPCC Plan. In addition, potentially contaminated runoff from the storage pads would discharge only to lined stormwater retention basins, and no process effluents would be discharged to the stormwater basins or into surface water (AES, 2010a). For these reasons, the NRC staff concludes that the proposed EREF project's contribution to cumulative impacts on surface water and groundwater quality would be SMALL.

Impacts to water resources from construction of the proposed 161-kV transmission line would occur in areas where soil-disturbing activities would change natural drainage patterns or increase surface runoff (and sedimentation potential) offsite. (Poles are not likely to be installed deep enough to create conduits to groundwater.) Accidental releases of hazardous materials and wastes (such as those used in voltage transformers) could impact the quality of surface water or groundwater. Because soil-disturbing activities would occur primarily during the construction phase, they would be short in duration. Water quality-related impacts could be avoided or minimized by implementing standard BMPs and mitigation measures, such as those that would be described in the proposed facility's SPCC Plan. Mitigation measures also would be implemented during all project phases to minimize surface runoff and soil erosion and the potential for inadvertent spills or releases (AES, 2010a). For these reasons, the proposed transmission line's contribution to cumulative impacts on water resources would be SMALL.

4.3.7 Ecology

Past and ongoing impacts to sagebrush steppe, the predominant community type in the Eastern Snake River Basalt Plains ecoregion, and wildlife have resulted primarily from habitat losses, such as from agriculture, fragmentation, and decreases in habitat quality due to livestock grazing (Connelly et al., 2004; BLM/DOE, 2004; ISAC, 2006). Invasive species and changes in fire regimes have also impacted sagebrush steppe in the region. Large areas of sagebrush habitat have been replaced by non-native grasses, through range improvement efforts or by wildfires. All of these factors, as well as roadway construction, have contributed to fragmentation of sagebrush habitat within the ecoregion. Increasing fragmentation decreases the patch size of undisturbed habitat, increases edge area, and decreases habitat connectivity (NorthWestern Energy, 2008). Species that require large contiguous habitat areas may decline. Some sagebrush obligate bird species, for example, can show declines within 100 meters (328 feet) of roadways, and mule deer and elk are affected by the proximity of roads (NorthWestern Energy, 2008).

These land uses and associated impacts are expected to continue into the foreseeable future. Additional future losses of habitat may result from additional conversion to cropland or development. Impacts to habitat and wildlife in the region could result from the construction of the Mountain States Transmission Intertie. An alternative route of that transmission line would be located adjacent to the proposed EREF property (MDEQ, 2010). The proposed action would contribute a loss of approximately 75 hectares (185 acres) to the cumulative impacts on sagebrush steppe habitat (AES, 2010a). This area represents approximately 0.7 percent of the sagebrush steppe within 8 kilometers (5 miles) and 0.2 percent within 16 kilometers (10 miles), and would result in a minor contribution to losses of sagebrush habitat within the area and ecoregion. The contribution to habitat fragmentation would be small due to the location of the proposed facility adjacent to previously disturbed nonirrigated pasture and cropland. Greater sage-grouse (*Centrocercus urophasianus*), a sagebrush obligate species and a candidate for Federal listing, have experienced severe long-term population declines in Idaho and throughout their range. These declines have been due in large part to the loss, degradation, and fragmentation of sagebrush habitat (Connelly et al., 2004; BLM/DOE, 2004; ISAC, 2006). Throughout the region, sagebrush communities have been converted to farmland and grasslands and have been lost or severely degraded by wildfires (Connelly et al., 2004; BLM/DOE, 2004; ISAC, 2006). As noted in Section 3.8, approximately 98 percent of the BLM Upper Snake Field Office Planning Area, which includes the proposed EREF property, is sagebrush steppe. Approximately 20,725 hectares (51,213 acres) of cultivated cropland and 3892 hectares (9617 acres) of recently burned grassland and introduced annual grasses occur within 16 kilometers (10 miles) of the proposed EREF (Landscape Dynamics Lab, 2009). Based on surrounding areas, these, along with other disturbed areas, likely represent losses of what had been mostly sage-grouse habitat. As discussed in Section 4.2.7, the proposed action would result in a minor contribution to losses and fragmentation of sagebrush habitat within the area and ecoregion. Sage-grouse would also likely avoid areas near the proposed facility during construction and operations, creating a somewhat larger area of effective loss of habitat. This loss would be a small incremental addition to the cumulative impacts on sage-grouse habitat within the 16-kilometer (10-mile) area and within the ecoregion, and would continue throughout the license period and potentially beyond, depending on post-decommissioning use of the site. Therefore, the contribution to cumulative impacts from the proposed EREF project on sage-grouse and other ecological resources would be SMALL.

For construction of the proposed 161-kV transmission line, vegetation would be cut where necessary for equipment operation at work areas for pole locations and pulling and tensioning sites. Pole location work areas would be 1444 square meters (15,625 square feet) in area; pulling and tensioning site work areas would be 7442 square meters (80,000 square feet) or 5978 square meters (64,000 square feet) in area (AES, 2010a). At some pulling and tensioning sites, ground disturbance could occur within a 150-meter (500-foot) radius (AES, 2010a). Disturbed soil in work areas would be graded to blend with natural contours and reseeded as necessary (AES, 2010a). One new access road, a 2-track dirt road, would be constructed on the east side of the proposed EREF site. Larger shrubs within the ROW or access roads would be cut to allow equipment access, while shorter shrubs would be driven over.

Vegetation types within a 91-meter (300-foot) wide corridor surveyed for the proposed transmission line route are similar to those of the proposed EREF site and include 48 hectares (118 acres) of sagebrush steppe, 155 hectares (382 acres) of irrigated cropland, and small areas of nonirrigated pasture planted with crested wheatgrass (AES, 2010a). Approximately 3.2 hectares (7.9 acres) of sagebrush steppe habitat would be permanently removed for access road and structure locations. Most of the sagebrush steppe within the corridor occurs within the existing ROW between the Bonneville and Kettle Substations. This habitat has been previously fragmented by the existing 69-kV transmission line and access roads. Expansion of the Bonneville Substation would primarily affect cropland. The location of the new Twin Buttes Substation on the proposed EREF site would be cleared and graded during EREF preconstruction. The loss of 3.2 hectares (7.9 acres) of sagebrush steppe habitat would contribute incrementally to the loss of this habitat type in the region, including the loss of 75 hectares (185 acres) associated with construction of the proposed EREF, and would result in a small contribution to cumulative impacts on this habitat type.

Indirect effects on sagebrush steppe habitat of transmission line construction and operation could also include erosion, sedimentation, spread of invasive species, reduction in habitat quality, and habitat fragmentation. Populations of sagebrush steppe species that are cut or crushed by heavy equipment in work areas, such as at pulling and tensioning sites, may require considerable periods of time to return to pre-disturbance levels, and some species may not recover. Some mortality of big sagebrush or other species would likely occur. In addition, non-native species occurring in the area or introduced to the sites could become established or expand into areas disturbed by construction activities. The habitat quality of these areas may subsequently be reduced. Invasive species, such as cheatgrass, can greatly change the fire regime, increasing the frequency and intensity of fires, adversely affecting native habitats such as sagebrush steppe. Transmission line ROWs can promote the spread of invasive species (BPA, 2000). Erosion of disturbed soils or from cut-over areas may contribute to reduction in sagebrush steppe habitat or habitat quality. Sedimentation from disturbed soils may degrade habitat along drainages or in wetlands that occur downstream. Erosion and sedimentation impacts would be reduced, however, by planned mitigation measures. Although habitat fragmentation can occur as a result of transmission line construction, the sagebrush steppe along the proposed transmission line route would be predominantly included within an existing ROW or would be located adjacent to the proposed EREF. Small portions of the proposed transmission line route east of the proposed EREF would be located in undisturbed areas and would contribute to the fragmentation of sagebrush steppe habitat. These indirect impacts would result in a small contribution to cumulative impacts on native habitats within the region.

Impacts of transmission line construction and operation could also include wildlife disturbance and wildlife mortality. The proposed transmission line route includes potentially suitable habitat for sagebrush obligate species, including migratory bird species, although much of this habitat has been affected by the existing transmission line and access roads. These species could be affected by the permanent loss of 3.2 hectares (7.9 acres) of sagebrush steppe habitat and the temporary loss of habitat in work areas and reduction in habitat quality of disturbed areas of sagebrush steppe in work areas. No sage-grouse leks have been found in the immediate vicinity of the new transmission line route (North Wind, 2010).

Wildlife would also be disturbed by noise and human presence during the construction of the proposed transmission line and expansion of the Bonneville Substation. Migratory birds nesting in the vicinity of the transmission line construction could be affected if nest abandonment occurs. The new transmission line would be approximately 150 meters (490 feet) closer to the nearest sage-grouse lek, compared to the proposed EREF. As with EREF construction, however, noise levels associated with transmission line construction would not be expected to affect sage-grouse at the lek. These indirect impacts would result in a small contribution to cumulative impacts on wildlife populations within the region.

The construction of a new transmission line could contribute to avian mortality as a result of bird collisions with the power lines, and could affect migratory bird species. Sage-grouse and sharp-tailed grouse, which are known to occur in the area, could be impacted due to the proximity of US 20 and movements between habitat north and south of the highway and proposed transmission line, or when migrating between seasonal use areas. While bald eagles, which nest along the Snake River, could potentially be affected by collisions with the transmission lines, such impacts are unlikely because of the distance from nesting and foraging areas. In addition, raptors, such as hawks and eagles, may perch on transmission line support structures, potentially resulting in mortality from electrocution. Ferruginous hawks, which nest in the region, could be also affected by the new transmission lines. However, RMP would implement design measures for the protection of raptors and other bird species, reducing potential impacts (AES, 2010a). Most of the proposed transmission line would be included within the existing 69-kV transmission line ROW, with about 7.6 kilometers (4.75 miles) of new ROW between the Kettle Substation and the proposed Twin Buttes Substation. The number of birds affected by the new line within the existing ROW could be greater than those currently affected. Relatively few birds would be expected to be affected by the new line within the proposed 161-kV transmission line ROW, much of which would be located within or adjacent to the proposed EREF site. The contribution of the proposed new transmission line to cumulative impacts on bird populations in the ecoregion would be SMALL.

Because support structures can provide perch sites for raptors and corvids (ravens and crows), construction of the proposed transmission line may increase predation by raptors and corvids in the area. Populations of prey species, such as sage-grouse or pygmy rabbits, which may occur in the area, could be impacted by increased predation.

4.3.8 Noise

With the exception of the construction of the proposed transmission line connecting the proposed EREF with the transmission grid operated by RMP, no major industrial facilities are expected to be constructed in the vicinity of the proposed EREF property. Noise impacts will occur from the construction of the proposed transmission line, but those impacts would be sporadic and SMALL. The noise impacts on the proposed EREF property associated with the continuing activities at INL would be SMALL. Cumulative impacts to noise from preconstruction, construction, and operation of the proposed EREF, from the construction and operation of the proposed transmission line that would serve the proposed EREF, and from activities at INL would be SMALL.

4.3.9 Transportation

The impacts of construction (including preconstruction activities) and operation of the proposed EREF due to increased traffic from commuting construction workers would be SMALL to MODERATE, although no highway upgrades would be required other than safety enhancements on US 20 such as the construction of turning/acceleration/deceleration or a grade-separated interchange for entry to and exit from the proposed EREF. As noted in the introduction to Section 4.3, there are no planned or proposed/future actions the vicinity of the proposed EREF that would contribute to cumulative transportation impacts (i.e., affect traffic levels. Current activities that would contribute to cumulative transportation impacts include the shipment of radioactive materials from INL to Idaho Falls along US 20 (approximately 25–40 shipments per month) (INL, 2010). Because the INL shipments comprise less than 2 percent of current traffic flow on US 20 in the vicinity of the proposed EREF and the population density along this route is low, the cumulative effects on transportation would be SMALL.

Construction and maintenance of the proposed 161-kV transmission line and the substation work would require access to the ROW from US 20. Traffic volume could increase along US 20, and slowing or accelerating construction and maintenance vehicles could result in intermittent disruption of high-speed traffic flow (see Section 3.10.1). However, only two access points from US 20 are anticipated (both of which currently exist near the proposed EREF site); the remaining access points are from an adjacent county road. Less than 10 vehicles would be used at any one time during construction of the proposed transmission line and new substation (AES, 2010a), and large construction equipment would not likely travel to and from work sites on a daily basis during construction period. The additional number of daily vehicle-trips resulting from these activities would represent less than 2 percent of the anticipated peak increase in daily traffic to and from the proposed EREF site during preconstruction and construction (see Section 4.2.9.1). In addition, this impact would occur during the construction phase of the proposed EREF and would be short in duration. The NRC staff concludes that transportation impacts associated with transmission line construction and operation would be SMALL.

4.3.10 Public and Occupational Health

Public and occupational health impacts that might contribute to cumulative impacts would be associated with the construction and operation of the proposed 161-kV transmission line that would serve the proposed EREF. It is estimated that 30 workers would complete the construction of the proposed transmission line within one year (AES, 2010a). This level of effort represents less than 1 percent of the total FTE-years estimated to construct the proposed facility (see Table 4-14). Maintenance of the line and ROW during its operational life would add minimally to already small occupational injury rates for operating the proposed EREF (see Table 4-15). Since the public and occupational impacts of facility construction and operation would be SMALL, the small incremental addition of the transmission line construction and operation would only negligibly contribute to cumulative impacts.

With regard to cumulative impacts from fluoride emissions during facility operation, there are currently very low levels of exposure to the public from industrial chemical emissions in the region surrounding the proposed facility in general and no other known or anticipated sources of fluoride emissions. Thus cumulative effects on the public of the minor HF emissions expected from the proposed facility in combination with other chemical emissions in the region would be SMALL.

The annual collective population dose from operations was estimated to be approximately 1.7×10^{-5} person-sievert (1.7×10^{-3} person-rem) in Section 4.2.10.2. Such a dose is so low that it cannot be monitored, as is the case for the annual collective population dose from operations at the nearby INL, as discussed in Section 3.11.1. Exposure of individuals that may be near the proposed EREF property boundary would also be low. Thus, cumulative impacts to the public from radiological sources at the proposed EREF and other nearby sources would be SMALL.

4.3.11 Waste Management

As shown in Section 4.2.11, the impact of disposal of hazardous, nonhazardous solid, and solid low-level radioactive wastes from the proposed EREF at the appropriate facilities would be SMALL given past and present conditions. Based on available capacities at low-level radioactive and hazardous waste treatment and disposal sites, in conjunction with the expectation that there will be no large developments in the Idaho Falls area that would cause a significant increase in municipal waste disposal volume, the cumulative impacts from hazardous and solid waste generation would be SMALL.

Nonhazardous and sanitary wastes would be generated during construction and maintenance of the proposed 161-kV transmission line and the new and upgraded substations. Nonhazardous construction wastes (including debris from the dismantled 69-kV transmission line) would be recycled or transported to an approved landfill such as the Bonneville County Hatch Pit (see Section 4.2.11.1). Sanitary waste would be collected locally in portable systems. The generation of hazardous waste is not anticipated, but hazardous materials that are typical of a high-voltage application (including oil in transformers, sulfuric acid in batteries, diesel fuel in generators, and sulfur hexafluoride gas in circuit breakers) would be used and could require disposal at an approved disposal facility (AES, 2010a). Because the number and volume of waste shipments from construction of the proposed transmission line and new substation would represent less than 1 percent of those from preconstruction and construction of the proposed

EREF, the NRC staff concludes that the cumulative waste management impacts of transmission line construction and operation would be SMALL.

4.3.12 Socioeconomics

A number of other development projects have been proposed for the two-county ROI that could produce cumulative socioeconomic impacts in association with the proposed EREF, depending upon project scope and development schedules of the additional projects. (Note: These projects are all located within the 80.5-kilometer [50-mile] radius ROI for socioeconomics, but, with the exception of the proposed EREF transmission line, outside the 16-kilometer [10-mile] ROI for all other environmental resources.) The construction of the proposed 13.75-mile, 161-kv transmission line to support the proposed EREF would produce 57 jobs and produce $2.8 million in income, $0.1 million in direct sales taxes, and $0.1 million in direct income taxes in the region including Bingham and Bonneville Counties (AES, 2010a). Jobs, income, and tax revenues produced during transmission line operations would be small. In Bonneville County, additional developments could include the Snake River Landing planned community, the Taylor Crossing planned community, The Narrows mixed-use office/residential development, the Central Valley development, the McNeil Development that includes a Marriott Hotel and condominiums, the Sleep Inn Hotel, and the West Broadway soccer complex presently under construction (AES, 2009a). In Bingham County, planned developments would include the construction of a 150-unit wind power development (AES, 2009a).

These projects would provide additional employment opportunities for construction workers and would increase the economic activity in the region. Depending upon the timing of construction and operation of each of these projects, however, there could be a number of negative impacts. Although competition for the hiring of construction and operations workers may lead to wage inflation in the area, the size of the regional labor force is likely large enough to prevent this being a major issue. The development of additional projects would also lead to long-term employment opportunities and might result in in-migration into the area. Depending on the timing of construction for these projects and the type and quantity of construction materials needed, there could be supply shortages of some materials, leading to price increases. However, the magnitude of these impacts would likely be SMALL. Given all these considerations, the cumulative socioeconomic impacts of the proposed EREF project would be SMALL.

4.3.13 Environmental Justice

Minority and low-income populations occur within a 4-mile radius of the proposed EREF site (see Section 3.13) and within a two-mile buffer either side of the proposed 13.75-mile transmission line ROW that would be constructed to support the proposed EREF (Table 4-38). However, none of the Census block groups associated with the proposed EREF or the proposed transmission line route have minority or low-income populations that exceed county or State averages by more than 20 percentage points, or exceed 50 percent of total block group population. Preconstruction, construction, and operation of the proposed EREF and construction and operation of the associated transmission line would not produce high and adverse impacts to the general population, and so would not disproportionately impact minority and low-income populations. Accordingly, the cumulative impacts on minority and low-income populations would be SMALL.

Table 4-38 Minority and Low-Income Populations within the 2-mi (3.2-km) Buffer Associated with the Proposed Transmission Line

Parameter	
Total population	1777
White, non-Hispanic	1470
Hispanic or Latino	266
Non-Hispanic or Latino minorities	41
One race	22
Black or African American	6
American Indian or Alaskan Native	2
Asian	13
Native Hawaiian or other Pacific Islander	1
Some other race	0
Two or more races	19
Total minority	307
Low-income	178
Percent minority	17.3
County percent minority	10.5
State percent minority	9.0
Percent low-income	10.2
County percent low-income	10.1
State percent low-income	11.8

Source: U.S. Census Bureau (2010).

Although minority and low-income populations occur in the vicinity of the proposed EREF site (see Section 3.13), construction and operation of the proposed EREF would not affect such populations. Accordingly, the cumulative impacts on environmental justice populations would be SMALL.

4.4 Impacts of the No-Action Alternative

As presented in Section 2.2 of this EIS, the no-action alternative would be to not construct, operate, and decommission the proposed EREF in Bonneville County, Idaho. As discussed in the introduction to Section 4.2, the NRC has granted an exemption for AES to conduct certain preconstruction activities in advance of a formal licensing decision. If the NRC does not grant a construction and operating license for the proposed EREF, some or all of the preconstruction activities granted under the exemption approval (NRC, 2010a) are expected to have already occurred. It follows that the impacts associated with these preconstruction activities, as described in Section 4.2, will also have occurred. There may be additional activities occurring at the proposed site in the future under the no-action alternative that may have adverse or beneficial impacts on the environment. The impacts associated with these activities would depend on what AES would decide to do with the proposed site or any improvements (e.g., access roads) already constructed on the site. The impact conclusions presented in this section for the no-action alternative address the impacts of denying the license, but do not include the impacts of the NRC-approved preconstruction activities, some or all of which are expected to have already occurred.

Under the no-action alternative, nuclear electricity generation customers would continue to depend on existing suppliers (i.e., existing uranium enrichment facilities, foreign sources, and the Megatons to Megawatts Program) to fulfill uranium enrichment needs. In addition, three future domestic sources of enriched uranium are planned – two of which are currently under construction (American Centrifuge Plant [ACP] and NEF) and the third is planned and seeking a license from the NRC (GLE Facility). Current U.S. demand for low-enriched uranium is about 12 to 14 million SWU annually (EIA, 2009). USEC is currently the only domestic supplier of enrichment services, providing enriched uranium to both domestic and foreign users. Existing USEC enrichment activities include operation of the Paducah Gaseous Diffusion Plant (GDP), the downblending of highly enriched uranium under the Megatons to Megawatts Program that is managed by USEC and scheduled to expire in 2013, and the import of foreign-enriched product. By combining its domestic enrichment facilities and the downblending of foreign highly enriched uranium, USEC can provide for approximately 56 percent of the U.S. enrichment market needs (USEC, 2004) while foreign suppliers provide the remaining 44 percent.

Under the no-action alternative, the Paducah GDP, including the Megaton to Megawatts Program, would serve as the only domestic source of low-enriched uranium. Reliance on one domestic source for enrichment services could result in disruptions to the supply of low-enriched uranium, and consequently to reliable operation of U.S. nuclear energy production, should there be any disruptions to foreign supplies and/or the operations of domestic suppliers (i.e., if the ACP, NEF, or GLE Facility would not be constructed and operated and the Megatons to Megawatts Program would not be extended beyond 2013).

If the license application for the proposed EREF is not granted, nuclear electricity generation using enriched uranium from the proposed EREF could be replaced with other power generation sources (e.g., fossil-fuel plants), which would present of range of impacts that are outside the scope of this EIS. Alternatively, enriched uranium could be provided by sources constructed at other locations. Therefore, impacts similar to those quantified in this EIS would simply occur at a different location. Should another domestic enrichment facility be constructed at an alternate location, environmental impacts would occur and could range from SMALL to LARGE. These impacts could be similar to those of the proposed action, but would depend on various factors, e.g., the type of facility and the affected environment at the alternate location.

The site-specific impacts of the no-action alternative for each resource area are discussed in the following sections.

4.4.1 Land Use

Under the no-action alternative, AES would purchase the property and restrictions on grazing and agriculture would occur. The zoning designation for the property would remain G-1 Grazing whether or not the proposed EREF is constructed. Current land uses of grazing and farming could potentially resume. Impacts to local land use would be SMALL.

4.4.2 Historic and Cultural Resources

Under the no-action alternative, the proposed EREF would not be constructed. No visual effects or noise would affect the Wasden Complex. Nevertheless, it is assumed that AES would purchase the property and undertake preconstruction activities that would destroy site MW004. However, site MW004 would not be affected by the Federal (NRC) licensing action and the NHPA would not apply. However, the removal of site MW004, which has already occurred, resulted in a LARGE impact because the site no longer exists; but because AES removed this site through professional excavation and data recovery and there are other homestead sites of this type found in the region, the impact has been mitigated to a MODERATE level (WCRM, 2010; Idaho SHPO, 2010b; Gilbert, 2010). The impact on historic and cultural resources would be SMALL to MODERATE under the no-action alternative.

4.4.3 Visual and Scenic Resources

Under the no-action alternative, impacts to visual and scenic resources would be SMALL. The proposed EREF would not be constructed. AES would purchase the property and clear the vegetation; however, these activities are not expected to alter the viewshed. No major visual intrusions to the existing landscape would occur because no large industrial structures would be constructed. The existing natural character of the area would largely remain intact. The lack of development would be consistent with the BLM VRM Class 1 designation for the Hell's Half Acre WSA. No visual intrusions to the Wasden Complex viewshed would occur.

4.4.4 Air Quality

Under the no-action alternative, the air quality impacts associated with the construction, operation, and decommissioning of the proposed EREF would not occur. The proposed site could revert to agricultural activities, which would impact ambient air quality through the release of criteria pollutants from the operation of agricultural vehicles and equipment and the release of fugitive dust from the tilling of soils. Those impacts are expected to be substantially less than impacts resulting from preconstruction and the proposed action. The NRC staff concludes that local air impacts associated with the no-action alternative would be SMALL.

4.4.5 Geology and Soils

Under the no-action alternative, no additional land disturbance from construction would occur and the land on the proposed EREF site could revert to crop and grazing activities. Wind and water erosion would continue to be the most significant natural processes affecting the geology and soils at the proposed site. Impacts to geology and soils would therefore be expected to be SMALL.

4.4.6 Water Resources

Under the no-action alternative, additional water use may or may not occur, depending on future plans for the property. Water resources would be unchanged. Water usage could continue at the current rate, should agricultural activities resume at the proposed site, and impacts on the ESRP aquifer and downgradient water users would be SMALL. No changes to surface water quality would be expected, and the natural (intermittent) surface flow of stormwater on the proposed site would continue. No additional groundwater use or adverse changes to groundwater quality would be expected. Impacts therefore would be SMALL.

4.4.7 Ecological Resources

Most impacts on ecological resources would occur during the preconstruction phase. However, such impacts would also occur under the proposed action. The potential impacts associated with the construction, operation, and decommissioning of the proposed EREF would not occur. The land on the proposed EREF site could revert to crop and grazing activities. Denying the license would not result in additional land disturbance on the proposed EREF property. Revegetation of the site could occur with renewal of some wildlife habitat. Anticipated impacts on ecological resources from the no-action alternative would be SMALL.

4.4.8 Noise

Under the no-action alternative, none of the noise impacts associated with construction, operation, and decommissioning at the proposed EREF would occur. Land uses on the proposed EREF site could revert to previous applications, livestock grazing and/or crop production, with concomitant noise impacts. Impacts would be SMALL.

4.4.9 Transportation

Under the no-action alternative, traffic volumes and patterns would remain the same as described in the affected environment section. The current volume of radioactive material and chemical shipments to/from facilities other than the proposed EREF would not increase. Transportation impacts would be SMALL.

4.4.10 Public and Occupational Health

Under the no-action alternative, public and occupational health impacts would be SMALL. Occupational health impacts from construction, operation, and decommissioning would not occur. Associated worker and public impacts from chemical and radioactive hazards would also not occur. Should the land be returned to grazing and agriculture, the impacts would be SMALL.

4.4.11 Waste Management

Under the no-action alternative, since construction, operation, and decommissioning of the proposed EREF would not occur, new wastes including sanitary, hazardous, low-level radioactive, or mixed wastes would not be generated that would require disposition. Impacts from waste management would be SMALL.

4.4.12 Socioeconomics

Under the no-action alternative, any positive or adverse consequences of the construction, operation, and decommissioning of the proposed EREF would not occur and socioeconomic conditions in the ROI would remain unchanged. As a result, the impact of no action on social and economic conditions in the region would be SMALL.

Population in the area surrounding the proposed EREF, Bingham and Bonneville Counties, is expected to grow in accordance with current projections, with total population in the region projected to be approximately 156,491 in 2013 and 168,331 in 2017 (AES, 2010a). In addition to population growth, the social characteristics of the region, including housing availability, school enrollment, availability of health service resources, and law enforcement and firefighting resources, are expected to change over time. However, future changes in these characteristics are difficult to quantify, and no projections of their future growth are available.

4.4.13 Environmental Justice

The no-action alternative would not be expected to cause any high and adverse impacts; it should not raise any environmental justice issues. Therefore, any impacts would be SMALL.

4.4.14 Accidents

There would be no facility accidents during operation if the proposed EREF is not constructed. Therefore, impacts would be SMALL.

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5 MITIGATION

This chapter identifies possible measures to mitigate potential environmental impacts from preconstruction and the proposed action, as required by Appendix A of Title 10, "Energy," Part 51, of the U.S. *Code of Federal Regulations* (CFR) (10 CFR Part 51). Under Council on Environmental Quality (CEQ) regulation 40 CFR 1500.2(f), Federal agencies shall, to the fullest extent possible, "use all practicable means consistent with the requirements of the *National Environmental Policy Act* and other essential considerations of national policy to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions on the quality of the human environment." The CEQ regulations define mitigation to include activities that (1) avoid the impact altogether by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the action and its implementation; (3) repair, rehabilitate, or restore the affected environment; (4) reduce or eliminate impacts over time by preservation or maintenance operations during the life of the action; or (5) compensate for the impact by replacing or substituting resources or environments (40 CFR 1508.20). This definition has been used in identifying potential mitigation measures. As such, mitigation measures are those actions or processes (e.g., process controls and management plans) that would be implemented to control and minimize potential impacts associated with the proposed Eagle Rock Enrichment Facility (EREF).

AREVA Enrichment Services, LLC (AES) must comply with applicable laws and regulations, including obtaining all appropriate construction and operating permits. A complete discussion of applicable laws and regulations is included in Chapter 1 of this Environmental Impact Statement (EIS). The mitigation measures identified by AES (AES, 2010a), many of which are compliance related, are discussed in Section 5.1. Further, based on the potential impacts identified in Chapter 4 (Environmental Impacts) of this EIS, the U.S. Nuclear Regulatory Commission (NRC) staff has identified additional potential mitigation measures for impacts of the proposed EREF project. These measures are described in Section 5.2.

The mitigation measures identified in this chapter do not include environmental monitoring activities. Environmental monitoring activities are described in Chapter 6 of this EIS.

5.1 Mitigation Measures Identified by AES

Tables 5-1 and 5-2 summarize those mitigation measures that were identified in AES's Environmental Report (ER) for the proposed EREF (AES, 2010a) as applicable to the preconstruction/construction and operations phases, respectively. The information in Tables 5-1 and 5-2 is taken largely from the ER. These mitigation measures were identified by AES to reduce the potential environmental impacts of preconstruction and the proposed action. AES did not identify mitigation measures for socioeconomics or environmental justice for either construction or operations because the socioeconomic impacts of the proposed project are mostly positive and the proposed project will result in no disproportionately high impacts on low-income and minority populations (see Sections 4.2.12 and 4.2.13). Additional mitigation measures may be considered by AES as a result of AES's consultations and/or permitting activities with Federal, State, and local regulatory agencies other than the NRC.

Table 5-1 Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts

Impact Area	Activity	Mitigation Measures
Land Use	Land disturbance	Use the following best management practices (BMPs) to mitigate short-term increases in soil erosion and fugitive dust (additional discussion is provided below under Geology and Soils): • minimize the construction footprint to the extent practicable • limit site slopes to a horizontal-vertical ratio of four to one, or less • use a sedimentation detention basin • protect undisturbed areas with silt fencing and straw bales, as appropriate • use site stabilization practices such as placing crushed stone on disturbed soil in areas of concentrated runoff • water onsite construction roads at least twice daily, when needed, to control fugitive dust emissions • after construction is complete, stabilize the site with natural low-water consumption, low-maintenance landscaping, and pavement
Historic and Cultural Resources	Disturbance of prehistoric archaeological sites and sites eligible for listing on the *National Register of Historic Places*	Educate workers on the regulations governing cultural resources, stressing that unauthorized collecting is prohibited. Use onsite cultural resource monitors during construction activities. Implement procedures to address unexpected discoveries of human remains or previously unidentified archaeological materials during ground-disturbing activities and procedures for the evaluation and treatment of these resources. Cease construction activities in the area around any discovery of human remains or other item of archaeological significance and notify the State Historic Preservation Officer to make the determination of appropriate measures to identify, evaluate, and treat the discoveries. Treatment/mitigation plan for site MW004 (recommended eligible for inclusion in the *National Register of Historic Places*) to recover significant information on that site (professional excavation and data recovery have been conducted).

Table 5-1 Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Visual and Scenic Resources	Potential visual intrusions in the existing landscape character	Use accepted natural, low-water-consumption landscaping techniques to limit any potential visual impacts. Such techniques will incorporate, but not be limited to, the use of native landscape plantings and crushed stone pavements on difficult-to-reclaim areas. Use prompt revegetation or covering of bare areas with natural materials. Paint the proposed facility in colors that would blend with the surrounding vegetation to reduce the contrast between the proposed EREF plant and the surrounding landscape. Create earthen berms or other types of visual screens made of other natural material to help reduce the visibility of the proposed facility. Focus all perimeter lights to be downfacing to minimize light pollution.
Air Quality	Fugitive dust and point-source releases of criteria pollutants	Apply construction BMPs to minimize fugitive dust, including: • apply water twice daily (when needed) to unpaved onsite roads, excavation areas, and clearing and grading areas • use alternative dust palliatives (inorganic salts, asphaltic products, synthetic organics) • establish and enforce speed limits for onsite roads • suspend certain dust-producing activities during windy conditions • apply gravel to the unpaved surfaces of onsite haul roads as an interim measure before permanent pavements are installed • apply erosion mitigation methods in areas of disturbed soils • use water sprays at material drop and conveyor transfer points • limit the height and disturbance of material stockpiles • apply water to the surfaces of stockpiles • cover open-bodied trucks that transport materials that could be sources of airborne dust

Table 5-1 Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Air Quality (Cont.)		• promptly remove earthen materials deposited on paved roadways by wind, trucks, or earthmoving equipment • promptly stabilize or cover bare areas resulting from roadway or highway interchange construction Apply BMPs to the design and operation of onsite vehicle and equipment fueling activities to minimize the release to the atmosphere of nonmethane hydrocarbons and mitigate the potential impact of spills or accidental releases; including: • equip storage tanks with appropriate VOC controls, liquid level gauges, and overfill protection • provide training to fuel delivery drivers • post appropriate warning signs at the fuel dispensing facility • pave fuel unloading and dispensing areas and equip them with curbs to control small spills • ensure delivery contractors carry spill kits and are required to address minor spills during fuel deliveries Maintain all internal combustion engines and their pollution control devices in good working order.
Geology and Soil Resources	Soil disturbance	Use BMPs to reduce soil erosion (e.g., earth berms, dikes, and sediment fences). Promptly revegetate or cover bare areas with natural materials. Use water to control fugitive dust emissions. Use standard drilling and blasting techniques to minimize impact to bedrock, reducing the potential for over-excavation, thereby minimizing damage to the surrounding rock and protecting adjacent surfaces that are intended to remain intact. Place soil stockpiles generated in a manner to reduce erosion. Reuse onsite excavated materials whenever possible. Use a stormwater detention basin.

Table 5-1 Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Geology and Soil Resources (Cont.)		Follow the requirements of a Spill Prevention Control and Countermeasures (SPCC) Plan to reduce the potential impacts from chemical spills or releases around vehicle maintenance and fueling locations, storage tanks, and painting operations, and ensure prompt and appropriate cleanup. Follow appropriate waste management procedures to minimize the impacts on soils from solid waste and hazardous materials that would be generated during all phases. Where practicable, implement a recycling program for materials suitable for recycling.
Water Resources	Water quality	Employ BMPs to control the use of hazardous materials and fuels. Maintain construction equipment in good repair without visible leaks of oil, greases, or hydraulic fluids. Control and mitigate spills in conformance with the Spill Prevention Control and Countermeasure (SPCC) Plan. Ensure discharges to surface impoundments meet the standards for stormwater and treated domestic sanitary wastewater, and that no radiological discharges are made. Use BMPs to control stormwater runoff to prevent releases to nearby areas to the extent possible. Use BMPs for dust control associated with excavation and fill operations. Water conservation will be considered when deciding how often dust suppression sprays will be applied. Use silt fencing and/or sediment traps. Use only water (no detergents) for external vehicle washing. Place stone construction pads at entrance/exits where an unpaved construction access adjoins a State road. Arrange all temporary construction basins and permanent basins to provide for the prompt, systematic sampling of runoff in the event of any special needs. Control water quality impacts by compliance with the National Pollution Discharge Elimination System (NPDES) Construction General Permit requirements and by applying BMPs as detailed in the proposed site's Stormwater Pollution Prevention Plan (SWPPP).

Table 5-1 Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Water Resources (Cont.)		Implement a SPCC Plan for the proposed facility to identify potential spill substances, sources, and responsibilities. Berm or self-contain all aboveground gasoline and diesel storage tanks. Construct curbing, pits, or other barriers around tanks and components containing radioactive wastes. Handle any hazardous materials by approved methods and ship offsite to approved disposal sites. Handle sanitary wastes by portable systems until the Domestic Sanitary Sewage Treatment Plant is available for site use. Provide an adequate number of these portable systems. Require control of surface water runoff for activities covered by the NPDES Construction General Permit.
	Water use	Use low-water-consumption landscaping rather than conventional landscaping to reduce water usage. Implement conservation practices when spraying water for dust control.
Ecological Resources	Habitat and wildlife disturbance	Manage unused open areas (i.e., leave undisturbed), including areas of native grasses and shrubs, for the benefit of wildlife. Use native plant species (i.e., low-water-consuming plants) to revegetate disturbed areas, to enhance wildlife habitat. Fence the stormwater discharge basins to limit access by wildlife. Reduce vehicle speeds onsite. Use BMPs to minimize dust. Apply water at least twice daily, when needed, to control dust in construction areas, in addition to other fugitive dust prevention and control methods. Focus all lights downward.

Table 5-1 Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Ecological Resources (Cont.)		Improve the existing boundary fence to ensure pronghorn access to the remaining habitat on the proposed site. The fence would include a smooth top wire no more than 42 inches above the ground, adequate wire spacing to prevent wildlife entanglement, a smooth bottom wire approximately 16 to 18 inches above the ground, and durable markers to increase wire visibility (AEA, 2010b). Remove livestock to improve sagebrush habitat. Take the following measures during construction and decommissioning of the proposed EREF to protect migratory birds: • perform clearing or removal of habitat, such as sagebrush, including buffer zones, outside of the migratory bird breeding and nesting season • survey additional areas to be cleared for active nests during migratory bird breeding and nesting season • avoid activities in areas containing active nests of migratory birds • consult the U.S. Fish and Wildlife Service (FWS) to determine the appropriate actions regarding the taking of migratory birds, if needed Use no herbicides during construction. Repair and stabilize any eroded areas, and collect sediment in a stormwater detention basin. Follow BMPs for temporary and permanent erosion and runoff control methods (as identified under Land Use). Consider all recommendations of appropriate State and Federal agencies, including the Idaho Department of Fish and Game and the FWS.

Table 5-1 Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Noise	Exposure of workers and the public to noise	Restrict most of US 20 use after twilight through early morning hours to minimize noise impacts to the nearest residence. Restrict usage of heavy truck and earthmoving equipment after twilight through early morning hours during construction of the access roads and highway entrances, to minimize noise impacts on the Hell’s Half Acre Wilderness Study Area. Perform construction or decommissioning activities with the potential for noise or vibration at residential areas that could have a negative impact on the quality of life, during the daytime hours (7:00 am–7:00 pm). If it is necessary to perform an activity that could result in excessive noise or vibration in a residential area after hours, notify the community in accordance with site procedures. Use engineered and administrative controls for equipment noise abatement, including the use of equipment and vehicle mufflers, acoustic baffles, shrouding, barriers, and noise blankets. Sequence construction or decommissioning activities to minimize the overall noise and vibration impact (e.g., establish the activities that can occur simultaneously or in succession). Use blast mats, if necessary. Create procedures for notifying State and local government agencies, residents, and businesses of construction or decommissioning activities that may produce high noise or vibration that could affect them. Post appropriate State highway signs warning of blasting. Create a Complaint Response Protocol for dealing with and responding to noise or vibration complaints, including entering the complaints into the proposed site’s Corrective Action Program. Establish and enforce onsite speed limits.

Table 5-1 Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Transportation	Traffic volume	Use the following BMPs to reduce traffic volumes, minimize noise, and minimize wildlife mortality: • encourage carpooling to minimize traffic due to employee travel • stagger shift changes to reduce the peak traffic volume on US 20 • construct acceleration and deceleration lanes at the entrances to the proposed EREF site to improve traffic flow and safety on US 20 • maintain low speed limits onsite to reduce noise and minimize impacts to wildlife
	Deposition on roadways	Use the following measures to minimize the release of dirt and other matter onto US 20: • promptly remove earthen materials on paved roads carried onto the roadway by wind, trucks, or earthmoving equipment • promptly stabilize or cover bare earthen areas once roadway and highway entrance earthmoving activities are completed • build gravel pads at the proposed EREF's entry/exit points along US 20 in accordance with the Idaho Department of Environmental Quality (IDEQ) *Catalog of Stormwater Best Management Practices for Idaho Cities and Counties, Volume 2, Erosion and Sediment Controls* (IDEQ, 2009) • apply periodic top dressing of clean stone to the gravel pads, as needed, to maintain the effectiveness of the stone voids • perform tire washing, as needed, on a stabilized stone (gravel) area that drains to a sediment trap • prior to entering US 20, inspect vehicles for cleanliness from dirt and other matter that could be released onto the highway • cover open-bodied trucks (e.g., install tarps over open beds) to prevent debris from falling off or blowing out of vehicles onto the highway

Table 5-1 Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Waste Management	Generation of industrial and hazardous wastes (air and liquid emissions in Air Quality and Water Resources above)	Develop a construction phase recycling program.

Source: AES, 2010a.

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts

Impact Area	Activity	Mitigation Measures
Visual and Scenic Resources	Potential visual intrusions in the character of the existing landscape	Use aesthetically pleasing screening measures such as berms and earthen barriers, natural stone, and other physical means to soften the impact of the buildings. Use neutral colors for structures. Limit lighting to that necessary to meet security requirements; focus lighting downward to reduce night lighting in the surrounding area.
Air Quality	Facility emissions of hazardous gases	Apply BMPs to the design and operation of onsite vehicle and equipment fueling activities to minimize the release to the atmosphere of nonmethane hydrocarbons and mitigate the potential impact of spills or accidental releases; including: • equip storage tanks with appropriate VOC controls, liquid level gauges, and overfill protection • provide training to fuel delivery drivers • post appropriate warning signs at the fuel dispensing facility • pave fuel unloading and dispensing areas and equip them with curbs to control small spills • ensure delivery contractors carry spill kits and are required to address minor spills during fuel deliveries Install the Separations Building Module (SBM) Safe-by-Design Gaseous Effluent Vent System (GEVS) and SBM Local Extraction GEVS, which are designed to collect and clean all potentially hazardous gases from the plant prior to release to the atmosphere. Provide instrumentation to detect and signal, via alarm, all nonroutine process conditions, including the presence of radionuclides or hydrogen fluoride (HF) in the exhaust stream that will trip the system to a safe condition in the event of effluent detection beyond routine operational limits.

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Air Quality (Cont.)		Install the Technical Services Building (TSB) GEVS, which is designed to collect and clean all potentially hazardous gases in the serviced areas from the TSB prior to release to the atmosphere. Provide instrumentation to detect and signal the Control Room, via alarm, regarding all nonroutine process conditions, including the presence of radionuclides or HF in the exhaust stream. Operators would then take appropriate actions to mitigate the release. Install the Centrifuge Test and Postmortem Facilities GEVSs, which are designed to collect and clean all potentially hazardous gases in the serviced areas from the Centrifuge Assembly Building prior to release to the atmosphere. Provide instrumentation to detect and signal the Control Room, via alarm, regarding all nonroutine process conditions, including the presence of radionuclides or HF in the exhaust stream. Operators would then take appropriate actions to mitigate the release. Design the TSB Contaminated Area heating, ventilating, and air conditioning (HVAC) system, the Ventilated Room HVAC System in the Blending, Sampling, and Preparation Building (BSPB), and the Centrifuge Test and Postmortem Facilities Exhaust Filtration System to collect and clean all potentially hazardous gases in the serviced areas prior to release to the atmosphere.
	Fugitive dust and equipment emissions	Apply gravel to the unpaved surface of the secondary access road. Impose speed limits on the unpaved secondary access road. Maintain air concentrations of criteria pollutants resulting from vehicle emissions and fugitive dust below the National Ambient Air Quality Standards.
Geology and Soil Resources	Soil disturbance	Follow the requirements of a Spill Prevention Control and Countermeasures (SPCC) Plan to reduce the potential impacts from chemical spills or releases around vehicle maintenance and fueling locations, storage tanks, and painting operations, and ensure prompt and appropriate cleanup. Follow appropriate waste management procedures to minimize the impacts on soils from solid waste and hazardous materials that would be generated. Where practicable, implement a recycling program for materials suitable for recycling.

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Water Resources	Water quality	Employ BMPs to control the use of hazardous materials and fuels. Control and mitigate spills in conformance with the SPCC Plan. Ensure discharges to surface impoundments meet the standards for stormwater and treated domestic sanitary wastewater, and that no radiological discharges are made. Use BMPs to control stormwater runoff to prevent releases to nearby areas to the extent possible. Use only water (no detergents) for external vehicle washing. Arrange all temporary construction basins and permanent basins to provide for the prompt, systematic sampling of runoff in the event of any special needs. Berm or self-contain all aboveground gasoline and diesel storage tanks. Construct curbing, pits, or other barriers around tanks and components containing radioactive wastes. Handle any hazardous materials by approved methods and ship offsite to approved disposal sites. Handle sanitary wastes by portable systems until the Domestic Sanitary Sewage Treatment Plant is available for site use. Provide an adequate number of these portable systems. Use evaporators in the Liquid Effluent Collection and Treatment System, thereby eliminating the need to discharge treated process water to an onsite basin.
	Water use	Use low-water-consumption landscaping rather than conventional landscaping to reduce water usage. Install low-flow toilets, sinks, and showers to reduce water usage. Implement localized floor washing using mops and self-contained cleaning machines rather than conventional washing with a hose to reduce water usage. Incorporate closed-loop cooling systems instead of cooling towers, thereby eliminating evaporative losses and cooling tower blowdown, resulting in reduced water usage.

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Ecological Resources	Habitat disturbance	Reduce vehicle speeds onsite. Focus all lights downward. Use herbicides in limited amounts during operations along access roads, industrial area, and security fence surrounding the proposed facility. Use herbicides according to government regulations and manufacturer's instructions to control noxious weeds. Reseed cropland areas on the proposed site with native species when the proposed EREF becomes operational. Consider all recommendations of appropriate State and Federal agencies, including the Idaho Department of Fish and Game and the FWS.
Noise	Exposure of workers and the public to noise	Mitigate operational noise sources primarily by plant design, whereby cooling systems, valves, transformers, pumps, generators, and other facility equipment are located mostly within plant structures and the buildings absorb the majority of the noise located within. Restrict most of US 20 use after twilight through early morning hours to minimize noise impacts to the nearest residence. Establish preventative maintenance programs that ensure all equipment is working at peak performance.
Transportation	Traffic volume	Encourage carpooling to minimize traffic due to employee travel. Stagger shift changes to reduce the peak traffic volume on US 20. Maintain low speed limits onsite to reduce noise and minimize impacts to wildlife.

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Public and Occupational Health	Nonradiological effects	Design process systems that handle uranium hexafluoride (UF_6) to operate at subatmospheric pressure, to minimize outward leakage of UF_6. Direct process off-gas from UF_6 purification and other operations through cold traps to solidify and reclaim as much UF_6 as possible. Pass remaining gases through high-efficiency filters and chemical absorbers to remove HF and uranic compounds. Monitor all UF_6 process systems by instrumentation that will activate alarms in the Control Room and will either automatically shut down the proposed facility to a safe condition or alert operators to take the appropriate action to prevent release in the event of operational problems. Investigate alternative solvents or apply control technologies for methylene chloride solvent use. Use administrative controls, practices, and procedures to assure compliance with the proposed EREF's Health, Safety, and Environmental Program. Design the program to ensure safe storage, use, and handling of chemicals to minimize the potential for worker exposure.
	Radiological effects	Put in place radiological practices and procedures to ensure compliance with the proposed EREF's Radiation Protection Program. Design the program to achieve and maintain radiological exposure to levels that are as low as reasonably achievable (ALARA). Conduct routine facility radiation and radiological surveys to characterize and minimize potential radiological dose/exposure. Monitor all radiation workers by use of dosimeters and area air sampling to ensure that radiological doses remain within regulatory limits and are ALARA. Provide radiation monitors in the gaseous effluent vents to detect and alarm and effect the automatic safe shutdown of process equipment in the event contaminants are detected in the system exhaust. Design systems to automatically shut down, switch trains, or rely on operator actions to mitigate the potential release.

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Public and Occupational Health (Cont.)		Design the proposed facility to delay and reduce UF_6 releases inside the buildings in a potential fire incident from reaching the outside environment, including automatic shutoff of room HVAC systems during a fire event.
		Design process systems that handle uranium hexafluoride (UF_6) to operate at subatmospheric pressure, to minimize outward leakage of UF_6.
		Move UF_6 cylinders only when cool and when UF_6 is in solid form, to minimize the risk of inadvertent release due to mishandling.
		Direct process off-gas from UF_6 purification and other operations through cold traps to solidify and reclaim as much UF_6 as possible. Pass remaining gases through high-efficiency filters and chemical absorbers to remove HF and uranic compounds.
		Separate uranic compounds and various other heavy metals in waste material generated by decontamination of equipment and systems.
		Use liquid and solid waste handling systems and techniques to control wastes and effluent concentrations.
		Pass gaseous effluent through pre-filters, high-efficiency particulate air (HEPA) filters and activated carbon filters to reduce the radioactivity in the final discharged effluent to very low concentrations.
		Route process liquid waste to collection tanks and treat through a combination of precipitation, evaporation, and ion exchange to remove most of the radioactive material prior to a final evaporation step to preclude any liquid effluent release from the proposed facility.
		Monitor all UF_6 process systems by instrumentation that will activate alarms in the Control Room and will either automatically shut down the proposed facility to a safe condition or alert operators to take the appropriate action to prevent release in the event of operational problems.

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Waste Management	Generation of industrial, hazardous, radiological, and mixed wastes (air emissions are addressed under Air Quality and liquid emissions are addressed under Water Resources)	Design system features to minimize the generation of solid waste, liquid waste, and gaseous effluent (gaseous effluent design features are described above under Public and Occupational Health). Store waste in designated areas of the proposed facility until an administrative limit is reached, then ship offsite to a licensed disposal facility; no disposal of waste onsite. Dispose of all radioactive and mixed wastes at offsite licensed facilities. Maintain a cylinder management program to monitor storage conditions on the Full Tails Cylinder Storage Pads, to monitor cylinder integrity by conducting routine inspections for breaches and to perform cylinder maintenance and repairs as needed. Store all tails cylinders filled with depleted UF_6 on saddles of concrete, or other suitable material, that do not cause corrosion of the cylinders. Place saddles on a concrete pad. Segregate the storage pad areas from the rest of the proposed enrichment facility by barriers, such as vehicle guard rails. Double stack depleted uranium tails cylinders on the storage pad, arrayed to permit easy visual inspection of all cylinders. Survey depleted uranium tails cylinders for external contamination (wipe test) prior to being placed on a Full Tails Cylinder Storage Pad or transported offsite. Fit depleted uranium tails cylinder valves with valve guards to protect the cylinder valves during transfer and storage. Make provisions to ensure that depleted uranium tails cylinders will not have defective valves (identified in NRC Bulletin 2003-03, "Potentially Defective 1-inch Valves for Uranium Hexafluoride Cylinders") (NRC, 2003) installed. Perform touch-up application of paint coating on depleted uranium tails cylinders if coating damage is discovered during inspection (UF_6 cylinder manufacturing will include abrasive blasting and coating with anticorrosion primer/paint, as required by specification).

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Waste Management (Cont.)		Allow only designated vehicles, operated by trained and qualified personnel, on the Full Tails Cylinder Storage Pads, Full Feed Cylinder Storage Pads, Full Product Cylinder Storage Pad, and the Empty Cylinder Storage Pad (refer to the Integrated Safety Analysis Summary, Section 3.8, for controls associated with vehicle fires on or near the Cylinder Storage Pads. Inspect depleted uranium tails cylinders for damage prior to placing a filled cylinder on a storage pad. Annually reinspect depleted uranium tails cylinders for damage or surface coating defects. These inspections will verify that: • lifting points are free from distortion and cracking • cylinder skirts and stiffener rings are free from distortion and cracking • cylinder surfaces are free from bulges, dents, gouges, cracks, or significant corrosion • cylinder valves are fitted with the correct protector and cap • cylinders are inspected to confirm that the valve is straight and not distorted, two to six threads are visible, and the square head of the valve stem is undamaged • cylinder plugs are undamaged and not leaking If inspection of a depleted uranium tails cylinder reveals significant deterioration or other conditions that may affect the safe use of the cylinder, transfer the contents of the affected cylinder to another cylinder in good condition and discard the defective cylinder. Determine the root cause of any significant deterioration and, if necessary, make additional inspections of cylinders. Make available onsite proper documentation on the status of each depleted uranium tails cylinder, including content and inspection dates. Use the lined Cylinder Storage Pads Stormwater Retention Basins to capture stormwater runoff from the Full Tails Cylinder Storage Pads. Minimize power usage by efficient design of lighting systems, selection of high-efficiency motors, and use of proper insulation materials.

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Waste Management (Cont.)		Control process effluents by means of the following liquid and solid waste handling systems and techniques: • follow careful application of basic principles for waste handling in all of the systems and processes • collect different waste types in separate containers to minimize contamination of one waste type with another; carefully package materials that can cause airborne contamination; provide ventilation and filtration of the air in the area as necessary; confine liquid wastes to piping, tanks, and other containers; use curbing, pits, and sumps to collect and contain leaks and spills • store hazardous wastes in designated areas in carefully labeled containers; also contain and store mixed wastes separately • neutralize strong acids and caustics before they enter an effluent stream • decontaminate and/or reuse radioactively contaminated wastes to reduce waste volume as far as possible • reduce the volume of collected waste such as trash, compressible dry waste, scrap metals, and other candidate wastes at a centralized waste processing facility • include administrative procedures and practices in waste management systems that provide for the collection, temporary storage, processing, and disposal of categorized solid waste in accordance with regulatory requirements • design handling and treatment processes to limit wastes and effluent. Perform sampling and monitoring to assure that plant administrative and regulatory limits will not be exceeded • monitor gaseous effluent for HF and radioactive contamination before release • sample and/or monitor liquid wastes in liquid waste treatment systems • sample and/or monitor solid wastes prior to offsite treatment and disposal

Table 5-2 Summary of Mitigation Measures Identified by AES for Operations Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Waste Management (Cont.)		• return process system samples to their source, where feasible, to minimize input to waste streams Implement a spill control program for accidental oil spills. Prepare a Spill Prevention Control and Countermeasure (SPCC) Plan prior to the start of operation of the proposed facility or prior to the storage of oil on the proposed site in excess of *de minimis* quantities, which will contain the following information: • identification of potential significant sources of spills and a prediction of the direction and quantity of flow that will likely result from a spill from each source • identification of the use of containment or diversionary structures such as dikes, berms, culverts, booms, sumps, and diversion ponds, at the proposed facility to control discharged oil • procedures for inspection of potential sources of spills and spill containment/diversion structures • assigned responsibilities for implementing the plan, inspections, and reporting • as part of the SPCC Plan, other measures will include control of drainage of rain water from diked areas, containment of oil and diesel fuel in bulk storage tanks, aboveground tank integrity testing, and oil and diesel fuel transfer operational safeguards Implement a nonhazardous materials waste recycling plan during operation. Perform a waste assessment to identify waste reduction opportunities and to determine which materials will be recycled. Contact brokers and haulers to find an end-market for the materials. Perform employee training on the recycling program so that employees will know which materials are to be recycled. Purchase and clearly label recycling bins and containers. Periodically evaluate the recycling program (i.e., waste management expenses and savings, recycling and disposal quantities) and report the results to the employees.

Source: AES, 2010a.

5.2 Potential Mitigation Measures Identified by the NRC

This section presents additional potential mitigation measures that were identified by the NRC staff, following their evaluation of the potential environmental impacts of the proposed EREF in Chapter 4. Tables 5-3 and 5-4 list the NRC-identified mitigation measures for preconstruction/construction and operations, respectively.

5.3 References

(AES, 2010a) AREVA Enrichment Services, LLC. "Eagle Rock Enrichment Facility Environmental Report, Rev. 2." Bethesda, Maryland. April.

(AES, 2010b) AREVA Enrichment Services, LLC. Letter from J.A. Kay (Licensing Manager, AES) to Sharon W. Kiefer (Assistant Director-Policy, IDFG) dated December 7, 2010. "Subject: Response to IDFG Comments to NRC Related to the EREF Transmission Line." ADAMS Accession No. ML103420579.

(IDEQ, 2009) Idaho Department of Environmental Quality. "Catalog of Stormwater Best Management Practices for Idaho Cities and Counties, Volume 2: Erosion and Sediment Controls."

(NRC, 2003) U.S. Nuclear Regulatory Commission. "Potentially Defective 1-Inch Valves for Uranium Hexafluoride Cylinders." NRC Bulletin 2003-03. August.

Table 5-3 Summary of Potential Mitigation Measures Identified by NRC for Preconstruction and Construction Environmental Impacts

Impact Area	Activity	Mitigation Measures
Air Quality	Point source releases of criteria pollutants	Ensure vehicles and equipment with internal combustion engines are properly tuned and pollution control devices are functional. Install hard-surface pavements, curbs, scupper drains, and drainage ways at fuel dispensing island that will channel spilled fuels to fire-safe containment sumps; require delivery drivers to remain in attendance throughout all fuel deliveries; place spill containment/response equipment at fuel dispensing stations. Provide first responder training to selected workers; ensure storage tanks are equipped with fully functional overflow and vapor control features. Install emergency shut-offs for fuel dispensing pumps; post spill response directives at the fuel dispensing islands; provide spill cleanup materials at the fuel dispensing islands for cleanup of small spills; ensure the fuel dispensing islands have adequate lighting. Adopt a policy that requires prompt cleanup of all spilled materials. Identify and select construction-related products and chemicals that are free of volatile solvents. Suspend high fugitive dust-generating activities during early morning hours with calm winds and during windy periods.
Geology and Soil	Soil disturbance	Minimize the construction footprint to the extent possible. Cover stockpiles to reduce exposure to wind and rain. Limit routine vehicle traffic to paved or gravel roads.
Water Resources	Stormwater management	Reduce the size of impervious surfaces (parking lots, roads, and roofs) to the extent possible; implement a “fix-it-first” infrastructure policy to set spending priorities on the repair of existing infrastructure over the installation of new infrastructure; and employ low-impact development strategies and practices during construction activities.

Table 5-3 Summary of Potential Mitigation Measures Identified by NRC for Preconstruction and Construction Environmental Impacts (Cont.)

Impact Area	Activity	Mitigation Measures
Ecological Resources	Habitat disturbance	Plant disturbed areas and irrigated crop areas with native sagebrush steppe species to establish native communities and prevent the establishment of noxious weeds. Plant immediately following the completion of disturbance activities and the abandonment of crop areas. Develop and implement a noxious weed control program to prevent the establishment and spread of invasive plant species. Hose down tires and undercarriage of off-road vehicles prior to site access to dislodge seeds or other propagules of noxious weeds. Monitor for noxious weeds throughout the construction and operations phases and immediately eradicate new infestations. Minimize indirect impacts of weed control activities, such as herbicide effects on nontarget species, and soil disturbance and fire hazards from vehicle operation in undisturbed areas during weed control activities.
Noise	Exposure of workers and the public to noise	Suspend the use of explosives during periods when meteorological conditions (e.g., low cloud cover) can be expected to reduce sound attenuation.

Table 5-4 Summary of Potential Mitigation Measures Identified by NRC for Operations Environmental Impacts

Impact Area	Activity	Mitigation Measures
Water Resources	Stormwater management	Reduce the size of impervious surfaces (parking lots, roads, and roofs) to the extent possible. Implement a “fix-it-first” infrastructure policy to set spending priorities on the repair of existing infrastructure over the installation of new infrastructure. Employ low-impact development strategies and practices during operations.
Ecological Resources	Wildlife protection	Develop areas that will retain water of suitable quality for wildlife and provide wildlife access to such areas with suitable water quality. For basins with water quality unsuitable for wildlife, use animal-friendly fencing and netting or other suitable material over basins to prevent use by migratory birds. Place metal reflectors on the top wire of the fence along the AES property boundary, to reduce sage-grouse mortality resulting from collisions with the fence. Coordinate with Idaho National Laboratory in monitoring risks to sage-grouse and other sensitive species and identifying measures to reduce risks and protect these species and their habitat, particularly sagebrush steppe. Coordinate with Idaho Department of Fish and Game to determine corrective action or mitigation for the offsite public lands lost to wildlife due to project effects.
Transportation	Traffic volume	Consider working with INL to operate a joint bus system. Establish shift changes outside of INL peak commuting periods.
Public and Occupational Health	Radiological effects	Store “empty” cylinders with heels in the middle of a storage pad between full tail cylinders to reduce external exposure to workers.

6 ENVIRONMENTAL MEASUREMENT AND MONITORING PROGRAMS

This chapter describes the proposed measurement and monitoring programs that would be used by AREVA Enrichment Services, LLC (AES) to characterize the effects on human health and the environment of radiological and nonradiological releases from the proposed Eagle Rock Enrichment Facility (EREF) in Bonneville County, Idaho. This proposed program includes direct monitoring of radiological and physiochemical (i.e., chemical and meteorological properties that affect measurements) gaseous and liquid effluents from facility operations, and monitoring and measurement of ambient air, surface water, groundwater, stormwater, soil, sediment, and direct radiation in the vicinity of the proposed EREF during preconstruction, construction, and operation.

6.1 Radiological Measurements and Monitoring Program

The U.S. Nuclear Regulatory Commission (NRC) requires that a radiological monitoring program be established for the proposed EREF to monitor and report the release of radiological gaseous and liquid effluents to the environment. These requirements are specified in Title 10, "Energy," of the U.S. *Code of Federal Regulations* (10 CFR) Part 20, Appendix B, and10 CFR 70.59. Table 6-1 lists the NRC guidance documents that apply to the radiological monitoring program. The NRC staff has reviewed engineering designs and proposed operational procedures submitted by AES in order to identify the locations and activities associated with potential emissions and effluents with radiologic character, and has verified that the pathways for these releases to the environment are appropriately represented in the proposed radiological monitoring program. Those pathways for environmental release are summarized below.

Radiological monitoring at the proposed EREF would be addressed through the Effluent Monitoring Program (EMP) and the Radiological Environmental Monitoring Program (REMP). The EMP addresses the monitoring, recording, and reporting of data for radiological contaminants emitted from specific points. Physical samples collected for analysis in this program would include exhaust vent air sampler filters, filters from mobile air monitors, and liquid condensate from the evaporator exhaust vent. Corrective actions would be implemented if action levels are exceeded. The REMP addresses the monitoring of general environmental media (i.e., soil, sediment, groundwater, biota, and ambient air) within and outside the proposed EREF property boundary. The REMP will be initiated at least two years prior to the start of plant operations in order to develop a baseline (AES, 2010a). In addition, the REMP may be enhanced as necessary to maintain the collection and reliability of environmental data based on changes to regulatory requirements or facility operations (AES, 2010a). Every six months, AES will submit a summary report of the environmental sampling program at the proposed EREF to the NRC (AES, 2010a). Monitoring locations are shown in Figure 6-1. Data collected under this program would be used to assess radiological impacts on the environment and estimate potential impacts on the public. The REMP would be used to confirm the effectiveness of the effluent controls and the EMP and to verify that facility operations do not result in detrimental radiological impacts on the environment.

As discussed in the following sections, radiological measurement and monitoring would include monitoring of air emissions, ambient air quality, wastewater discharge, stormwater and basin sediment, groundwater, and soil and vegetation, along with direct gamma radiation monitoring.

Table 6-1 NRC Guidance Documents Relevant to Radiological Monitoring Programs

Guidance	Purpose and Content
Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) – Effluent Streams and the Environment"[a]	Provides acceptable methods for designing a program to ensure the quality of the results of measurements for radioactive materials in the effluents and the environment outside of nuclear facilities during normal operations.
Regulatory Guide 4.16, "Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants"[b]	Provides descriptions of acceptable methods for submitting semiannual reports that specify the quantity of each principal radionuclide released to unrestricted areas to estimate the maximum potential annual doses to the public resulting from such releases.

[a] NRC, 1979.
[b] NRC, 1985.

6.1.1 Air Emissions Monitoring

The Air Emissions Monitoring Program would monitor each individual point source or pathway of potential radioactive airborne release to the atmosphere from the proposed EREF. Radioactive airborne releases of gaseous effluents could result from the following events or activities:

- controlled releases of gaseous effluents from ventilation stacks

- controlled gaseous releases from the uranium enrichment equipment during decontamination and maintenance of equipment

- handling, temporary storage, and transportation of uranium hexafluoride (UF_6) feed cylinders, product cylinders, and depleted uranium cylinders

Monitoring for radioactive air emissions from the proposed EREF is conducted as part of the EMP, which would monitor, report, and record data on radiological contaminants released to the atmosphere from specific point sources. Gaseous effluents from the proposed EREF that have the potential for airborne radioactivity would be discharged from the sources listed below, and monitoring and sampling at these locations would be conducted in accordance with NRC Regulatory Guide 4.16 (NRC, 1985). These sources would all lie within the industrial footprint of the proposed EREF; however, the precise locations of these effluent points have been withheld as security-related information. Table 6-2 provides a summary of the EMP for gaseous discharges (AES, 2010a). Additional details on the exhaust vents enrolled in the monitoring program are provided below.

- **Separations Building GEVSs.** Each of the four Separations Building Modules (SBMs) would have exhaust vents on its roof. Each vent would be continuously monitored for alpha radiation and hydrogen fluoride (HF).[1] In addition, samples would undergo uranium isotopic

[1] In the strict sense, HF is not released as a result of EREF operations. Instead, trace amounts of UF_6 could be released from the pollution control devices installed on building and processing area ventilation systems. The UF_6 would be immediately hydrolyzed by the humidity in the ambient air, resulting in the formation of HF.

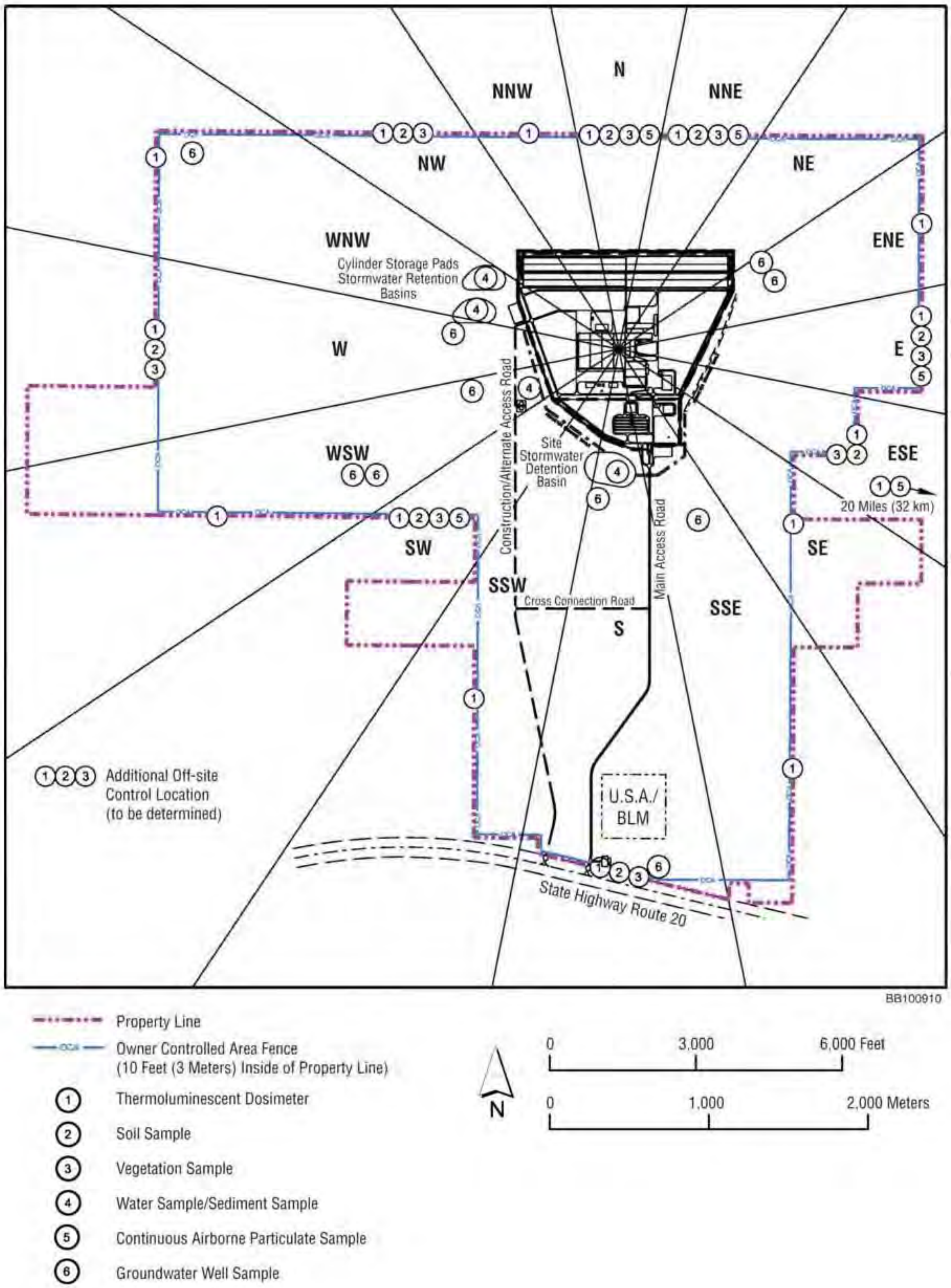

Figure 6-1 Proposed Radiological Sampling Stations and Monitoring Locations (AES, 2010a)

Table 6-2 EREF Proposed Gaseous Effluent Monitoring Program

Sample Location	Sample Type	Analysis/ Frequency
• Separation Building GEVS exhaust vents • TSB GEVS exhaust vent • TSB Contaminated Area HVAC System exhaust vent • Centrifuge Test and Postmortem Facilities GEVS exhaust vent[a] • Centrifuge Test and Postmortem Facilities exhaust filtration system exhaust vent[a] • Ventilated Room HVAC System exhaust vent	Continuous air monitoring for particulates	Gross alpha/beta weekly; isotopic analysis on quarterly composite sample[b]
Evaporator	Continuous liquid condensate from exhaust vent	Gross alpha/beta weekly; isotopic analysis on quarterly composite sample[b]
Process areas[c]	Local area continuous air particulate filter[d]	Gross alpha/beta weekly; isotopic analysis on quarterly composite sample[b]
Nonprocess areas[c]	Local area continuous air particulate filter[d]	Gross alpha/beta on quarterly composite sample[b]

[a] Continuous sampling protocols are in effect only when this proposed facility is operational.
[b] Isotopic analyses for uranium isotopes (^{238}U, ^{236}U, ^{235}U, and ^{234}U) would commence whenever gross alpha and gross beta activities indicate that an individual radionuclide could be present in a concentration >10 percent of the specified concentrations in Table 2 of Appendix B to 10 CFR Part 20.
[c] Process areas include any area or facility at which UF_6 transfers between feed, product, or tails cylinders occur, including areas where cylinders containing UF_6 are opened for testing, inspection, or sampling. A nonprocess area is any area or facility where uranic material is present in an open form.
[d] Mobile devices may be used to collect the necessary samples.
Source: AES, 2010a.

analysis quarterly or if the gross alpha and gross beta activities indicate that an individual radionuclide could be present in a concentration greater than 10 percent of the concentrations specified in Table 2, Appendix B, of 10 CFR Part 20.

- **Technical Services Building GEVS.** This system would discharge to a vent on the Technical Support Building (TSB) roof. The vent would be continuously monitored for alpha radiation and HF. In addition, samples would undergo uranium isotopic analysis quarterly or if the gross alpha and gross beta activities indicate that an individual radionuclide could be present in a concentration greater than 10 percent of the concentrations specified in Table 2, Appendix B, of 10 CFR Part 20.

- **Centrifuge Test and Postmortem Facilities GEVS.** This system would discharge through an exhaust vent on the roof of the Centrifuge Assembly Building (CAB). The Centrifuge

Test and Postmortem Facilities GEVS vent-sampling system would provide for continuous monitoring and periodic sampling of the gaseous effluent in the exhaust vent. The exhaust vent would be continuously monitored for alpha radiation and HF. In addition, samples would undergo uranium isotopic analysis quarterly or if the gross alpha and gross beta activities indicate that an individual radionuclide could be present in a concentration greater than 10 percent of the concentrations specified in Table 2 of Appendix B to 10 CFR Part 20.

- **Centrifuge Test and Postmortem Facilities Exhaust Filtration System.** When operational, this system would maintain a negative pressure with the Centrifuge Test and Postmortem Facilities, thus reducing the potential for radiologic contamination of adjacent areas. The system would discharge through an exhaust vent on the roof of the CAB. Sampling of this vent for alpha radiation and HF would occur only when the Centrifuge Test Facility or the Centrifuge Postmortem Facility are in operation.

- **TSB Contaminated Area HVAC System.** This vent would be continuously monitored for alpha radiation and HF. In addition, samples would undergo uranium isotopic analysis quarterly or if the gross alpha and gross beta activities indicate that an individual radionuclide could be present in a concentration greater than 10 percent of the concentrations specified in Table 2, Appendix B, of 10 CFR Part 20.

- **BSPB Ventilated Room HVAC System.** The vent would be continuously monitored for alpha radiation and HF. In addition, samples would undergo uranium isotopic analysis quarterly or if the gross alpha and gross beta activities indicate that an individual radionuclide could be present in a concentration greater than 10 percent of the concentrations specified in Table 2, Appendix B, of 10 CFR Part 20.

In addition to the specific exhaust vents described above, all HVAC systems serving process areas where radioactive airborne contamination is possible would be designed to allow access for periodic sampling of exhaust air in accordance with NRC Regulatory Guide 4.16 (NRC, 1985). Periodic sampling would also occur in nonprocess areas, and may include the use of mobile continuous air monitors (see Table 6-2).

Sample analysis would employ methodologies with minimum detectable concentrations (MDC) of 1.8×10^{-9} becquerel per milliliter (5.0×10^{-14} microcurie per milliliter), a value representing 5 percent of the limit of 1.0×10^{-12} microcurie per milliliter set by the NRC in 10 CFR Part 20, Appendix B, Table 2, “Effluent Concentrations (retention Class W).”

In addition, a separate vent on the TSB roof would be designed to allow for the capture and sampling of air and condensate from saturated air delivered to the TSB vent from the evaporator of the Liquid Effluent Collection and Treatment System. Periodic sampling of both the discharge air and condensate for isotopic uranium would take place. The evaporator condensate samples would be analyzed to a MDC equivalent to 5 percent or less of the 10 CFR Part 20, Appendix B, Table 2, Column 1 (Air), value for retention Class W.

In addition to the pollution control devices affixed to each point source of potential radiological effluent release, administrative action levels would be established for effluent samples and monitoring instrumentation as an additional element of the effluent control procedure. All action levels would be established sufficiently low so as to permit implementation of corrective actions before regulatory limits are exceeded. Effluent sample analytical results that exceed the action levels would precipitate an investigation into the source of elevated radioactivity. For example, radiological analyses would be performed more frequently on ventilation air filters if there were a significant increase in gross radioactivity or when a process change or other circumstances cause significant changes in radioactivity concentrations. Additional corrective actions would be implemented based on the level, automatic shutdown programming, and operating procedures that would be developed in the detailed alarm design phase. Under routine operating conditions, controls and interventions would ensure that radioactive material in gaseous effluents discharged from the proposed facility would comply with regulatory release criteria at all times.

Compliance with regulatory release criteria would be demonstrated through effluent and environmental sampling data. Meteorological data from an onsite station would be continuously collected and used to assess the impacts of accidental releases.

As part of the proposed EREF EMP, the gaseous effluent sampling program supports the determination of the quantity and concentration of radionuclides discharged from the proposed facility as well as the collection of other information required to be reported to the NRC or to demonstrate compliance with State and Federal regulations and permits. All potentially radioactive effluents from the proposed EREF would be discharged through monitored pathways. All effluent monitoring instruments would be capable of attaining a minimum detectable concentration (MDC) of at least 1.8×10^{-9} becquerel per milliliter (5.0×10^{-14} microcurie per milliliter) and would be subject to periodic maintenance and calibration, functional tests to verify operability, and appropriate quality controls.

Uranium compounds expected in the gaseous effluent could include depleted hexavalent uranium, triuranium octaoxide (U_3O_8), and uranyl fluoride (UO_2F_2), and the uranium isotopes uranium-238 (^{238}U), uranium-236 (^{236}U), uranium-235 (^{235}U), and uranium-234 (^{234}U) would be expected to be the prominent radionuclides. Representative samples would be collected from each release point identified above. Effluent data would be maintained, reviewed, and assessed by the EREF Radiation Protection Manager to ensure that gaseous effluent discharges comply with regulatory release criteria for uranium.

6.1.2 Ambient Air Quality Monitoring

While the EMP's Air Emissions Monitoring Program described above (Section 6.1.1) monitors each individual point source or pathway of potential radioactive airborne release to the atmosphere from the proposed EREF, the REMP's Ambient Air Quality Monitoring Program monitors general air quality within and beyond the proposed EREF property boundary, collecting data at various locations around and outside the property.

Continuous monitoring for airborne radioactive particulate would be conducted at five locations – two along the north property boundary of the proposed EREF; one along the south boundary at a point closest to the industrial area; one on the east property boundary in the direction of the closest residence, approximately 8 kilometers (5 miles) away (Figure 6-1); and one located 32 kilometers (20 miles) to the east in Idaho Falls. These sampling locations have been selected in accordance with the NUREG-1302, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors" (NRC, 1991) and are based on consideration of the locations of effluent point sources within the proposed EREF industrial area, meteorological data (the most prevalent wind directions experienced at the proposed site), and current and projected surrounding land uses. In addition, because particulate releases can be expected to behave primarily as ground-level plumes with particulate concentrations diminishing rapidly and uniformly with distance from the source, and because radioactive emissions during routine operations are expected to be very low, sampling at the proposed property boundaries, rather than at locations more distant from the sources, is expected to represent worst-case conditions and the best opportunity to detect released radioactivity.

Particulate monitoring is an element of the proposed EREF REMP and is designed to collect representative samples that yield data that demonstrate the effectiveness of effluent controls and the EMP. Samples would be retrieved biweekly; however, periods of heavy concentrations of airborne dust may require more frequent sample retrieval. All samples collected from the particulate monitors would be analyzed in the onsite laboratory; however, for quality control purposes and as a contingency, samples may sometimes be shipped to an independent offsite laboratory for analysis.

Sample analysis for gross alpha would employ methodologies with MDC of 1.8×10^{-9} becquerel per milliliter (5.0×10^{-14} microcuries per milliliter), a value representing 5 percent of the limit of 1.0×10^{-12} microcurie per milliliter set by the NRC in 10 CFR Part 20, Appendix B, Table 2, “Effluent Concentrations (retention Class W).” Quality controls on sample recovery, handling, and analysis would be sufficient to validate results in accordance with Regulatory Guide 4.15 (NRC, 1979).

6.1.3 Wastewater Discharge Monitoring

The proposed EREF design includes liquid waste processing to remove uranic material from the waste stream by precipitation, filtration, and evaporation. There would be no direct discharge of process liquid waste effluents onsite or offsite. Therefore, no sampling of liquid process waste effluents, beyond that described in Table 6-3, is planned. Potentially contaminated liquid wastes would be processed via the facility’s Liquid Effluent Collection and Treatment System. Uranic material would be removed from liquid waste effluents through two stages of precipitation and filtration. Liquid waste effluents would be sampled on an as-needed basis for isotopic analysis before being discharged to the Liquid Effluent Treatment System Evaporator. The final process stage of evaporation would release the resulting distillate steam directly to the atmosphere without condensing vapor out of the air stream. Since multiple stages of precipitation, filtration, and evaporation would be used to treat liquid effluents, no significant releases of uranic material to the environment would be expected. However, liquid condensate in the treatment system evaporator exhaust vent would be sampled periodically as part of the proposed site’s radiological monitoring program to confirm that no uranic releases have occurred (Table 6-3). The composition of the sediment layer of the Liquid Effluent Treatment System Evaporator would also be characterized periodically by isotopic analysis. This data would be evaluated along with nearby air monitoring data to identify any potential resuspension of particles in the air (AES, 2010a).

The Domestic Sanitary Sewage Treatment Plant would receive only domestic sanitary wastes. No plant process-related effluents would be introduced and no releases of uranic material to the environment would be expected. However, sampling of liquid sanitary waste effluents for

Table 6-3 Radiological Sampling and Analysis Program for Liquid Waste Effluents

Sample Type	Location	Sampling Frequency	Type of Analysis
Wastewater Discharge			
Liquid effluent	Collection tanks	TBD[a]; liquid	Isotopic analysis[b]
Liquid condensate	Treatment system evaporator exhaust vent	Weekly	Gross alpha/beta
	Treatment system evaporator exhaust vent	Quarterly; composite sample	Isotopic analysis[b]
Sediment	Evaporator	TBD[a] 1 to 2 kg (2.2 to 4.4 lb) sediment	Isotopic analysis[b]
Treated domestic sanitary wastewater	TBD[c]	Semiannually; 1 to 2 kg (2.2 to 4.4 lb) solid fraction	Isotopic analysis[b]
Stormwater and Basin Sediment			
Stormwater	Once from each of the three stormwater basins	Quarterly; 4-L (1.1-gal) samples	Isotopic analysis[b]
Sediment	One from each of three stormwater basins	Quarterly; 1 to 2 kg (2.2 to 4.4 lb) sediment	Isotopic analysis[b]
Groundwater			
Groundwater	Nine deep wells and one shallow well located downgradient, cross gradient, and upgradient of proposed EREF	Semiannually; 4-L (1.1-gal) samples	Isotopic analysis[b]

[a] TBD = to be determined, as needed.
[b] Isotopic analysis for ^{234}U, ^{235}U, ^{236}U, and ^{238}U.
[c] TBD = to be determined (but prior to discharge to retention basin).
Source: AES, 2010a.

isotopic analysis prior to discharge (to the Cylinder Storage Pads Stormwater Retention Basins) is planned as part of the proposed site's radiological monitoring program to confirm that no uranic releases have occurred (AES, 2010a).

6.1.4 Stormwater and Basin Sediment Monitoring

Three stormwater basins would collect stormwater runoff at the proposed EREF: one Site Stormwater Detention Basin, which would receive general site runoff, and two Cylinder Storage Pads Stormwater Retention Basins, which would receive stormwater runoff from the Cylinder Storage Pads and treated discharge from the Domestic Sanitary Sewage Treatment Plant. All three basins would be included in the proposed site's radiological monitoring program for liquid waste effluents (AES, 2010a).

Discharge from the Site Stormwater Detention Basin would occur only by evaporation and infiltration into the ground. Although the basin would be designed to have an outlet structure for overflow, if needed during a storm event exceeding the design basis, it is not expected that runoff from this overflow would reach surface water bodies offsite (AES, 2010a). Therefore, no sampling of stormwater effluents other than for the stormwater basins listed in Table 6-3 is planned. Since the Site Stormwater Detention Basin would only receive stormwater runoff from paved surfaces (not including the Cylinder Storage Pad area), building roofs, and landscaped areas, no significant releases of uranic material to the environment would be expected. However, stormwater and sediment from the basin (when present) would be sampled periodically as part of the proposed site's radiological monitoring program to confirm that no uranic releases have occurred (Table 6-3).

Discharge from the Cylinder Storage Pads Stormwater Retention Basins would occur only by evaporation. Although the basin would collect treated sanitary effluents and stormwater runoff from the concrete-paved areas in the cylinder storage areas, it would not receive process-related effluents. Therefore, no significant releases of uranic material to the environment would be expected. However, stormwater and sediment from these basins (when present) would be sampled periodically as part of the proposed site's radiological monitoring program to confirm that no uranic releases have occurred (Table 6-3).

6.1.5 Groundwater Monitoring

Groundwater samples from onsite monitoring wells would be collected semiannually for isotopic analysis as part of the proposed site's radiological monitoring program (AES, 2010a). Section 3.7.2.4 discusses the baseline monitoring for groundwater currently taking place on the proposed EREF property (baseline monitoring characterizes groundwater prior to construction and provides a basis for comparison once the plant becomes operational). The locations of the groundwater monitoring wells are shown in Figure 6-1. Monitoring well locations are based on the predominant direction of groundwater flow under the proposed EREF site, which is from the northeast to the southwest, and their proximity to key facility structures. During operation, samples would be collected twice a year from the same eight monitoring wells that were used for baseline monitoring and two new deep aquifer wells, which would be installed to the west and south of the facility footprint. These 10 wells would be used to characterize groundwater downgradient, cross gradient, and upgradient of the proposed EREF. Groundwater samples would be analyzed for uranium isotopes (Table 6-3). The minimum detectable concentrations (MDCs) for uranium analysis would be 1.1×10^{-4} becquerel per milliliter (3.0×10^{-9} microcuries per milliliter), a value representing less than 2 percent of the annual limit of 3.0×10^{-7} microcuries per milliliter for uranium isotopes in groundwater set by the NRC in 10 CFR Part 20, Appendix B, Table 2 (AES, 2010a).

The Idaho Department of Environmental Quality (IDEQ) has a statewide network of wells it monitors to evaluate the overall quality of groundwater throughout the State to meet the objectives of the State's *Ground Water Quality Protection Act*. Any monitoring outside of the proposed EREF property boundary, therefore, would occur under the aegis of the State's groundwater quality monitoring program.

6.1.6 Soil and Vegetation Sampling

Prior to the startup of operations at the proposed EREF, baseline vegetation and soil sampling would be conducted for the REMP. Samples would be collected quarterly from each sector at locations near the Owner Controlled Area fence line. The sectors, shown on Figure 6-1, are the areas identified with the 16 compass directions centered on the proposed EREF. Following the commencement of facility operations, sampling would be conducted semiannually from nine sample locations. One sample would be collected from each of eight sectors, three of which would be those with the highest predicted atmospheric deposition (see Figure 6-1). Samples would also be collected from an offsite control location. Vegetation and soil samples would be collected in the same vicinity. Vegetation samples may include vegetable crops and grass, according to availability. Vegetation and soil samples would each consist of 1–2 kilograms (2.2–4.4 pounds) of the sampled materials and would undergo isotopic analysis for uranium (AES, 2010a).

6.1.7 Direct Gamma Radiation Monitoring

The only significant sources of gamma emitting radionuclides would be due to the decay of ^{235}U and ^{238}U progeny associated with the stored UF_6 cylinders. Thermoluminescent dosimeters (TLDs) combined with computer modeling would be used to extrapolate dose from direct gamma radiation. The environmental TLDs would be placed along the Owner Controlled Area fence line. In addition, two TLDs would be placed at offsite locations for control purposes (AES, 2010a).

The offsite TLD control samples would provide information on regional changes of the background radiation levels. The TLDs along the fence line would provide a combined reading of background as well as above background readings associated with the UF_6 cylinders. The dosimeters would be analyzed quarterly. The offsite dose equivalent associated with direct gamma radiation would be estimated through extrapolation of the TLD data using the Monte Carlo N-Particle (MCNP) (X5 Monte Carlo Team, 2003) or similar computer program (AES, 2010a).

6.1.8 Monitoring Procedures and Laboratory Standards

The monitoring procedures implemented in the radiological monitoring program would conform with the guidance found in NRC Regulatory Guide 4.15, “Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) – Effluent Streams and the Environment” (NRC, 1979).

The monitoring procedures would employ well-known and acceptable sampling and analytical methods. Instrument maintenance and calibration programs would be developed on the basis of the given instrument in accordance with the manufacturers’ recommendations. Sampling and measuring equipment would be properly maintained and calibrated at regular intervals. These maintenance and calibration procedures would include ancillary equipment such as airflow meters. The radiological monitoring program implementation procedures would include functional testing and routine checks to demonstrate that monitoring and measuring instruments are in working condition.

AES would periodically audit the effluent monitoring program. Quality assurance procedures would be implemented to ensure representative sampling, proper use of appropriate sampling methods and equipment, proper locations for sampling points, and proper handling, storage, transport, and analyses of effluent samples.

Regulatory Guide 4.15 calls for the use of established standards such as those provided by the National Institute of Standards and Technology (NIST) as well as standard analytical procedures such as those provided by the National Environmental Laboratory Accreditation Conference (NELAC).

The proposed EREF would ensure that the onsite laboratory and any contractor laboratory participate in third-party intercomparison programs such as the Mixed Analyte Performance Evaluation Program (MAPEP), U.S. Department of Energy (DOE) Quality Assurance Program (DOEQAP), and the Analytics Inc. Environmental Radiochemistry Cross-Check Program. The proposed EREF would require that all radiological vendors are certified by the National Environmental Laboratory Accreditation Program (NELAP) or an equivalent State laboratory accreditation agency for the analytes being tested.

6.1.9 Reporting

As required by 10 CFR 70.59, the proposed EREF would submit a semiannual summary report of the environmental sampling program to the NRC with all associated data. The report would include:

- types of samples obtained
- quantities of samples
- frequency of environmental measurements
- radionuclide identities of facility-related radionuclides
- radionuclide activity concentrations of facility-related radionuclides obtained from environmental sample

Also, the semiannual report would publish the minimal detectable concentrations for the analyses and the error associated with each measurement. Significant positive trends in activity concentrations would be presented in the report as well as potential adjustments to the sampling program, unavailable samples, and deviations to the sampling program.

6.2 Nonradiological Measurements and Monitoring Program

Monitoring and measurement of nonradiological effluents would be conducted under the proposed facility’s Physiochemical Monitoring Program to verify the effectiveness of effluent control measures. Nonradiological monitoring encompasses physiochemical measurements in general, as well as a number of specific monitoring programs. Physiochemical monitoring would routinely sample chemical contaminants in effluent streams and environmental media.

Specific monitoring programs would address liquid effluents, stormwater, environmental media, meteorology, and biota. These topics are summarized in the following sections.

6.2.1 Physiochemical Monitoring

A physiochemical monitoring program would be conducted during the operation of the proposed EREF as part of an environmental protection program to control chemical and other nonradiological emissions and effluent discharges from the proposed facility. This monitoring program would confirm that effluent controls are working properly and would alert operators when they are not, so that corrective measures can be taken. Controls for gaseous and liquid effluents that would be in place in the proposed facility are discussed in Sections 4.2.4 and 4.2.6, respectively.

Physiochemical monitoring would be conducted by sampling stormwater, soil, sediment, surface water (if present in intermittent drainages), vegetation, and groundwater as defined in Table 6-4. Sampling locations are shown in Figure 6-2. Physiochemical monitoring would include effluent streams directly, as well as potentially affected environmental media, including soil, sediments, groundwater, surface water, and biota. Specific parameters monitored would include heavy metals, industrial organic compounds, and pesticides. Water effluents would also be sampled for fluoride, while gaseous effluents would be also sampled for HF as the fluoride ion. Additional chemicals may also be monitored, as required by permits, regulations, or other requirements.

Sampling would be conducted on a routine basis, such as monthly or quarterly, while provisions would be in place to respond to emergency situations, accidents, or increased emission levels found in routine sampling. Sampling frequency and locations would be determined by the proposed EREF environmental staff in accordance with any permit requirements, such as an NPDES permit for industrial stormwater (Section 6.2.1.2), to demonstrate compliance. All liquid, solid, and gaseous wastes from enrichment-related processes and decontamination operations would be analyzed for chemical and radiological properties to determine appropriate disposal methods or treatment requirements (AES, 2010a). In the event of any accidental release from the proposed EREF, sampling protocols would be initiated immediately and on a continuing basis to document the extent and impact of the release until conditions are abated and mitigated (AES, 2010a).

Effluent compliance levels would be set primarily in the respective permits issued and administered by U.S. Environmental Protection Agency (EPA) Region 10 and the Idaho Department of Environmental Quality (IDEQ), namely the NPDES permits issued under provisions of the *Clean Water Act*. In order to ensure meeting these levels, administrative action levels set below permitted levels would be established for all measured parameters prior to starting operations. Response actions for elevated measurements would be set at three levels of priority: (1) sample value exceeds three times normal background level, (2) sample value exceeds any administrative action level, and (3) sample value exceeds any regulatory limit. Appropriate response actions would be conducted accordingly, ranging from increasing monitoring frequency to performing corrective actions to prevent exceeding regulatory compliance levels.

Table 6-4 Physiochemical Sampling and Analysis Program

Media	Number of Locations	Monitoring Frequency	Sample Type	Monitored Parameters[a]
Groundwater	Nine deep wells and one shallow well (for baseline monitoring)	Semiannually for deep wells and for shallow wells when water is present	Grab	Metals, organics, and pesticides; water level elevations
Soil/sediment	Three minimum soil samples at location to be determined; 1 soil/ sediment sample at the detention basin outfall	Quarterly near vegetation sample locations; one sample at each location	Surface grab	Metals, organics, pesticides, and fluoride uptake
	Retention and detention basin sediments at discharge points to the basins	Quarterly; one sample at each location	Surface grab	Metals, organics, pesticides, and fluoride uptake
Surface water	Potential location in intermittent drainages on southwestern corner of proposed property	Quarterly, if water is present	Grab	Metals, organics, and pesticides
Stormwater	Retention and detention basins at locations to be determined	Quarterly, if water is present	Grab	See Table 6-5
Vegetation[b]	Four minimum	Quarterly, if present (i.e., during growing seasons); one sample at each location	Surface grab	Fluoride uptake
Meteorology	One onsite station augmented by records from nearby meteorological stations	Daily	Continuous	Wind direction and speed, temperature, and humidity

[a] Analyses would meet EPA lower limits of detection, as applicable, and would be based on the baseline surveys and the type of matrix (sample type).
[b] Location to be established by AES's Environmental, Health, Safety, and Licensing staff.
Source: AES, 2010a.

Samples would be analyzed mainly in an onsite laboratory in the Technical Services Building using methods and instrumentation specified in permits or otherwise meeting measurement quality and performance requirements. A laboratory quality control and quality assurance program would be implemented that would include written calibration and analysis procedures, use of laboratory quality control samples, and comparison studies with certified third-party laboratories. Some specialty analytical services, such as bioassays, may be contracted to an offsite laboratory as the need arises.

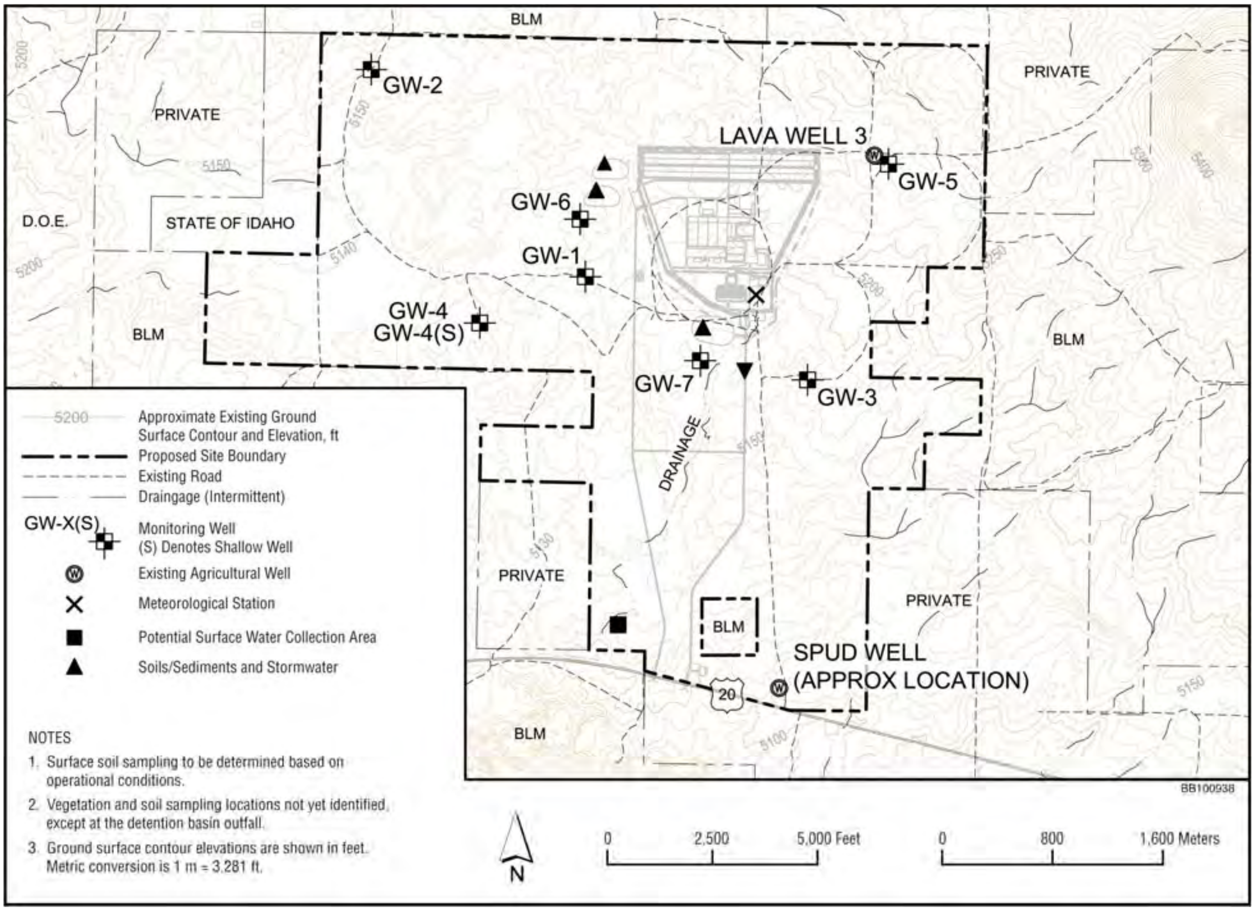

Figure 6-2 Proposed Physiochemical Monitoring Locations (AES, 2010a)

During implementation of the monitoring program, some samples could be collected in a different manner than what is specified in Table 6-4. Reasons for these deviations could include severe weather events, changes in the length of the growing season, and changes in the amount of vegetation present. Under these circumstances, documentation would be prepared to describe how the samples were collected and the rationale for any deviations from normal monitoring program methods. If a sampling location has frequent unavailable samples or deviations from the schedule, then another location could be selected or other appropriate actions taken. Each year, the AES would submit a summary of the environmental program and associated data to the IDEQ and/or EPA Region 10, as required under its NPDES permits issued under IDAPA 58.01.16 and 40 CFR Part 122, respectively. This summary would include the types, numbers, and frequencies of samples collected (AES, 2010a).

The Potential to Emit (PTE) criteria and hazardous air pollutants of each of the proposed EREF's stationary emission sources would be inconsequential with respect to impacts on ambient air quality, and no operating permits are expected to be necessary for those emission sources that would require monitoring for ambient air quality impacts. Official ambient air quality monitoring stations in Idaho Falls operated by the IDEQ would continue to operate. Given the expected minimal impact on ambient air quality from proposed EREF operations and the current attainment status of the area with respect to all NAAQS, no additional ambient air quality monitoring specific to proposed EREF operations and release of nonradioactive pollutants would be warranted during routine facility operation.

During preconstruction and construction, AES would establish and operate particulate monitoring stations at locations along the north, south, and east proposed boundaries. These locations would continue in use during proposed EREF operation to monitor for airborne radioactive particulates (see Figure 6-1). AES would also review particulate monitoring data from the State-run monitoring station 20 miles to the east in Idaho Falls to identify impacts from preconstruction and construction activities at the proposed EREF. No releases of hazardous air pollutants (HAPs) related to construction have been projected by AES. Based on AES's description of the preconstruction and construction activities, NRC staff concurs that no HAPs would be released. Consequently, no monitoring programs have been suggested and the staff believes that no HAP monitoring during these phases is necessary.

6.2.1.1 Liquid Effluent Monitoring

Liquid effluent monitoring would be conducted at various locations throughout the proposed EREF to characterize potential releases other than those associated with wastewater discharge, which are covered in the radiological monitoring program (Section 6.1.3). Liquid effluent monitoring would involve both liquid (groundwater, surface water, and stormwater) and solid (soil or basin sediment) media (Table 6-4). Grab samples would be collected on a semiannual (groundwater) and quarterly (soil/sediment, surface water, and stormwater) basis and analyzed for metals, organics, and pesticides (and fluoride uptake in the case of soils and sediments). For groundwater, water level elevations would also be recorded for both deep wells and shallow wells (if water is present). Treated sanitary effluents would be sampled for isotopic analysis prior to being discharged to the retention basins (see Section 6.1.3; Table 6-3). Because treated sanitary wastewater discharges to the stormwater retention basins, nonradiological liquid effluent monitoring for sanitary discharge falls under the nonradiological (physiochemical) stormwater monitoring presented in Tables 6-4 and 6-5 and described in Section 6.2.1.2.

6.2.1.2 Stormwater Monitoring

A stormwater monitoring program would be initiated during preconstruction and construction of the proposed EREF. Data collected as part of the monitoring program would be used to evaluate the effectiveness of measures taken to prevent the contamination of stormwater and to retain sediments within property boundaries. A temporary detention basin would be used as a sediment control basin during preconstruction and construction as part of the proposed facility's overall sedimentation erosion control plan.

During operation of the proposed EREF, the water quality of stormwater discharge would be typical of runoff from building roofs and paved areas. Except for small amounts of oil and grease typically found in runoff from paved roadways and parking areas, the discharge would not be expected to contain contaminants. Stormwater monitoring would continue with the same frequency upon initiation of operation. During plant operation, samples would be collected from the two Cylinder Storage Pads Stormwater Retention Basins and the Site Stormwater Detention Basin (used as a temporary detention basin during preconstruction and construction) to demonstrate that runoff would not contain any contaminants. Table 6-5 lists the parameters that would be monitored and their monitoring frequencies. The stormwater monitoring program

Table 6-5 Stormwater Monitoring Program for Detention and Retention Basins[a]

Monitored Parameter	Monitoring Frequency	Sample Type	LLD[b]
Oil and grease	Quarterly, if standing water exists	Grab	0.5 ppm
Total suspended solids	Quarterly, if standing water exists	Grab	0.5 ppm
Five-day biological oxygen demand	Quarterly, if standing water exists	Grab	2 ppm
Chemical oxygen demand	Quarterly, if standing water exists	Grab	1 ppm
Total phosphorus	Quarterly, if standing water exists	Grab	0.1 ppm
Total kjeldahl nitrogen	Quarterly, if standing water exists	Grab	0.1 ppm
pH	Quarterly, if standing water exists	Grab	0.01
Nitrate plus nitrite nitrogen	Quarterly, if standing water exists	Grab	0.2 ppm
Metals	Quarterly, if standing water exists	Grab	Varies by metal

[a] Site Stormwater Detention Basin, Cylinder Storage Pads Stormwater Retention Basins, and any temporary basin(s) used during preconstruction and construction.
[b] LLD = lower limit of detection; analyses would meet EPA LLDs, as applicable, and would be based on the baseline surveys and the type of matrix (sample type).
Source: AES, 2010a.

would be refined to reflect the requirements of the NPDES Construction General Discharge Permit and the General Permit for Industrial Stormwater that AES would obtain from the EPA Region 10 (AES, 2010a).

6.2.1.3 Environmental Monitoring

An environmental surveillance sampling program would be implemented with the objective of detecting and monitoring any discernible and relevant effects of plant operations on the surrounding environment so that appropriate actions could be taken to mitigate effects if necessary. As noted above, the chemical constituents analyzed would be in accordance with permits and could include other process or site-related chemicals of interest. Soils, sediments, surface water, groundwater, and biota would be sampled in areas potentially impacted by process effluents or runoff from the proposed facility. Sampling would be conducted both onsite and offsite.

Sampling locations would be selected based on wind patterns, surface runoff patterns, and at, or down-gradient of, discrete discharge points, including the outfall at the Stormwater Detention Basin. Groundwater samples would be collected from a series of wells installed around the facility, as shown in Figure 6-2. Stormwater would be sampled from the Cylinder Storage Pads Stormwater Retention Basins and from the intermittent stream drainage at the southwest corner of the proposed property.

Vegetation sampling would include grasses and locally grown vegetable crops. Soils would be sampled at the same locations as vegetation, including at the outlet at the Stormwater Detention Basin described in Section 4.2.6. Sediment samples would be collected at the discharge points of the various collection basins that would exist onsite (AES, 2010a).

6.2.1.4 Meteorological Monitoring

Meteorological parameters of wind speed and direction, air temperature, and humidity would be continuously monitored at an onsite meteorological tower. Instruments would be located on the tower at an elevation of 40 meters (132 feet). The tower would be located such that the instruments would be at the same approximate elevation as effluent emission points and would be sufficiently distant from buildings and other structures so as not to be influenced by turbulence caused by those structures. The exact location of the meteorological tower has been withheld as security-related information. A “clear area” would be maintained for a distance of at least ten times the height of obstructions located within the prevailing wind directions from the tower. Quality control programs would use formalized procedures to provide for instrument calibrations, preventative maintenance and corrective actions, and redundant data capture and storage such that a data recovery rate of at least 90 percent would be maintained over time. Real-time meteorological data would be displayed in the Control Room where instrument malfunctions could be quickly identified and addressed. Real-time data would available for use in dispersion modeling for both routine and nonroutine (accident) conditions.

6.2.1.5 Local Flora and Fauna

The physiochemical monitoring program would include quarterly sampling of grasses and locally grown vegetable crops, which would be analyzed for fluoride uptake (Table 6-4). Sampling locations would be established by AES’s Environmental, Health, Safety, and Licensing staff. Section 6.2.2 provides a discussion of the monitoring of impacts to biotic communities.

6.2.1.6 Quality Assurance

The onsite analytical laboratory would implement a formal quality assurance/quality control program to monitor, assess, control, and report to the appropriate agencies the performance of chemical analyses so that they meet required performance standards specified in permits or within the standard procedures employed. Generally recognized good laboratory practices would be employed in all aspects of the analysis. The quality assurance program for nonradiological analyses would employ similar quality assurance principles as that for radiological analyses presented in Sections 6.1.8 and 6.1.9. Radiological and nonradiological programs have traditionally been administered separately at the laboratory level, owing to technical differences, laboratory access controls, analyst training, and to separate guidance from different Federal agencies providing technical oversight. Quality assurance programs for the two technical areas at the proposed EREF would be administered within a single overarching sampling and analysis organization. Different third-party laboratories would be involved in separate quality assurance measurement programs involving external parties.

The quality assurance program for both radiological and nonradiological measurements would be headed by a qualified quality assurance officer and would employ formal written procedures for all phases of method performance, from sample collection through data management and reporting. Recognized standard methods would be used that are known to produce results of the required quality. Chain-of-custody procedures would be followed during handling and transfer of samples and results. Both field samples and laboratory quality control samples would be analyzed, including appropriate blank, duplicate, and spiked samples, as well as laboratory calibration and sample recovery standards. Performance standards would be set to meet the requirements of the measurement program, and would include standards for lower limits of detection, sample recovery, and reproducibility of analysis.

Employed outside contract laboratories would have relevant EPA and Idaho certifications. Such laboratories would likewise follow a formal quality assurance program, including participation in third-party comparison studies, and would employ methods approved by the proposed EREF's laboratory quality assurance officer.

6.2.2 Ecological Monitoring

The ecological monitoring program would characterize changes that may occur in the composition of biotic communities as a result of preconstruction, construction, and operation of the proposed EREF.

The program would focus on observable changes in habitat characteristics and wildlife populations.

The ecological monitoring program would be carried out in accordance with generally accepted monitoring practices and the requirements of the Idaho Department of Fish and Game and the U.S. Fish and Wildlife Service. Under the program, data would be collected, recorded, stored, and analyzed. Procedures would be established, as appropriate, for data collection, storage, analysis, reporting, and corrective actions. Actions would be taken as necessary to reconcile anomalous results (AES, 2010a).

6.2.2.1 Monitoring Program Elements

The elements that would be included in the ecological monitoring program are vegetation, birds, mammals, and herpetiles (reptiles and amphibians). There are currently no action levels or reporting levels for any of these elements. However, consultations would continue with all appropriate agencies, such as the U.S. Fish and Wildlife Service, Bureau of Land Management, and Idaho Department of Fish and Game. Agency recommendations, based on future consultations and reviews of monitoring program data, would be considered in the development of action levels and/or reporting levels for each element (AES, 2010a).

In addition, to reduce potential impacts on birds and other wildlife, AES would periodically monitor the proposed site during the preconstruction, facility construction, and operation phases, including sampling of detention-basin and retention-basin waters. Measures would be taken to release any entrapped wildlife. The monitoring program would include an assessment of the effectiveness of entry barriers and release features (AES, 2010a). In addition, for the first five years following the completion of the new transmission line, AES would conduct annual surveys of the transmission line route for avian mortalities, including sage-grouse, due to collision or electrocution (AES, 2010b). These surveys would consist of in-vehicle observations while driving along the transmission line right-of-way. Remedial measures, such as high-visibility line markers, would be considered if surveys indicate the need. If perching of raptors or corvids that would imperil sage-grouse populations is discovered, remedial measures, such as anti-perching devices, would be considered.

6.2.2.2 Observations and Monitoring Program Design

The overall monitoring program would include preconstruction, construction, and operations monitoring programs. The preconstruction monitoring program would be conducted prior to the initiation of construction activities and would establish the baseline ecological conditions on the proposed EREF property. The monitoring procedures used to characterize the vegetation, bird, mammal, and herpetile communities during preconstruction monitoring would also be used for the construction and operations monitoring programs (AES, 2010a).

Surveys for the construction and operations monitoring program would use the same monitoring locations established for the preconstruction monitoring program. These surveys are designed to detect broad changes in the composition of the biotic communities that may be associated with the construction and operation of the proposed EREF. Changes resulting from natural succession processes would be considered in the interpretation of the results of the construction and operations monitoring program, because it is expected that plant communities on the proposed property would undergo successional changes, even in the absence of the proposed EREF project, with concomitant changes in the bird, mammal, and herpetile communities (AES, 2010a).

No specific monitoring equipment would be needed for the ecological monitoring, due to the type of monitoring proposed for the program as described above (AES, 2010a). Data collected for the ecological monitoring program would be recorded on paper and/or electronic forms. These data would be kept on file for the life of the proposed facility (AES, 2010a).

The monitoring program analyses would include descriptive statistics that would include the mean, standard deviation, standard error, and confidence interval for the mean. For each study, the sample size would be indicated. These standard descriptive statistics would be used to assess sample variability. For these studies, a significance level of 5 percent would be used, resulting in a 95 percent confidence level (AES, 2010a).

The data collected for the ecological monitoring program would be analyzed by the Environment, Health, and Safety Manager or a staff member reporting to the manager. A summary report would be prepared and would include spatial and temporal information regarding species composition and distribution and the relative abundance of key species (AES, 2010a).

Vegetation

Monitoring plant communities would include estimates of ground cover at about 20 permanent monitoring locations. The establishment of permanent monitoring locations would allow for the long-term evaluation of vegetation trends and characteristics of the proposed EREF property. Monitoring would be conducted annually in June, coinciding with the flowering period of the dominant perennial species. The selected monitoring locations would be positioned within the proposed EREF property, outside the proposed facility footprint. Global Positioning System coordinates would be recorded and used to identify and relocate the monitoring points (AES, 2010a). Figure 6-3 shows the positions of the monitoring locations.

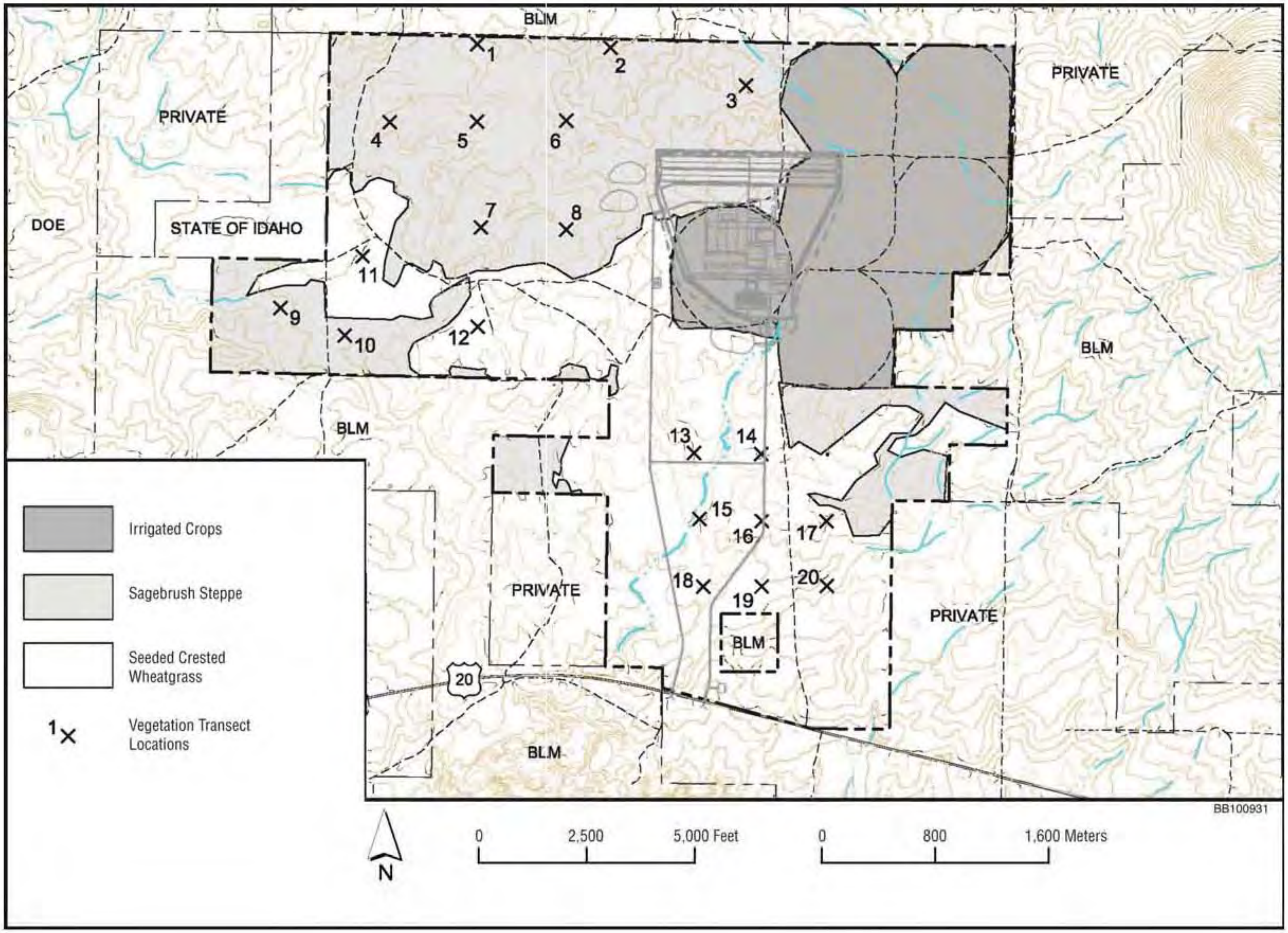

Figure 6-3 Vegetation Sampling Locations (AES, 2010a)

Using the point-transect method, monitoring data would be collected from the sagebrush steppe and disturbed sagebrush steppe habitats. Two 50-meter (164-foot) transect lines would extend from a randomly selected point at each monitoring location, one transect oriented to the east and the other to the south. Observation data would be collected at points located at intervals along the transect lines. Ground surface data (e.g., bare soil, leaf litter) on overstory and understory species that are intersected by the data points would be recorded. Data analysis would determine species composition and ground surface characteristics. In addition to preconstruction and construction monitoring, operations monitoring would initially be conducted through at least the first 3 years of plant operation. Subsequently, changes to the monitoring program may be initiated based on operational experience (AES, 2010a).

Wildlife

Wildlife monitoring surveys would be conducted to record the presence of mammals, birds, and herpetiles in the vicinity of the proposed EREF site. Wildlife monitoring would be designed to identify species and provide estimates of abundance. The surveys would be conducted annually in late spring/early summer and late fall/early winter. Data recorded each sampling day would include weather conditions (e.g., temperature, wind speed and direction, humidity, cloud cover). Changes in weather conditions during sampling would also be recorded. No surveys would be conducted when weather conditions (e.g., rain, heavy snow, high winds) reduce the likelihood of wildlife observations due to reduced animal activity or reduced visibility (AES, 2010a).

Permanent parallel transects, 1.6 kilometers (1.0 mile) in length and separated by 0.4 to 0.8 kilometers (0.25 to 0.50 miles), would be located in the sagebrush steppe and disturbed sagebrush steppe habitats. Transects would be walked from 30 minutes before sunrise to 1.5 hours after sunrise and 1.5 hours before sunset to 30 minutes after sunset. Data collected would include visual observations of animals, signs (e.g., tracks, droppings, feathers, nests, burrows), and calls. Species composition and relative abundance would be determined. Gender and age (e.g., juvenile, adult) would be recorded when possible. Data would also include behavior (flight, singing, territory establishment, nesting, perching). In addition to preconstruction and construction monitoring, operations monitoring would initially be conducted through at least the first 3 years of plant operation. Subsequently, changes to the monitoring program may be initiated based on operational experience (AES, 2010a).

Birds

Surveys of bird populations would be conducted twice each year, in late spring during breeding, nesting, and brood rearing seasons, and also during the winter. Recorded data would include species and numbers of individuals observed, as well as behavior. Data would be compared to information regarding birds listed in Table 6-6 as potentially using the proposed EREF property (AES, 2010a).

Mammals

Surveys of mammal populations would be conducted twice each year, in late spring during breeding and nursing season and during late fall/winter during migration and movements to winter range. Recorded data would include species and numbers of individuals observed, as

Table 6-6 Birds Potentially Using the Proposed EREF Property

Common Name	Scientific Name	Summer Breeder	Wintering	Resident	Migrant
Turkey vulture	*Cathartes aura*	U[a]	U	–[a]	A[a]
Osprey	*Pandion haliaetus*	–	–	–	R[a]
Bald eagle	*Haliaeetus leucocephalus*	–	U	–	R
Northern harrier	*Circus cyaneus*	–	–	C[a]	–
Sharp-shinned hawk	*Accipiter striatus*	R	R	–	R
Cooper's hawk	*Accipiter cooperii*	U	R	–	R
Swainson's hawk	*Buteo swainsoni*	U	R	–	U
Red-tailed hawk	*Buteo jamaicensis*	U	R	–	R
Ferruginous hawk	*Buteo regalis*	U	R	–	R
Rough-legged hawk	*Buteo regalis*	C	A	–	C
Golden eagle	*Aquila chrysaetos*	U	C	–	U
American kestrel	*Falco sparverius*	C	U	–	C
Merlin	*Falco columbarius*	–	–	R	–
Peregrine falcon	*Falco peregrinus*	–	–	R	–
Gyrfalcon	*Falco rusticolus*	–	–	–	A
Prairie falcon	*Falco mexicanus*	–	–	U	–
Chukar	*Alectoris chukar*	–	–	U	–
Greater sage-grouse	*Centrocercus urophasianus*	–	–	C	–
Kildeer	*Charadrius vociferus*	C	–	–	C
Long-billed curlew	*Numenius americanus*	U	–	–	U
Franklin's gull	*Larus pipixcan*	U	–	–	U
Ring-billed gull	*Larus delawarensis*	U	–	–	U
California gull	*Larus californicus*	R	–	–	U
Herring gull	*Larus argentatus*	U	–	–	U
Mourning dove	*Zenaida macroura*	C	R	–	C
Great horned owl	*Bubo virginianus*	–	–	U	–
Burrowing owl	*Athene cunicularia*	U	A	–	U
Short-eared owl	*Asio flammeus*	U	–	–	U
Northern sawwhet owl	*Aegolius acadicus*	–	A	–	A
Common nighthawk	*Chordeiles minor*	C	–	–	U
Horned lark	*Eremophila alpestris*	C	C	–	C
Black-billed magpie	*Pica pica*	–	–	C	–
American crow	*Corvus brachyrhynchos*	–	–	U	–

Table 6-6 Birds Potentially Using the Proposed EREF Property (Cont.)

Common Name	Scientific Name	Summer Breeder	Wintering	Resident	Migrant
Common raven	*Corvus corax*	–	–	U	–
Rock wren	*Salpinctes obsoletus*	U	–	–	U
Canyon wren	*Catherpes mexicanus*	R	–	–	R
House wren	*Troglodytes aedon*	U	U	–	U
Western bluebird	*Sialia mexicana*	U	–	–	U
American robin	*Turdus migratorius*	C	–	–	C
Sage thrasher	*Oreoscoptes montanus*	C	–	–	C
Northern shrike	*Lanius excubitor*	–	R	–	U
Loggerhead shrike	*Lanius ludovicianus*	–	–	U	–
European starling	*Sturnus vlugaris*	–	–	C	–
Black-headed grosbeak	*Pheucticus melanocephalus*	R	–	–	R
Green-tailed towhee	*Pipilo chlorurus*	U	–	–	U
Rufous-sided towhee	*Pipilo erythrophthalmus*	U	–	–	U
Brewer's sparrow	*Spizella breweri*	C	–	–	C
Lark sparrow	*Chondestes grammacus*	U	–	–	R
Black-throated sparrow	*Amphispiza bilineata*	R	–	–	R
Sage sparrow	*Amphispiza belli*	C	–	–	C
Lark bunting	*Calamospiza melanocorys*	R	–	–	R
White-crowned sparrow	*Zonotrichia leucophrys*	–	–	–	R
Vesper sparrow	*Pooecetes gramineus*	U	–	–	U
Chipping sparrow	*Spizella passerina*	–	–	–	R
Grasshopper sparrow	*Ammodramus savannarum*	U	–	–	U
Brown-headed cowbird	*Molothrus ater*	–	–	–	U
Snow bunting	*Plectrophenax nivalis*	–	R	–	R
Red-winged blackbird	*Agelaius phoeniceus*	U	–	–	U
Western meadowlark	*Sturnella neglecta*	C	U	–	C
Brewer's blackbird	*Euphagus cyanocephalus*	C	R	–	C
Rosy finch	*Leucosticte arctoa*	–	R	–	R
House sparrow	*Passer domesticus*	C	U	–	C

[a] U = Species likely would be uncommon onsite if observed at all; C = Species likely would be common onsite; R = Species likely would be rare onsite if observed at all; A = Accidental occurrence; – = Not applicable.
Source: AES, 2010a.

well as behavior (e.g., fleeing, feeding, or resting). Data would be compared to information regarding mammals listed in Table 6-7 as potentially using the proposed EREF property (AES, 2010a).

<u>Herpetiles</u>

Surveys of reptile and amphibian populations would be conducted once each year, during the summer when these species are most active. Recorded data would include species and numbers of individuals observed, as well as behavior (e.g., breeding, display, feeding, resting, or thermoregulating). Data would be compared to information regarding reptiles and amphibians listed in Table 6-8 as potentially using the proposed EREF property (AES, 2010a).

6.3 References

(AES, 2010a) AREVA Enrichment Services, LLC. "Eagle Rock Enrichment Facility Environmental Report, Rev. 2." Bethesda, Maryland. April.

(AES, 2010b) AREVA Enrichment Services, LLC. Letter from J.A. Kay (Licensing Manager, AES) to Sharon W. Kiefer (Assistant Director-Policy, IDFG) dated December 7, 2010, "Subject: Response to IDFG Comments to NRC Related to the EREF Transmission Line." ADAMS Accession No. ML103420579.

(NRC, 1979) U.S. Nuclear Regulatory Commission. "Quality Assurance for Radiological Monitoring Programs (Normal Operations) – Effluent Streams and the Environment." Regulatory Guide 4.15, Rev. 1. February.

(NRC, 1985) U.S. Nuclear Regulatory Commission. "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants." Regulatory Guide 4.16, Rev. 1. December.

(NRC, 1991) U.S. Nuclear Regulatory Commission. "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors." NUREG-1302. Generic Letter 89-01, Supplement No. 1.

(X5 Monte Carlo Team, 2003) X5 Monte Carlo Team. "MCNP – A General Monte Carlo N-Particle Transport Code, Version 5." LA-UR-0301987. April 24.

Table 6-7 Mammals Potentially Using the Proposed EREF Property

Common Name	Scientific Name	Preferred Habitat	Probable Occurrence
Little brown myotis	*Myotis lucifugus*	Coniferous forest, riparian areas in the mountains and lower valleys, woodlots, shelterbelts, and urban areas.	Unlikely to occur due to lack of suitable habitat.
Townsend's bigeared bat	*Plecotus townsendii*	Desert scrub, mixed conifer forest, and piñon-juniper habitat. Specifically associated with limestone caves, mines, lava tubes.	Unlikely to occur due to lack of suitable habitat.
White-tailed jack rabbit	*Lepus townsendii*	Found in open grasslands and montane shrublands generally above shrub steppe.	Probably occurs at the property in limited numbers due to lack of habitat.
Black-tailed jack rabbit	*Lepus californicus*	A habitat generalist, primarily found in arid regions supporting shortgrass habitats.	Likely occurs at the property.
Mountain cottontail	*Sylvilagus nattallii*	Brushy, rocky areas in dense sagebrush and streamside thickets and forest edges.	Likely occurs at the property.
Yellow-bellied marmot	*Marmota flaviventris*	Prefers montane meadows adjacent to talus slopes or rock outcrops; avoids tall vegetation.	Unlikely to occur due to lack of suitable habitat.
Pygmy rabbit	*Brachylagus idahoensis*	Big sagebrush habitat and secondarily in communities dominated by rabbitbrush.	Potentially occurs at the property.
Townsend's ground squirrel	*Spermophilus townsendii*	Arid environments with deep, friable, well-drained soils.	Likely occurs at the property.
Least chipmunk	*Eutamias minimus*	Sagebrush, bitterbrush, and other Great Basin shrub habitats.	Likely occurs at the property.
Northern pocket gopher	*Thomomys talpoides*	Mountain meadows, tundra, grasslands, sagebrush steppe, and agricultural fields – habitats lacking canopy cover but having abundant ground cover.	Probably occurs at the property in limited numbers due to lack of habitat.
Great basin pocket mouse	*Perognathus parvus*	Arid, sparsely vegetated plains and brushy areas.	Likely occurs at the property.
Ord's kangaroo rat	*Dipodomys ordii*	Semiarid, open habitats. Big sagebrush/crested wheatgrass range; disturbed sites.	Likely occurs at the property.
Beaver	*Castor canadensis*	Stable aquatic habitats providing adequate water, channel gradient of less than 15 percent, and quality food species.	Unlikely to occur due to lack of suitable habitat.

Table 6-7 Mammals Potentially Using the Proposed EREF Property (Cont.)

Common Name	Scientific Name	Preferred Habitat	Probable Occurrence
Western harvest mouse	*Reithrodontomys megalotis*	Open areas, including grasslands, prairies, meadows, and arid areas including deserts, sand dunes, and shrublands.	Likely occurs at the property.
Deer mouse	*Peromyscus maniculatus*	Most common habitats are prairies, bushy areas, and woodlands.	Likely occurs at the property.
Coyote	*Canis latrans*	Extremely adaptable; uses a wide range of habitats, including forests, grasslands, deserts.	Likely occurs at the property.
Long-tailed weasel	*Mustela frenata*	Upland brush, grasslands and woods to subalpine rock slides and semi-open forest areas.	Probably occurs at the property in limited numbers due to lack of habitat.
Badger	*Taxidea taxus*	Occurs primarily in grasslands, shrublands, and other treeless areas with friable soil and a supply of rodent prey.	Likely occurs at the property.
Canada lynx	*Lynx canadensis*	Canada lynxes require early, mid- and late-successional forests.	Unlikely to occur due to lack of suitable habitat.
Bobcat	*Lynx rufus*	Adapted to a wide variety of habitats, including canyons, deserts, and mountain ranges. Bobcats are found in desert environments if shade is available.	Probably occurs at the property in limited numbers due to lack of habitat.
Elk	*Cervus elaphus*	Found mostly in mountain or foothill areas; prefer alpine meadows in summer and then move to lower, wooded slopes or sagebrush steppe in winter.	Likely occurs at the property.
Mule deer	*Odocoileus hemionus*	Coniferous forests, shrub steppe, chaparral, and grasslands, from dry, open country to dense forests. Prefer arid open areas and rocky hillsides.	Probably occurs at the property in limited numbers due to lack of habitat.
Pronghorn	*Antilocapra americana*	Open plains and semi-deserts; often found on low, rolling, expansive lands with less than 30 percent slope.	Likely occurs at the property.

Source: AES, 2010a.

Table 6-8 Amphibians and Reptiles Potentially Using the Proposed EREF Property

Common Name	Scientific Name	Preferred Habitat	Probable Occurrence
Great Basin spadefoot toad	*Spea intermontana*	Sagebrush communities below 6,000 feet in elevation having loose soil in which to burrow. Breeding habitat is aquatic.	Unlikely to occur due to lack of aquatic habitat.
Long-nosed leopard lizard	*Gambelia wislizenii*	Arid and semi-arid plains with sagebrush, grass, and other low scattered vegetation. Prefers flat areas with open space for running, avoiding densely vegetated areas.	Probably occurs at the property in limited numbers due to lack of habitat.
Short-horned lizard	*Phrynosoma douglassi*	Open pine forests, pinion-juniper forests, shortgrass prairies, and sagebrush desert.	Likely occurs at the property.
Sagebrush lizard	*Sceloporus graciosus*	Sagebrush and other types of shrublands, in open areas with scattered low bushes and lots of sun.	Likely occurs at the property.
Western skink	*Eumeces skiltonianus*	Piñon-juniper forests, grassy areas, desert shrub, talus slopes, and canyon rims; often found in areas associated with water.	Unlikely to occur due to lack of suitable habitat.
Rubber boa	*Charina bottae*	Desert shrub to open pine forest. Often near water and near rocks, woody debris, or leaf litter that are used for cover.	Unlikely to occur due to lack of suitable habitat.
Desert striped whipsnake	*Masticophis taeniatus*	Occurs in open brushy country-desert scrub, sagebrush flats, and mixed woodlands. Often found along the edges of rivers or ponds.	Probably occurs at the property in limited numbers due to lack of habitat.
Gopher snake	*Pituophis catenifer*	Grassland, sagebrush, agricultural lands, riparian areas, woodlands, desert.	Likely occurs at the property.
Western terrestrial garter snake	*Thamnophis elegans*	Found statewide in habitats ranging from desert riparian areas to mountain lakes and meadows.	Probably occurs at the property in limited numbers due to lack of habitat.
Western rattlesnake	*Crotalus viridis*	Drier regions with sparse vegetation, usually with a rocky component.	Likely occurs at the property.

Source: AES, 2010a.

7 BENEFIT-COST ANALYSIS

A benefit-cost analysis can provide a rationale for deciding whether a project is likely to have a net positive economic impact, by aggregating each of the costs and benefits resulting from the project. A benefit-cost analysis involves valuing the benefits and costs associated with projects in monetary terms, to the extent possible. Depending on the extent of the data available, benefit-cost analyses may rely entirely or partially on qualitative data to assess the various costs and benefits, with the methodology employed for a benefit-cost analysis usually being dependent on the specific issues involved in a project. Costs and benefits are often separated into two categories, private and societal. Private costs and benefits are those that impact the owner of a project or facility, in this case AREVA Environmental Services, LLC (AES), while societal costs and benefits are those that impact society as a whole. Much of the data associated with preconstruction, construction, and operation of the proposed Eagle Rock Enrichment Facility (EREF) in Bonneville County, Idaho, that would be used to assess the private costs of the proposed EREF, the costs of constructing and operating the facility, are proprietary commercial information, withheld in accordance with Title 10, "Energy," of the U.S. *Code of Federal Regulations* (10 CFR 2.390). These costs are presented in a proprietary appendix to this Environmental Impact Statement (EIS), Appendix H, and are not discussed in this chapter. As such, Appendix H is not included in the publicly available version of this EIS. Additional data associated with operation of the facility, regarding annual revenues from the sale of enriched uranium, was not available, meaning that no estimate of the private benefits of the facility can be made.

As a result of the lack of data that can be publicly disclosed or is otherwise available, the analysis in this chapter focuses on the various societal costs and benefits associated with preconstruction, the proposed action, and the no-action alternative using data provided by AES in its license application and Environmental Report (AES, 2010a). These data include the economic and fiscal benefits of preconstruction, facility construction, and operation to the region of influence (ROI) (defined in Section 7.1) in which the plant would be located, and to the Idaho State economy. Also discussed are the benefits of the plant in fulfilling the need for enriched uranium to meet domestic electricity requirements, for domestic supplies of enriched uranium for national energy security, and for upgraded uranium enrichment technology in the United States for energy generation with fewer emissions of criteria pollutants and carbon. Societal costs considered include those related to impacts on land use, historical and cultural resources, visual and scenic resources, air quality, geology and soil, water resources, ecological resources, environmental justice, noise, transportation, public and occupational health, waste management, and accidents.

The chapter compares the societal benefits and costs both quantitatively, in monetary terms where possible, and qualitatively. Section 7.1 weighs the costs and benefits associated with preconstruction and the proposed action. Section 7.2 then compares the costs and benefits for preconstruction and the proposed action relative to those of the no-action alternative. Section 7.3 combines these two sections in forming overall conclusions. Alternatives that have previously been ruled out for failing to meet the proposed project's technical and policy objectives are described in Section 2.2.4 and are not revisited in this chapter.

7.1 Costs and Benefits of Preconstruction and the Proposed Action

The proposed action is for AES to construct, operate, and decommission a gas centrifuge uranium enrichment facility in Bonneville County, Idaho. To allow the proposed action to take place, the NRC would issue a license for AES under the provisions of the *Atomic Energy Act*. The license would authorize AES to possess and use special nuclear material, source material, and byproduct material at the proposed EREF for a period of 30 years, in accordance with the NRC's regulations in 10 CFR Parts 70, 40, and 30, respectively. The proposed EREF would be constructed over an eleven-year period. Enrichment operations would begin in 2014, continuing until 2041, when production would gradually decrease as decommissioning begins.

As discussed in Section 3.12 of this EIS, the principal socioeconomic benefit of the proposed EREF would be an increase in employment and income in the ROI, defined as the 11-county area in which workers at the proposed facility would live and spend their wages and salaries. Although the majority of the costs, and most of the socioeconomic impacts, of the various phases of development of the proposed EREF would occur in the 11-county ROI, the majority of the economic and fiscal benefits would occur in a 2-county ROI consisting of Bingham and Bonneville Counties. The uranium enrichment technology and energy security benefits of the facility would occur at the national level.

This section describes the costs and benefits of construction and operation of the proposed EREF and those associated with preconstruction. Quantitative estimates (in terms of dollars) are provided where possible. Other costs and benefits are described in qualitative terms.

7.1.1 Costs of Preconstruction and the Proposed Action

The direct costs associated with the proposed action may be categorized by the following life-cycle stages:

- facility construction
- facility operation
- depleted uranium disposal
- decommissioning

In addition to the costs of the proposed action, costs would be incurred for preconstruction under both the proposed action and the no-action alternative.

As the monetary costs associated with the preconstruction, construction, and operations phases of the proposed EREF are withheld under the provisions of 10 CFR 2.390, the costs associated with each of these life-cycle stage are discussed and summarized in a proprietary appendix, Appendix H, and summarized in Table H-1. As decommissioning activities for the proposed EREF are anticipated to occur more than 20 years in the future, costs associated with this phase of the proposed action cannot be estimated with any certainty at this time. It is expected, however, that annual decommissioning costs would be less than the annual costs of operating the facility.

In addition to monetary costs, preconstruction and the proposed action would result in impacts on various resource areas, which are considered “costs” for the purpose of this analysis. The resource areas and corresponding impacts are summarized below and described in more detail in Chapter 4 of this EIS. As summarized below, the impacts of preconstruction and the proposed action on the various resource areas would be mostly SMALL, with MODERATE impacts in a few cases. Any LARGE impacts would generally be very temporary and intermittent in nature, or would be reduced to MODERATE with the appropriate mitigation measures.

- *Land Use.* As described in Section 4.2.1, the proposed EREF would be located entirely on private land. The operation of a uranium enrichment facility is consistent with the county’s zoning. Current agricultural uses of the proposed EREF property would be curtailed, but similar activities would continue over large land areas surrounding the proposed EREF property and vicinity. For example, it is not anticipated that preconstruction, construction, and operation of the proposed EREF would have any effect on current land uses found on the surrounding Federal lands administered by the U.S. Bureau of Land Management. Land use impacts resulting from preconstruction, construction, and operation would be SMALL.

- *Historic and Cultural Resources.* As described in Section 4.2.2, there are 13 cultural resource sites in the immediate vicinity of the proposed EREF. Only one of these sites is eligible for listing on the *National Register of Historic Places*, the John Leopard Homestead (site MW004). This site is within the construction footprint of the proposed EREF. Preconstruction activities would destroy site MW004 and the resulting impacts would be LARGE, but were considered MODERATE because the appropriate mitigation, involving professional excavation of, and data recovery at, site MW004 was implemented by AES and other homestead sites of this type exist in the region (WCRM, 2010; Idaho, SHPO 2010b; Gilbert, 2010). Other than for site MW004, the impacts of the proposed project on historic and cultural resources would be SMALL.

- *Visual and Scenic Resources.* As described in Section 4.2.3, preconstruction and construction equipment and the industrial character of the proposed EREF buildings would create significant contrast with the surrounding visual environment of the primarily agricultural and undeveloped rangeland. The proposed facility would be about 2.4 kilometers (1.5 miles) from public viewing areas such as US 20 and the Hell’s Half Acre Wildlife Study Area (WSA); thus, the impact on views would be SMALL to MODERATE.

- *Air Quality*. As described in Section 4.2.4, preconstruction and construction traffic and operation of construction equipment are projected to cause a temporary increase in the concentrations of particulate matter. These impacts would be SMALL. However, fugitive dust from land clearing and grading operations could result in large releases of particulate matter for temporary periods of time. Such impacts would be MODERATE to LARGE during certain preconstruction periods and activities. Facility operations could produce small gaseous releases associated with operation of the process that could contain uranium compounds and hydrogen fluoride. Small amounts of nonradioactive air emissions would consist of carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM), volatile organic compounds (VOCs), and sulfur dioxide (SO_2). Air quality impacts during operations would be SMALL.

- *Geology and Soil.* As described in Section 4.2.5, impacts could result primarily during preconstruction and construction from surface grading and excavation activities that loosen soil and increase the potential for erosion by wind and water. Soil compaction as a result of heavy vehicle traffic could also increase the potential for soil erosion by increasing surface runoff. Spills and inadvertent releases during all project phases could contaminate site soils. Implementation of mitigation measures would ensure that these impacts would be SMALL.

- *Water Resources*. As described in Section 4.2.6, the water supply for the proposed facility would be from onsite wells, and water usage would be well within the water appropriation for the proposed property. Also, the plant would have no discharges to surface water or groundwater. Thus, water resource impacts would be SMALL.

- *Ecological Impacts*. As described in Section 4.2.7, impacts would occur primarily as a result of preconstruction and construction activities, which would mean the removal of shrub vegetation and the relocation and displacement of wildlife presently on the proposed site as a result of noise, lighting, traffic, and human presence. Collisions with vehicles, construction equipment, and fences may cause some wildlife mortality. No rare or unique communities or habitats or Federally listed threatened or endangered species have been found or are known to occur on the proposed site. The impact of the proposed EREF on ecological resources would be SMALL to MODERATE.

- *Noise*. As described in Section 4.2.8, increased noise associated with the operation of construction machinery is expected during preconstruction and construction, with noise levels of between 80 to 95 dBA at the highway entrances, access roads, and the Visitor Center. Construction noise would be temporary and would be reduced to about 51 to 66 dBA at the nearest hiking trail point on the Hell's Half Acre WSA. Impacts would be SMALL. Impacts during the operation of the facility itself would also be SMALL.

- *Transportation*. As described in Section 4.2.9, the primary impact of preconstruction, construction, and operation on transportation resources is expected to be increased traffic on nearby roads and highways due to truck shipments and site worker commuting. Transportation impacts during preconstruction, construction, and facility operation would be SMALL to MODERATE on adjacent local roads (due to the potentially significant increase in average daily traffic), but regional impacts would be SMALL.

- *Public and Occupational Health*. As described in Section 4.2.10, the analysis of nonradiological impacts during preconstruction and construction includes estimated numbers of injuries and illnesses incurred by workers and an evaluation of impacts due to exposure to chemicals and other nonradiological substances, such as particulate matter (dust) and vehicle exhaust. All such potential nonradiological impacts would be SMALL. No radiological impacts are expected during preconstruction and initial facility construction, prior to radiological materials being brought onsite. Operation of the proposed EREF could result in release of small quantities of UF_6 during normal operations. Total uranium released to the environment via airborne effluent discharges is anticipated to be less than 10 grams (6.84 µCi or 0.253 MBq) per year. No liquid effluent wastes are expected from facility operation. For a hypothetical member of the public at the proposed property boundary, the annual dose was estimated to be approximately 0.014 millisievert per year (1.4 millirem per year). Doses attributable to normal operation of the proposed EREF facility would be small compared to the normal background dose range of 2.0 to 3.0 millisievert (200 to 300 millirem). Radiological impacts during operations would be SMALL.

- *Waste Management*. As described in Section 4.2.11, small amounts of hazardous waste and approximately 6116 cubic meters (8000 cubic yards) of nonhazardous and nonradioactive wastes would be generated during preconstruction and construction activities. During operations, approximately 75,369 kilograms (165,812 pounds) of solid nonradioactive waste would be generated annually, including approximately 5062 kilograms (11,136 pounds) of hazardous wastes. Approximately 146,500 kilograms (322,300 pounds) of radiological and mixed waste would be generated annually, of which approximately 100 kilograms (220 pounds) would be mixed waste. All wastes would be transferred offsite to licensed waste facilities with adequate disposal capacity for the wastes from the proposed EREF. Overall, impacts would be SMALL.

- *Socioeconomics*. As described in Section 4.2.12, there would be increases in regional employment, income, and tax revenue during preconstruction, construction, and operation. Although these impacts would be SMALL compared to the 11-county economic baseline, they are generally considered to be positive. Impacts on housing and local community services, which could be negative if significant population in-migration were to occur, would also be SMALL.

- *Environmental Justice.* As described in Section 4.2.13, the majority of the environmental impacts associated with preconstruction, construction, and operation of the proposed EREF that would affect the population as a whole would be SMALL, and generally would be mitigated if they were negative. Environmental impacts are primarily those affecting historical and cultural resources, visual and scenic resources, air quality, transportation, and facility accidents. However, as there are no minority or low-income populations defined according to CEQ guidelines within the 4-mile area around the proposed facility, there would be no disproportionate impacts on these populations as a result of this proposed project.

- *Accidents*. As described in Section 4.2.15, six accident scenarios were evaluated in this EIS as a representative selection of the types of accidents that are possible at the proposed EREF. The representative accident scenarios selected vary in severity from high- to intermediate-consequence events and include accidents initiated by natural phenomena (earthquakes), operator error, and equipment failure. The consequence of a criticality accident would be high (fatality) for a worker in close proximity. Worker health consequences are low to high from the other five accidents that involve the release of UF_6. Radiological consequences to a maximally exposed individual (MEI) at the Controlled Area Boundary (proposed EREF property boundary) are low for all six accidents including the criticality accident. Uranium chemical exposure to the MEI is high for one accident and low for the remainder. For HF exposure to an MEI at the proposed property boundary, the consequence of three accidents is intermediate, with a low consequence estimated for the remainder. All accident scenarios predict consequences to the collective offsite public of less than one lifetime cancer fatality. Impacts from accidents would be SMALL to MODERATE.

7.1.2 Benefits of the Proposed Action

The proposed action would result in the annual production of up to a maximum of 6.6 million separative work units (SWUs) of enriched uranium between 2022 and 2041. As discussed in Section 1.3 of this EIS, this level of production would represent an augmentation of the domestic supply of enriched uranium and would meet the need for increased domestic supplies of enriched uranium for national energy security. Under the proposed action, enriched uranium production would be undertaken with the latest enrichment technology, and would facilitate the generation of electricity with lower emissions of criteria pollutants and carbon.

The proposed action would also result in small positive socioeconomic impacts in the 11-county ROI, as described in Section 4.2.12. Table 7-1 presents the estimated employment and tax revenue benefits associated with the proposed action. Employment in the 11-county ROI as a result of preconstruction activities is estimated at 308 full-time jobs. In addition, State income tax revenues would be $0.1 million, and State sales and use tax receipts would be $0.9 million during preconstruction. Average employment in the 11-county ROI during construction is estimated at 947 full-time jobs, with $0.4 million in State income tax revenues and $2.7 million in State sales taxes. During the construction/operations overlap period between 2014 and 2021, 1645 jobs would be created in the first year, lasting throughout the startup period; $0.7 million in income taxes would be generated annually for the State of Idaho; and $1.8 million in property taxes would be collected annually by Bonneville County. During the operations phase between 2022 and 2040, 3289 jobs would be created in the first year, lasting throughout the operating period, with fewer positions required in the last year of operations, 2041. During the operating period, the State of Idaho would benefit from $1.3 million annually in income taxes, while Bonneville County would collect $3.5 million annually in property tax receipts (AES, 2010a).

As the decommissioning phase of the proposed EREF would occur more than 20 years in the future, decommissioning costs cannot be estimated with any certainty at this time. Decommissioning impacts would be SMALL, with impacts likely to be less than the impacts of operating the facility.

Construction of an electrical transmission line to support the proposed EREF facility would produce 57 jobs, $0.1 million in direct sales taxes, and $0.1 million in direct income taxes.

Although it can be assumed that some portion of State sales and income taxes paid would be returned to the 11-county ROI under revenue-sharing arrangements between each county and State government, the exact amount that would be received by each county cannot be determined.

Beyond the economic and fiscal benefits of the proposed EREF in the 11-county ROI, the facility would also create fiscal benefits in the nation as a whole, primarily in the form of Federal income taxes on employee wages and salaries. Based on the distribution of employees in each salary category at the proposed facility, and current Federal marginal income tax rates, it is estimated that annual individual Federal income taxes during the peak year of facility construction would be $15.5 million, with $7.2 million produced annually during startup and $14.5 million generated annually during facility operations. Federal income taxes would amount to $2.8 million during preconstruction activities.

Table 7-1 Socioeconomic Benefits Associated with the Proposed EREF in the 11-County ROI

Project Phase	Annual Average Direct and Indirect Jobs Created (full-time jobs)	Direct Annual State Income Tax Revenues ($ million, 2008 $)	Direct Annual State Sales Tax Revenues ($ million, 2008 $)	Annual Local Government Property Tax Revenues ($ million, 2008 $)
Preconstruction	308	0.1	0.9	NA[a]
Construction	947	0.4	2.7	NA
Construction/Operations Overlap Period	1645	0.7	NA	1.8
Operation	3289	1.3	NA	3.5
Transmission Line	57	0.1	0.1	<0.1

[a] NA = not applicable.

Source: AES, 2010a.

7.1.3 Summary Regarding the Proposed Action

This analysis shows that although there are economic and fiscal benefits associated with preconstruction, construction, and operation of the proposed EREF in the ROI, these impacts would be SMALL. There would also be costs resulting from impacts on various resource areas, which are not possible to quantify. For the majority of these resource areas, impacts would be SMALL or SMALL to MODERATE in magnitude.

7.2 Comparative Benefit-Cost Analysis of Proposed Action Relative to No-Action Alternative

This section compares selected costs and benefits of the proposed action to those of the no-action alternative. This comparison focuses on the tradeoffs between constructing the proposed EREF compared to not constructing the facility. Other possible actions involving other domestic and foreign uranium enrichment suppliers at existing and proposed new facilities both in the United States and elsewhere are likely to be similar under the two alternatives, and are therefore not considered in the comparison.

As a result of the lack of data that can be publicly disclosed or is otherwise available on private benefits (facility revenues) and costs (preconstruction, facility construction, and operating costs), the analysis focuses on the societal benefits and costs of the facility, including the impacts on employment, income, and tax revenues during the construction and operations phases in the region of influence around the proposed site, and the contribution of the proposed facility to meeting policy and technical objectives.

7.2.1 No-Action Alternative

The proposed EREF would not be constructed, operated, and decommissioned under the no-action alternative; preconstruction activities at the proposed site that are not part of the proposed action could still take place (see Section 4.4). Preconstruction activities would include the disturbance of land associated with site clearing and preparation activities and the construction of ancillary facilities, meaning that some ecological, natural, and socioeconomic impacts would therefore occur. For the purposes of the no-action alternative, all potential local environmental impacts during the construction, operations, and decommissioning phases would be avoided. Similarly, all socioeconomic impacts related to employment, economic activity, population, housing, and community resources during the construction, operations, and decommissioning phases would not occur.

7.2.2 The Proposed Action

The benefits of preconstruction, construction, and operation of the proposed EREF on the economy in the 11-county ROI in which the plant is located, and on the State economy are described in Sections 4.2 and 7.1.2. Societal costs and impacts on land use, historical and cultural resources, visual and scenic resources, air quality, geology and soils, water resources, ecological resources, noise, transportation, public and occupational health, waste management, and environmental justice are described in Sections 4.2 and 7.1.1. In all cases, the impacts are too small to materially affect the comparative benefit-cost analysis.

Other non-monetary cost areas described in Section 7.1.1 are not included as part of this comparison because the effect of these impacts is assumed to be either (1) approximately equal for the proposed action and the no-action alternative as defined above or (2) too small in differential impact to materially affect the comparative benefit-cost analysis.

This analysis does not attempt to estimate the economic effects of a cheaper source of enriched uranium for nuclear power plants, or estimate the impact of lower enriched uranium prices on the ratio of nuclear and non-nuclear power in the domestic economy (1) on overall power demand and price and (2) on the potential economic benefits to consumers and suppliers.

7.2.3 Compliance with Policy and Technical Objectives

The following policy and technical objectives are relevant to the choice of an enrichment technology:

- the need for enriched uranium to fulfill domestic electricity requirements
- the need for domestic supplies of enriched uranium for national energy security
- the need for upgraded uranium enrichment technology in the United States
- the need for energy generation with fewer emissions of criteria pollutants and carbon

The following sections compare the proposed action and the no-action alternative in terms of how well they meet each of these objectives.

7.2.3.1 Meeting Demand for Enriched Uranium

Currently, the demand for enriched uranium in the United States for domestic electricity production is met from two categories of sources:

- domestic production of enriched uranium

- other foreign sources

The current 5-year average U.S. demand for enriched uranium is 14 million SWUs per year (EIA, 2010). From 2005 through 2009, the United States Enrichment Corporation delivered approximately 10 to 13.5 million SWUs to customers annually, of which 5.5 million SWUs per year were from the Megatons to Megawatts Program. Of the remaining 4.5 to 7.5 million SWUs, an average of approximately 2 million SWUs were sold for use in the United States and the balance exported (USEC, 2010). Therefore, of the amount sold for use in the United States, approximately 2 million SWUs (about 15 percent of U.S. demand) come from enrichment at the Paducah Gaseous Diffusion Plant (PGDP) and 5.5 million SWUs (about 38 percent of U.S. demand) come from downblending at the Megatons to Megawatts Program, which depends on deliveries from Russia (EIA, 2010; USEC, 2010). Capacity at the proposed EREF could theoretically be sold only to the U.S. market, thus reducing the overall foreign dependence to approximately 6 million SWUs (43 percent of U.S. demand).

7.2.3.2 National Energy Security

Currently, foreign sources supply as much as 85 percent of the U.S. demand for enriched uranium. The primary domestic production of enriched uranium currently takes place at a single plant – the Paducah Gaseous Diffusion Plant. The heavy dependence on foreign sources and the lack of diversification of domestic sources of enriched uranium represent a potential reliability risk for the domestic nuclear energy industry, which supplies 20 percent of national energy requirements. Interagency discussions led by the National Security Council have concluded that the United States should maintain a viable and competitive domestic uranium enrichment industry for the foreseeable future (DOE, 2002). The U.S. Department of Energy (DOE) has noted the importance of promoting the development of additional domestic enrichment capacity to achieve this objective (DOE, 2002).

It is anticipated that all gaseous diffusion enrichment operations in the United States will cease in 2012 due to the higher cost of aging facilities (DOE, 2007). Furthermore, the Megatons to Megawatts Program is scheduled to expire in 2013. As noted above, these two sources meet more than half of the current U.S. demand for low-enriched uranium (LEU). As a result, new domestic sources of enriched uranium are needed to reliably provide fuel to both the existing and future nuclear power plants in the United States. Thus, projected 6 million SWUs production from the proposed EREF has the potential to be crucial to meeting the nuclear power industry's needs and to increasing the nation's energy security. This benefit is potentially LARGE.

7.2.3.3 Technology Upgrade

A DOE–USEC agreement in 2002 regarding the proposed American Centrifuge Plant in Piketon, Ohio, was intended to "facilitate the deployment of new, cost-effective advanced treatment technology in the U.S. on a rapid scale" (NRC, 2006). Similarly, the proposed action represents the implementation of a technology that is contemporary, cost-effective, and reliable (such as the gas centrifuge technology to be used in the proposed EREF). The proposed action is therefore better able to address the objective of upgraded domestic uranium enrichment technology than the no-action alternative, in which no technology is implemented.

7.2.3.4 Energy Generation with Fewer Emissions of Criteria Pollutants and Carbon

Production of enriched uranium at the proposed EREF would support an increase in electricity production using nuclear technology. Compared to the most likely alternative, coal-fired power plants, nuclear electricity generation results in fewer emissions of criteria pollutants such as nitrogen oxides, sulfur dioxide, and particulate matter, as well as reduced emissions of carbon. In addition, the gas centrifuge technology being chosen for the proposed EREF is less energy-intensive than the existing gaseous diffusion technology. Therefore, regional air quality and environmental impacts would be further reduced. On a national basis, these environmental benefits of the proposed action would be MODERATE.

7.2.4 Conclusions Regarding the Proposed Action versus the No-Action Alternative

Based on consideration of local and national socioeconomic benefits, and the costs of preconstruction, construction, and operation of the proposed EREF on a range of environmental resources, and on public and occupational health, the proposed action is preferable relative to the no-action alternative in the following respects:

- The proposed action better satisfies DOE's policy and technical objectives for meeting future demand, national energy security, technological upgrades, and reducing emissions of criteria pollutants and carbon; and

- The proposed action would have positive impacts in the 11-county ROI on employment, income, and tax revenues during the preconstruction, construction, operations, and decommissioning phases.

7.3 Overall Benefit-Cost Conclusions

While there are national energy security and fiscal benefits associated with the proposed action, and local socioeconomic benefits in the 11-county ROI in which the proposed EREF would be located, there are also direct costs associated with the preconstruction, construction, and operation phases of the proposed project, as well as impacts associated with the proposed action on various resource areas. However, these impacts are estimated to be small in magnitude and small in comparison to the local and national benefits of the proposed action.

Although the no-action alternative would include the continuation of enriched uranium production using gaseous diffusion technology and imported enriched uranium supplies, in order to satisfy domestic demand, the proposed action better satisfies DOE's policy and technical objectives. These objectives require meeting future demand for enriched uranium and improved national energy security with the desired technology upgrades. Also, under the proposed action, there would be fewer emissions of criteria pollutants and carbon. The staff concludes that in comparison to the no-action alternative, the proposed action is associated with significant net positive benefits.

7.4 References

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8 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

On December 30, 2008, AREVA Enrichment Services, LLC (AES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission the proposed Eagle Rock Enrichment Facility (EREF) (AES, 2008). AES proposes to locate the facility in Bonneville County, Idaho, approximately 32 kilometers (20 miles) west of Idaho Falls. Revisions to the license application were submitted on April 23, 2009 (Revision 1) (AES, 2009a) and April 30, 2010 (Revision 2) (AES, 2010a). If licensed, the proposed EREF would enrich uranium for use in commercial nuclear fuel for power reactors. Feed material would consist of non-enriched uranium hexafluoride (UF_6). AES would employ a gas centrifuge-based enrichment process to enrich uranium to up to 5 percent uranium-235 by weight, with a planned maximum target production of 6.6 million separative work units (SWUs) per year. The proposed EREF would be licensed in accordance with the provisions of the *Atomic Energy Act*. Specifically, an NRC license under Title 10, “Energy,” of the U.S. *Code of Federal Regulations* (10 CFR) Parts 30, 40, and 70 would be required to authorize AES to possess and use byproduct material, source material, and special nuclear material at the proposed EREF.

AES expects to begin preconstruction in late 2010. If the license application is approved, AES expects to begin facility construction in 2011, which would continue for 11 years. AES anticipates commencing initial production in 2014 and reaching full production in 2022. Prior to license expiration in 2041, AES would decide to seek to renew its license to continue operating the facility or plan for the decontamination and decommissioning of the facility per the applicable licensing conditions and NRC regulations.

Section 102 of the *National Environmental Policy Act of 1969*, as amended (NEPA) (Public Law 91-190; Title 42, Section 4321 et seq., *United States Code* [42 U.S.C. 4321 et seq.]), directs that an Environmental Impact Statement (EIS) is required for major Federal actions that significantly affect the quality of the human environment. Section 102(2)(C) of NEPA requires that an EIS include information about the following:

- the environmental impacts of the proposed action
- any adverse environmental effects that cannot be avoided, should the proposal be implemented
- alternatives to the proposed action
- the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity
- any irreversible and irretrievable commitments of resources that would be involved if the proposed action is implemented

NRC’s regulations under 10 CFR Part 51 implement the requirements of NEPA. In particular, 10 CFR 51.20(b)(10) states that issuance of a license for a uranium enrichment facility requires the NRC to conduct an environmental review and prepare an EIS. As part of its license application and two license application revisions, AES submitted an Environmental Report (ER) and ER Revisions 1 and 2. Information in the ERs and supplemental environmental documentation provided by AES has been reviewed and independently verified by the NRC and used, in part, by the NRC in preparing the EIS. ER Revision 2 (AES, 2010b) incorporates the supplemental environmental documentation provided by AES subsequent to the submittal of ER Revision 1, with the exception of some responses to requests for additional information (AES, 2009b) and supplemental information provided subsequent to ER Revision 2 (North Wind, 2010) that were also used in the preparation of this EIS.

The April 23, 2009, Revision 1 to the AES license application provided details on an expansion of the maximum annual production of the proposed EREF from 3.3 to 6.6 million SWUs per year. On June 17, 2009, AES submitted a request for an exemption from certain NRC regulations to allow commencement of certain preconstruction activities (e.g., site preparation) prior to issuance of the NRC license (AES, 2009c). On October 15, 2009, AES provided information that distinguishes between the environmental impacts of the preconstruction activities specified in its exemption request and those of NRC-authorized construction activities that will not be undertaken unless a license is granted (AES, 2009d). Supplemental information on the proposed transmission line required to power the proposed EREF was submitted by AES on February 18, 2010 (AES, 2010c). On March 17, 2010, the NRC granted an exemption (NRC, 2010) authorizing AES to conduct the preconstruction activities on the proposed EREF site, which AES had requested in its June 17, 2009, exemption request.

Upon acceptance of the ER, the NRC began the environmental review process described in 10 CFR Part 51 by publishing, on May 4, 2009, in the *Federal Register* (74 FR 20508) a Notice of Intent to prepare an EIS and conduct scoping. The purpose of the EIS scoping process was to assist in determining the range of actions, alternatives to the proposed action, and potential impacts to be considered in the EIS, and to identify significant issues related to the proposed action. Comments and information from the public and government agencies were obtained during the scoping period. As part of the scoping process, the NRC staff held a public scoping meeting on June 4, 2009, in Idaho Falls, Idaho. NRC staff considered the public comments received during the scoping process for preparation of this EIS; the summary of the EIS scoping process is provided in Appendix A (the September 2009 Scoping Summary Report).

In addition to reviewing AES's ER and supplemental documentation, the NRC staff consulted with appropriate Federal, State, and local agencies and Tribal organizations. On June 2–4, 2009, the NRC staff met with officials of a number of these agencies and organizations and also conducted a site visit and technical meetings with AES.

Further comments from the public and government agencies were received after the NRC staff issued a Draft EIS for public review and comment on July 21, 2010, and announced its availability in the *Federal Register* (75 FR 4266) in accordance with 10 CFR 51.73, 51.74, and 51.117. The public comment period ended on September 13, 2010. During the public comment period, the NRC staff held two public meetings – in Boise, Idaho, on August 9, 2010, and in Idaho Falls, Idaho, on August 12, 2010 – where oral comments from members of the public were received on the Draft EIS. In addition to oral comments received at the public meetings, the NRC staff received written comments on the Draft EIS at the public meetings and by postal mail and email during the public comment period. The transcripts of the public meetings and the written comments received are part of the public record for the proposed project and were considered by the NRC staff in preparing this EIS. Comment summaries and the NRC staff's responses are contained in Appendix I of this EIS.

Included in this EIS are (1) the results of the NRC staff's analyses, which consider and weigh the environmental effects of preconstruction and the proposed action; (2) mitigation measures for reducing or avoiding adverse effects; (3) the environmental impacts of alternatives to the proposed action; and (4) the NRC staff's recommendation regarding the proposed action based on its environmental review.

Potential environmental impacts are evaluated in this EIS using the three-level standard of significance – SMALL, MODERATE, or LARGE – developed by the NRC using guidelines from the Council on Environmental Quality (CEQ) (40 CFR 1508.27). Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, provides the following definitions of the three significance levels:

- SMALL – Environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

- MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

- LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

8.1 Unavoidable Adverse Environmental Impacts

Section 102(2)(c)(ii) of NEPA requires that an EIS include information on any adverse environmental effects that cannot be avoided, should the proposed action be implemented. Unavoidable adverse environmental impacts are those potential impacts of the NRC action that cannot be avoided and for which no practical means of mitigation are available.

The environmental impacts associated with the proposed action and with the no-action alternative are described in detail in Chapter 4 for each resource area. The impacts of these two alternatives are summarized and compared in Section 2.4. Chapter 4 also discusses the mitigation measures that AES proposed in its ER to mitigate the potential impacts of the proposed action and the mitigation measures identified by the NRC. These two sets of mitigation measures are summarized in Chapter 5, Tables 5-1 and 5-2 and Tables 5-3 and 5-4, respectively. The cumulative impacts on the environment that would result from the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions, are described in Section 4.3.

As discussed in Chapter 4, the environmental impacts that would result if the proposed action were to be implemented as proposed by AES would mostly be SMALL and would, in most cases, be mitigated by the methods proposed by AES. The only resource areas in which certain impacts would be classified as SMALL to MODERATE would be visual and scenic resources, ecological resources, and transportation. In addition, impacts on historic and cultural resources as a result of preconstruction activities would be MODERATE with appropriate mitigation, and air quality impacts from fugitive dust would be MODERATE to LARGE on a temporary basis during preconstruction and construction activities.

The primary impact on historic and cultural resources would result from the destruction during EREF preconstruction activities of site MW004, the John Leopard Homestead, which has been recommended as eligible for listing in the *National Register of Historic Places*. However, the mitigation of this site by AES prior to its disturbance results in a MODERATE level for this impact.

The proposed EREF would create a significant contrast with the surrounding visual environment, presenting a MODERATE impact to visual and scenic resources. The extent of the proposed EREF and the industrial nature of its buildings are not in character with the surrounding viewshed, which includes the surrounding grazing and agricultural lands and the Hell's Half Acre Wilderness Study Area/National Natural Landmark approximately 2.4 kilometers (1.5 miles) to the south.

The impact level on ecological resources has been classified as MODERATE during preconstruction and construction activities because these activities would result in the removal of sagebrush steppe and nonirrigated pasture vegetation. Indirect impacts of preconstruction and construction would include the generation of fugitive dust, erosion of disturbed areas, and potential sedimentation of downgradient habitats. Also, preconstruction and construction activities would result in some wildlife mortality and cause other wildlife to relocate as a result of noise, lighting, traffic, and human presence. Collisions with vehicles or construction equipment may cause some wildlife mortality as well.

The transportation impacts on US 20 in the immediate vicinity of the proposed EREF would be SMALL to MODERATE due to increases in traffic density (primarily from commuting workers) during preconstruction and facility construction, and when facility construction and initial operations overlap.

The ground-disturbing activities during preconstruction and construction would result in increased fugitive dust emissions and cause MODERATE to LARGE air quality impacts. However, air quality impacts would be at the MODERATE to LARGE level only temporarily. The majority of the time, these impacts would be SMALL.

8.2 Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

Consistent with the CEQ definition in 40 CFR 1502.16 and the definition provided in Section 5.8 of NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs* (NRC, 2003), this EIS defines short-term uses and long-term productivity as follows:

- Short-term uses generally affect the present quality of life for the public (i.e., the 30-year license period for the proposed EREF).

- Long-term productivity affects the quality of life for future generations on the basis of environmental sustainability (i.e., long-term is the period after license termination for the proposed EREF).

Preconstruction, construction, and operation of the proposed EREF would necessitate short-term commitments of resources. The short-term commitment of resources would include the use of materials required to construct new buildings and operation support facilities, transportation resources, and other materials and disposal resources for operations at the proposed EREF. Preconstruction, construction, operations, and decommissioning of the proposed EREF would also require the permanent commitment of energy and water resources. The short-term use of resources would result in potential long-term socioeconomic benefits to the local area and the region, such as improvements to the local economy and infrastructure supported by worker income and tax revenues and the maintenance and enhancement of a skilled worker base.

Workers, the public, and the environment would be exposed to increased amounts of radioactive and hazardous materials over the short term from the operation of the proposed EREF and the associated materials, including process emissions and the handling of waste. Construction and operation of the proposed EREF would require a long-term commitment of terrestrial resources, such as land, water, and energy. Impacts would be minimized by the application of proper mitigation measures and resource management. In closing the EREF, AES would decontaminate and decommission the buildings and equipment and restore them for unrestricted use. This work would make the buildings and the site available for other uses. The use of the site and the buildings for other industrial purposes would constitute a long-term benefit to the community and would increase long-term productivity. Continued employment, expenditures, and tax revenues generated during preconstruction, construction, and operation of the proposed EREF and from future site uses after the EREF is decommissioned would directly benefit the local, regional, and State economies and would be considered a long-term benefit.

8.3 Irreversible and Irretrievable Commitment of Resources

Irreversible commitment of resources refers to resources that are destroyed and cannot be restored, whereas an irretrievable commitment of resources refers to material resources that once used cannot be recycled or restored for other uses by practical means (NRC, 2003). The implementation of the proposed action as described in Section 2.1 would include the commitment of land, water, energy, raw materials, and other natural and manmade resources. About 240 hectares (592 acres) on the 1700-hectare (4200-acre) property to be purchased by AES would be used for the preconstruction, construction, and operation of the proposed EREF. AES has stated that following decontamination and decommissioning, all parts of the plant and site would be available for unrestricted use (AES, 2010b). Therefore, if the license is granted, the 240-hectare (592-acre) parcel of land would likely remain in industrial use beyond license termination.

Preconstruction, construction, and operation of the proposed EREF would use groundwater resources from the Eastern Snake River Plain (ESRP) aquifer. The proposed EREF is a consumptive water-use facility, meaning all water would be used and none would be returned to its original source. Although the amount of water from the ESRP aquifer that would be used by the proposed EREF represents a small percentage of the total capacity of the facility's water right appropriation, this water would be lost in three ways: (1) the water would evaporate from the liquid effluent treatment system evaporator and the two Cylinder Storage Pads Stormwater Retention Basins; (2) the water would evaporate or infiltrate into the ground from the Site Stormwater Retention Basin; and (3) infiltrated groundwater would undergo evapotranspiration. It is unlikely that any of the water used by the proposed EREF would replenish the ESRP aquifer or reach adjacent properties.

Energy expended would be in the form of fuel (gasoline and diesel) for equipment and electricity for facility preconstruction, construction, and operations. There are no plans to use natural gas at the proposed EREF. The electrical energy requirement for EREF operation would represent a small increase in the electrical energy demand of the area. Improvements in the local area's electrical power capacity to support the proposed EREF (i.e., the upgrade/addition of an electrical transmission line and substations) would contribute to a slight increase in the irreversible and irretrievable commitment of resources because of the dedication of a small portion of land and material that would be needed for such improvements and the expansion of services.

Resources that would be committed irreversibly or irretrievably during preconstruction, construction, and operation of the proposed EREF include materials that could not be recovered or recycled and materials that would be consumed or reduced to unrecoverable forms. Preconstruction and construction of the proposed EREF would involve the commitment of varying amounts of building materials. During operation, the proposed EREF would generate a small amount of nonrecyclable waste streams, such as hazardous and radiological wastes. Generation of these waste streams would represent an irreversible and irretrievable commitment of material resources.

Even though the land used to construct the proposed EREF would be returned to other productive uses after the facility is decommissioned, there would be some irreversible commitment of land at some offsite locations used to dispose of solid wastes generated at the proposed EREF. In addition, wastes generated during the conversion of depleted UF_6 produced at the proposed EREF and the depleted uranium oxide conversion product from the depleted UF_6 conversion would be disposed of at an offsite location (see Section 2.1.5). The land used for the disposal of these materials would also represent an irreversible commitment of land. No solid wastes or depleted uranium oxide conversion product originating from the proposed EREF would be disposed of on the EREF property.

When the facility is decommissioned, some of the materials used in its construction, such as concrete, steel, other metals, plastics, and other materials, would be recycled and reused. Other materials would be disposed of in licensed and approved offsite locations. The amount of land used to dispose of these materials would also be an irretrievable land resource.

During the operation of the proposed EREF, natural UF_6 would be used as the feed material. This would require the mining of uranium (not licensed by the NRC) and other operational steps in the front end of the uranium fuel cycle (licensed by the NRC) that result in the production of UF_6. The use of uranium minerals would be an irretrievable resource commitment. There would also be other irreversible and irretrievable commitments of resources during uranium fuel cycle operations that result in the production of natural UF_6 feed. As shown in Figure 1-2, there are several fuel cycle operations leading up to the production of the natural UF_6 that feed enrichment operations. These steps include the mining and processing of uranium ore, which result in the production of natural triuranium octaoxide (U_3O_8) and conversion of natural U_3O_8 to UF_6. All materials and energy used in the construction and operation of the facilities used to mine and process the uranium ore and convert natural U_3O_8 to natural UF_6 would constitute an irreversible and irretrievable commitment of resources.

8.4 References

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(AES, 2009a) AREVA Enrichment Services, LLC. Letter from Sam Shakir (President and CEO, AES) to the U.S. Nuclear Regulatory Commission dated April 23, 2009. "Subject: Revision 1 to License Application for the Eagle Rock Enrichment Facility." ADAMS Accession No. ML091210638.

(AES, 2009b) AREVA Enrichment Services, LLC. Letter from Jim Kay (Licensing Manager, AES) to the U.S. Nuclear Regulatory Commission dated September 9, 2009. "Subject: Response to Requests for Additional Information – AREVA Enrichment Services LLC Environmental Report for the Eagle Rock Enrichment Facility." ADAMS Accession No. ML092530636.

(AES, 2009c) AREVA Enrichment Services, LLC. Letter from Sam Shakir (President and CEO, AES) to the U.S. Nuclear Regulatory Commission dated June 17. "Subject: Request for Exemption from 10 CFR 70.4, 10 CFR 70.23(a)(7), 10 CFR 30.4, 10 CFR 30.33(a)(5), 10 CFR 40.4, and 10 CFR 40.32(e) Requirements Governing 'Commencement of Construction.'" ADAMS Accession No. ML091770390.

(AES, 2009d) AREVA Enrichment Services, LLC. Letter from Jim Kay (Licensing Manager, AES) to the U.S. Nuclear Regulatory Commission dated October 15. "Subject: Response to Request for Additional Information – AES Eagle Rock Enrichment Facility Exemption Request Related to Commencement of Construction (TAC L32730)." ADAMS Accession No. ML092920169.

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(North Wind, 2010) North Wind, Inc. "Sage Grouse Survey Report, Eagle Rock Enrichment Facility." May 13. ADAMS Accession No. ML101390471.

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(NRC, 2010) U.S. Nuclear Regulatory Commission. Letter from D. Dorman (U.S. Nuclear Regulatory Commission) to G. Harper (AREVA Enrichment Services, LLC) dated March 17. "Subject: Approval of AREVA Enrichment Services LLC Exemption Request Related to Requirements Governing Commencement of Construction (TAC L32730)."

9 AGENCIES AND ORGANIZATIONS CONTACTED

The following sections list the agencies and organizations contacted by the U.S. Nuclear Regulatory Commission to discuss the Eagle Rock Enrichment Facility project and/or obtain comments, information, and data for use in preparing this Environmental Impact Statement. Position titles/functions of agency/organization personnel are included where known.

9.1 Federal Agencies

Advisory Council on Historic Preservation, Washington, D.C.
  Reid Nelson, Director, Office of Federal Agency Programs
  Tom McCulloch, Archaeologist
  Raymond V. Wallace, Historic Preservation Technician

U.S. Department of Energy (DOE), Headquarters, Washington, D.C.
  Carol Borgstrom, Director, Office of NEPA Policy and Compliance

U.S. Department of Energy, Idaho National Laboratory (INL), Idaho Falls, Idaho
  Bruce Angle, Environmental Management System Manager
  Miriam Taylor, Transportation Specialist

U.S. Department of Energy, Idaho Operations Office, Idaho Falls, Idaho
  Jack Depperschmidt, NEPA Compliance Officer
  Richard Kauffman, Interim NEPA Compliance Officer

U.S. Department of Energy, Loan Programs Office, Washington, D.C.
  Matthew McMillen, Director, Environmental Compliance Division
  Patrick Gorman, Environmental Specialist
  Joseph Montgomery, Consultant

U.S. Department of the Interior, Washington, D.C.
  Director, Office of Environmental Policy and Compliance

U.S. Department of the Interior, Bureau of Land Management, Idaho Falls District, Idaho Falls, Idaho
  Joe Kraayenbrink, District Manager
  Karen Rice, Associate District Manager

U.S. Department of the Interior, Bureau of Land Management, Upper Snake River Field Office, Idaho Falls, Idaho
  Wendy Reynolds, Upper Snake Field Manager
  Rebecca Lazdauskas, Realty Specialist
  Mark Ennes, District NEPA Coordinator
  Mark Kennison, District NEPA Coordinator
  Stephanie Balbarini, Solicitor
  William Boggs, Visual Resource Management Coordinator

U.S. Department of the Interior, Fish and Wildlife Service, Eastern Idaho Field Office, Chubbuck, Idaho

Damien Miller, Supervisor
Gary Burton, Acting Supervisor
Ty Matthews, Fish and Wildlife Biologist

U.S. Department of the Interior, National Park Service, Craters of the Moon National Monument & Preserve, Arco, Idaho

Doug Neighbor, Superintendent

U.S. Department of the Interior, National Park Service, National Natural Landmarks Program, Sedro Woolley, Washington

Steve Gibbons, Coordinator

U.S. Department of the Interior, National Park Service, Pacific West Region, Seattle, Washington

Rory Westberg, Acting Regional Director
Keith Dunbar, Chief of Park Planning and Environmental Compliance
Kelly Powell, Realty Specialist

U.S. Environmental Protection Agency, Region 10, Seattle, Washington

Christine B. Reichgott, Manager, Environmental Review & Sediment Management Unit
Theogene Mbabaliye, Environmental Scientist

9.2 Federally Recognized Indian Tribes

The Shoshone-Bannock Tribes, Fort Hall Indian Reservation, Idaho

Nathan Small, Chairman, Fort Hall Business Council (FHBC)
Alonzo Coby, Former Chairman, FHBC
Willie Preacher, Tribal DOE Program Director
Carolyn Smith, Cultural Resource Coordinator
Tino Batt, Member, FHBC
Devon Boyer, Member, FHBC
Blaine Edmo, Member, FHBC
Glenn Fisher, Member, FHBC
Ann Lindroth, Member, FHBC
Lee Juan Taylor, Member, FHBC
LaRae Buckskin, Cultural Resources Research
Camille Carter, Emergency Response
Christina Cutler, Tribal DOE Environmental Specialist
Wes Jones, Emergency Response
Patrick Teton, Chief of Police
Mel Timbana
Roger Turner, Program Manager

9.3 State Agencies

Idaho Department of Environmental Quality (IDEQ), Headquarters Office, Boise, Idaho
Toni Hardesty, Director

Idaho Department of Environmental Quality, IDEQ State Office, Technical Services Division, Boise, Idaho
Mark Dietrich, Division Administrator and State Response Program Manager
Orville Green, Waste Program Administrator
Craig Halverson

Idaho Department of Environmental Quality, Idaho Falls Regional Office, Idaho Falls, Idaho
Erick Neher, Regional Administrator
Lezlie Aller, INL Oversight Manager
David Jones, Senior Health Physicist
Bruce LaRue

Idaho Department of Fish and Game, Headquarters Office, Boise, Idaho
Cal Groen, Director
Sharon W. Kiefer, Assistant Director – Policy
Lance Hebdon, Inter-Governmental Policy Coordinator
Tom Hemker, Wildlife Program Coordinator
Don Kemner, Wildlife Program Coordinator

Idaho Department of Fish and Game, Upper Snake River Region, Idaho Falls, Idaho
Gary Vecellio, Environmental Review and Coordination

Idaho Department of Water Resources, Eastern Regional Office, Idaho Falls, Idaho
Ernest Carlsen, Water Rights Supervisor

Idaho State Historical Society, State Historic Preservation Office, Boise, Idaho
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AREVA Enrichment Services LLC (AES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission the proposed Eagle Rock Enrichment Facility (EREF) near Idaho Falls in Bonneville County, Idaho. If licensed, the proposed facility would enrich uranium for use in commercial nuclear fuel for power reactors. Feed material would be non-enriched uranium hexafluoride (UF6). AES would employ a gas centrifuge process to enrich uranium up to 5 percent uranium-235 by weight, with a planned maximum target production of 6.6 million separative work units (SWUs) per year. The proposed EREF would be licensed in accordance with the provisions of the Atomic Energy Act. Specifically, an NRC license under Title 10, "Energy," of the U.S. Code of Federal Regulations (10 CFR) Parts 30, 40, and 70 would be required to authorize AES to possess and use special nuclear material, source material, and byproduct material at the proposed EREF site.

This Environmental Impact Statement (EIS) was prepared in compliance with the National Environmental Policy Act (NEPA) and the NRC regulations for implementing NEPA (10 CFR Part 51). This EIS evaluates the potential environmental impacts of the proposed action and its reasonable alternatives.

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ABSTRACT

On December 30, 2008, AREVA Enrichment Services LLC (AES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission the proposed Eagle Rock Enrichment Facility (EREF). The proposed EREF would be located in Bonneville County, Idaho, approximately 32 kilometers (20 miles) west of Idaho Falls. Revisions to the license application were submitted by AES on April 23, 2009, and April 30, 2010. If licensed, the proposed facility would enrich uranium for use in commercial nuclear fuel for power reactors. AES would employ a gas centrifuge enrichment process to enrich uranium to up to five percent uranium-235 by weight, with a planned maximum target production of 6.6 million separative work units (SWUs) per year. AES initiated preconstruction activities (e.g., site preparation) in late 2010 under an exemption approved by the NRC to conduct such activities prior to licensing. If its license application is approved, AES expects to begin facility construction in 2011and commence initial production in 2014, reaching peak production in 2022. AES's license would be for a term of 30 years. Prior to license expiration in 2041, AES would seek to renew its license to continue operating the proposed facility or plan for the decontamination and decommissioning of the proposed facility per the applicable licensing conditions and NRC regulations. The proposed EREF would be licensed in accordance with the provisions of the *Atomic Energy Act*. Specifically, an NRC license under Title 10, "Energy," of the U.S. *Code of Federal Regulations* (10 CFR) Parts 30, 40, and 70 would be required to authorize AES to possess and use special nuclear material, source material, and byproduct material at the proposed EREF site.

This Environmental Impact Statement (NUREG-1945) (EIS) was prepared in compliance with the *National Environmental Policy Act of 1969*, as amended (NEPA), and the NRC regulations for implementing NEPA (10 CFR Part 51). This EIS evaluates the potential environmental impacts of preconstruction activities and of the proposed action, which is to construct, operate, and decommission the proposed EREF near Idaho Falls in Bonneville County, Idaho. Also, this EIS describes the environment potentially affected by AES's proposal, evaluates reasonable alternatives to the proposed action, describes AES's environmental monitoring program and mitigation measures, and evaluates the costs and benefits of the proposed action.

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EXECUTIVE SUMMARY

BACKGROUND

Under the provisions of the *Atomic Energy Act* and pursuant to Title 10 of the U.S. *Code of Federal Regulations* (10 CFR) Parts 30, 40, and 70, the U.S. Nuclear Regulatory Commission (NRC) is considering whether to issue a license that would allow AREVA Enrichment Services, LLC (AES) to possess and use byproduct material, source material, and special nuclear material at a proposed gas centrifuge uranium enrichment facility near Idaho Falls in Bonneville County, Idaho, for a period of 30 years. The scope of activities to be conducted under the license would include the construction, operation, and decommissioning of the proposed Eagle Rock Enrichment Facility (EREF). The application for the license was filed with the NRC by AES by letter dated December 30, 2008. Revisions to the license application were submitted by AES on April 23, 2009 (Revision 1) and April 30, 2010 (Revision 2). To support its licensing decision on AES's proposed EREF, the NRC determined that the NRC's implementing regulations in 10 CFR Part 51 for the *National Environmental Policy Act* (NEPA) require the preparation of an Environmental Impact Statement (EIS). The development of this EIS is based on the NRC staff's review of information provided by AES, independent analyses, and consultations with the U.S. Fish and Wildlife Service and other Federal agencies, Native American tribes, the Idaho State Historic Preservation Office (SHPO) and other State agencies, and local government agencies.

The enriched uranium produced at the proposed EREF would be used to manufacture nuclear fuel for commercial nuclear power reactors. Enrichment is the process of increasing the concentration of the naturally occurring and fissionable uranium-235 isotope. Uranium ore usually contains approximately 0.72 weight percent uranium-235. To be useful in light-water nuclear power plants as fuel for electricity generation, the uranium must be enriched up to 5 weight percent uranium-235.

THE PROPOSED ACTION

The proposed action considered in this EIS is for AES to construct, operate, and decommission a uranium enrichment facility, the proposed EREF, at a site near Idaho Falls in Bonneville County, Idaho. To allow the proposed action to take place, the NRC would issue a license to AES as discussed above. The proposed EREF would be located on a 186-hectare (460-acre) section of a 1700-hectare (4200-acre) parcel of land that it intends to purchase from a single private landowner. Current land uses of the proposed EREF property include native rangeland, nonirrigated seeded pasture, and irrigated cropland. The proposed EREF, if approved, would be situated on the north side of US 20, about 113 kilometers (70 miles) west of the Idaho/Wyoming State line and approximately 32 kilometers (20 miles) west of Idaho Falls. The eastern boundary of the U.S. Department of Energy's (DOE) Idaho National Laboratory (INL) is 1.6 kilometers (1 mile) west of the proposed property. The lands north, east, and south of the proposed property are a mixture of private-, Federal-, and State-owned parcels, with the Federal lands managed by the Bureau of Land Management (BLM).

Using a gas centrifuge process, the proposed EREF would produce uranium enriched up to 5 percent by weight in the isotope uranium-235, with a planned maximum target production of 6.6 million separative work units (SWUs) per year. An SWU is a unit of measurement used in the nuclear industry, pertaining to the process of enriching uranium for use as fuel for nuclear power plants. If the license is approved, facility construction would begin in 2011 with heavy construction (construction of all major buildings and structures) continuing for 7 years into 2018. The proposed EREF would begin initial production in 2014 and reach peak production in 2022. Operations would continue at peak production until approximately 9 years before the license expires. Decommissioning activities would then begin and be completed by 2041. Decommissioning would involve the sequential shutdown of the 4 Separation Building Modules (SBMs) resulting in a gradual decrease in production. Each SBM would take approximately 4.5 years to decommission.

Supplemental information on a proposed 161-kilovolt (kV) electrical transmission line required to power the proposed EREF was submitted by AES on February 18, 2010. The NRC has no jurisdiction over transmission lines; therefore, the transmission line for the proposed EREF is not considered part of the proposed action. However, construction and operation of this transmission line are considered in this EIS under cumulative impacts.

NRC EXEMPTION FOR AES TO CONDUCT CERTAIN PRECONSTRUCTION ACTIVITIES

On June 17, 2009, AES submitted a request for an exemption from certain NRC regulations to allow commencement of certain preconstruction activities on the proposed EREF site prior to NRC's decision to issue a license for the construction, operation, and decommissioning of the proposed EREF. On March 17, 2010, the NRC granted an exemption authorizing AES to conduct the requested preconstruction activities. Under the exemption, these preconstruction activities are not considered by the NRC as part of the proposed action, although the environmental impacts of these activities are discussed in this EIS along with the impacts of facility construction.

Specifically, the exemption covers the following activities and facilities:

- clearing of approximately 240 hectares (592 acres) for the proposed EREF

- site grading and erosion control

- excavating the site including rock blasting and removal

- constructing a stormwater retention pond

- constructing main access and site roadways

- installing utilities

- erecting fences for investment protection

- constructing parking areas

- erecting construction buildings, offices (including construction trailers), warehouses, and guardhouses

This exemption authorizes AES to conduct the stated activities, provided that none of the facilities or activities subject to the exemption would be components of AES's Physical Security Plan or its Standard Practice Procedures Plan for the Protection of Classified Matter, or otherwise be subject to NRC review or approval. AES initiated preconstruction activities in late 2010.

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action would be to allow AES to construct, operate, and decommission a facility using gas centrifuge technology to enrich uranium up to 5 percent by weight of uranium-235, with a production capacity of 6.6 million SWU per year, at the proposed EREF near Idaho Falls in Bonneville County, Idaho. This facility would contribute to the attainment of national energy security policy objectives by providing an additional reliable and economical domestic source of low-enriched uranium to be used in commercial nuclear power plants.

Nuclear power currently supplies approximately 20 percent of the nation's electricity. The United States Enrichment Corporation Paducah Gaseous Diffusion Plant, Paducah, Kentucky, is currently the primary U.S. supplier of low-enriched uranium for nuclear fuel in the United States. However, the URENCO USA facility (formerly known as the National Enrichment Facility) in Lea County, New Mexico, which began initial operations in June 2010, may provide additional enrichment services in the future as construction continues on its remaining cascade halls. The American Centrifuge Plant (ACP) in Piketon, Ohio, which is currently under construction, and the proposed Global Laser Enrichment (GLE) Facility in Wilmington, North Carolina, for which the NRC is currently reviewing its license application, may also provide additional domestic enrichment services in the future. The existing operating Paducah, Kentucky, enrichment plant supplies approximately 15 percent of the current U.S. demand for low-enriched uranium. The United States Enrichment Corporation also imports downblended (diluted) weapons-grade uranium from Russia through the Megatons to Megawatts Program to supply an additional 38 percent of the U.S. demand. The remaining 47 percent of low-enriched uranium is imported from foreign suppliers. The current primary dependence on a single U.S. supplier and foreign sources for low-enriched uranium imposes reliability risks for the nuclear fuel supply to U.S. nuclear power plants. National energy policy emphasizes the importance of having a reliable domestic source of enriched uranium for national energy security. The production of enriched uranium at the proposed EREF would be equivalent to about 40 percent of the current and projected demand (15 to16 million SWUs) for enrichment services within the United States.

ALTERNATIVES TO THE PROPOSED ACTION

In this EIS, the NRC staff considered a reasonable range of alternatives to the proposed action, including alternative sites for an AES enrichment facility, alternative sources of low-enriched uranium, alternative technologies for uranium enrichment, and the no-action alternative. Two of the alternatives, the proposed action and the no-action alternative, were analyzed in detail. The approved preconstruction activities discussed earlier are assumed to occur prior to NRC's decision to grant a license to AES and, therefore, are assumed to occur under both the proposed action and the no-action alternative.

Under the no-action alternative, the proposed EREF would not be constructed, operated, and decommissioned in Bonneville County, Idaho. Uranium enrichment services would continue to be performed by existing domestic and foreign uranium enrichment suppliers. However, URENCO USA would provide and the ACP and potentially the proposed GLE Facility may provide enrichment services in the future.

AES considered 44 alternative sites throughout the United States. AES evaluated these sites based on various technical, safety, economic, and environmental selection criteria, and concluded that the Eagle Rock site in Bonneville County, Idaho, met all of the criteria. The NRC staff reviewed AES's site-selection process and results to determine if any site considered by AES was obviously superior to the proposed Eagle Rock site. The NRC staff determined that the process used by AES was rational and objective, and that its results were reasonable. Based on its review, the NRC staff concluded that none of the candidate sites were obviously superior to the AES preferred site in Bonneville County, Idaho.

The NRC staff examined three alternatives to satisfy domestic enrichment needs: (1) reactivate the Portsmouth Gaseous Diffusion Plant near Piketon, Ohio; (2) downblend highly enriched uranium instead of constructing a domestic uranium enrichment facility; and (3) purchase low-enriched uranium from foreign sources. These alternatives were eliminated from further consideration based on concerns related to reliability, excessive energy consumption, and national energy security, and did not meet national energy policy objectives involving the need for a reliable, economical source of domestic uranium enrichment.

The NRC staff also evaluated alternative technologies to the gas centrifuge process: electromagnetic isotope separation, liquid thermal diffusion, gaseous diffusion, Atomic Vapor Laser Isotope Separation, Molecular Laser Isotope Separation, and separation of isotopes by laser excitation. These technologies were eliminated from further consideration based on factors such as the technology immaturity, economic impracticality, or exclusive licensing.

In addition, the NRC staff considered conversion and disposition methods for depleted uranium hexafluoride (UF_6): (1) beneficial use of depleted $UF_{6,}$ and (2) conversion at facilities other than the new facilities that the U.S. Department of Energy (DOE) has built at Portsmouth and Paducah. For the purposes of this analysis, because the current available inventory of depleted uranium exceeds the current and projected future demand for the material, the depleted UF_6 generated by the proposed EREF was considered a waste product, and disposition alternatives involving its use as a resource were not further evaluated.

Existing fuel fabrication facilities have not expressed an interest in performing depleted UF_6 conversion services, and the cost for the services would be difficult to estimate; therefore, this alternative was eliminated from further consideration. However, International Isotopes, Inc. submitted a license application to the NRC on December 31, 2009, to construct and operate a depleted UF_6 conversion facility near Hobbs, New Mexico. On February 23, 2010, the NRC staff accepted the license application, and has initiated a formal safety and environmental review.

POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This EIS evaluates the potential environmental impacts of the proposed action. A standard of significance has been established for assessing environmental impacts. Following the Council on Environmental Quality's regulations in 40 CFR 1508.27, the NRC staff has assigned each impact one of the following three significance levels:

- SMALL. The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

- MODERATE. The environmental effects are sufficient to noticeably alter but not destabilize important attributes of the resource.

- LARGE. The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

As described in Chapter 4, the environmental impacts of preconstruction and the proposed action would mostly be SMALL. Some potential impacts would be SMALL to MODERATE or MODERATE in a few cases; and there would be LARGE, though intermittent, short-term impacts in one resource area during preconstruction. Methods for mitigating the potential impacts are identified in Chapters 4 and 5. Environmental measurement and monitoring methods are described in Chapter 6.

Summarized below are the potential environmental impacts of the proposed action on each of the resource areas considered in this EIS. Each summary is preceded by the impact significance level for the respective resource areas.

Land Use

SMALL. The construction of a uranium enrichment facility would alter the current land use, which consists primarily of agriculture and undeveloped rangeland. The 240-hectare (592-acre) proposed EREF site under consideration would be located entirely on a 1700-hectare (4200-acre) private parcel of land. Bonneville County has zoned the location as G-1, Grazing, which allows for industrial development, and is intended to allow certain activities that should be removed from population centers in the county. The operation of a uranium enrichment facility is consistent with the county's zoning. It is not anticipated that construction and operation of the proposed EREF would have any effect on the current land uses found on the surrounding public lands managed by the BLM.

Restrictions to land use would begin with the purchase of the proposed property by AES. The alteration of land use would begin during preconstruction and continue during construction. Preconstruction activities would result in the alteration of the land as a result of activities such as land clearing and grading, restricted access to the proposed EREF property, and cessation of agricultural uses (grazing and crop production). The majority of impacts to land use would occur during preconstruction. However, since large land areas in the county will continue to be used for grazing and crop production, including the BLM-managed lands surrounding the proposed EREF property, land use impacts resulting from preconstruction and construction would be SMALL.

Operation of the proposed EREF would restrict land use on the proposed property to the production of enriched uranium. The operation of the proposed EREF is not expected to alter land use on adjacent properties. Impacts on land use due to operations would be SMALL.

At the end of decommissioning, the buildings and structures would be available for unrestricted use. As a result, impacts on land use due to decommissioning would be SMALL.

Historic and Cultural Resources

<u>SMALL TO MODERATE</u>. Impacts to historic and cultural resources would occur primarily during preconstruction. Construction would take place on ground previously disturbed by preconstruction activities. There are 13 cultural resource sites (3 prehistoric, 6 historic, and 4 multi-component) in the surveyed areas of the proposed EREF property. One of these sites, the John Leopard Homestead (MW004), is located within the footprint of the proposed EREF, and has been recommended as eligible for the *National Register of Historic Places*. Site MW004 would be destroyed by preconstruction activities. However, AES mitigated impacts to site MW004 prior to land disturbance through professional excavation and data recovery, and other similar homestead site types exist in the region. Therefore, the impact to site MW004 would be limited to a MODERATE level.

Construction and operation of the proposed EREF would be unlikely to result in visual or noise impacts on the Wasden Complex, an important group of archaeological sites, because it is located approximately 1.6 kilometers (1.0 mile) from the proposed EREF site and sits behind a ridge that partially blocks the view. Other impacts during operations would be SMALL because no intact historic or cultural resources would remain.

Decommissioning would not likely affect historic and cultural resources because any areas disturbed during decommissioning would have been previously disturbed during preconstruction and construction. Therefore, impacts would be SMALL.

Visual and Scenic Resources

<u>SMALL TO MODERATE</u>. Impacts to visual and scenic resources result when contrasts are introduced into a visual landscape. The proposed project site and surrounding areas consist primarily of sagebrush semi-desert to the north, east, and west of the proposed site. The proposed facility would be located approximately 2.4 kilometers (1.5 miles) from areas of public view, including US 20 and the Hell's Half Acre Wilderness Study Area (WSA) to the south which contains the remains of a 4000-year-old lava flow. The BLM gave a Visual Resource Management (VRM) Class I designation to the WSA, which applies to areas of high scenic quality.

Visual impacts during preconstruction could result along US 20 from increased activity at the proposed site and fugitive dust, but these would be of a relatively short duration. The clearing of vegetation and installation of a perimeter fence would change the visual setting; however, they would not drastically alter the overall appearance of the area. Impacts on visual and scenic resources due to preconstruction would be SMALL.

Construction of the proposed EREF would introduce visual intrusions that are out of character with the surrounding area. While initial construction activities would commence on a cleared area, such a view is not very intrusive on the visual landscape. Similarly, fugitive dust generated during the construction period would be of a temporary nature and cause minimal disturbance to the viewshed. However, because of the extent of the proposed EREF project, the type and size of equipment involved in construction, and the industrial character of buildings to be built, construction of the proposed EREF would create significant contrast with the surrounding visual environment, which is predominantly rangeland and cropland. Thus, visual impact levels associated with construction would range from SMALL to MODERATE.

Construction and operation of the proposed EREF would be unlikely to result in visual impacts on the Wasden Complex due to its distance from the proposed EREF site and location behind a ridgeline that obscures views of the lower portions of the proposed facility. However, operations would have an impact on the surrounding visual landscape. The proposed facility is visually inconsistent with the current setting, and its operation is expected to alter the visual rating on surround public lands, which would be a MODERATE visual impact. Also, plant lighting at night could be perceivable at the trailhead of the Hell's Half Acre WSA, although probably not from the Craters of the Moon National Park located 72 kilometers (45 miles) to the west of the proposed EREF site.

At the end of decommissioning, the buildings and structures would be available for unrestricted use. As a result, impacts on visual and scenic resources would remain MODERATE.

Air Quality

<u>SMALL to LARGE</u>. Air emissions during preconstruction and construction would include fugitive dust from heavy equipment working on the proposed site, engine emissions from construction equipment onsite and vehicles transporting workers and materials to the proposed site, and emissions from diesel-fueled generators. The generators, although not intended to provide power for construction activities, would be operated weekly for preventative maintenance. During preconstruction, fugitive dust from land clearing and grading operations would result in large releases of particulate matter. Such impacts would be MODERATE to LARGE during certain preconstruction periods and activities that would be temporary and brief in duration. Otherwise, impacts on ambient air quality from preconstruction would be SMALL for all hazardous air pollutants (HAPs) and all criteria pollutants except particulates. Air quality impacts during construction would be SMALL for all HAPs and all criteria pollutants.

During operations, the proposed EREF would not be a major source of air emissions, although there is a potential for small gaseous releases associated with operation of the process that could contain UF_6, hydrogen fluoride (HF), and uranyl fluoride (UO_2F_2). Also, small amounts of nonradioactive air emissions consisting of carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM), volatile organic compounds (VOCs), and sulfur dioxide (SO_2) would be released:

- from the auxiliary diesel electric generators to supply electrical power when power from the utility grid is not available

- during building and equipment maintenance activities

- from trucks, automobiles, and other vehicles in use onsite

Air emissions are not expected to impact regional visibility. Ambient air modeling predicts that impacts on ambient air quality from the routine operation of the proposed EREF would be SMALL with respect to all criteria pollutants and all HAPs.

During decommissioning, impacts would result from emissions including fugitive dust (mitigated by dust suppression work practices) and CO, NO_x, PM, VOCs, and SO_2 from transportation equipment and would be SMALL.

Geology and Soils

<u>SMALL</u>. Impacts on about 240 hectares (592 acres) of land would occur primarily during preconstruction, as a result of soil-disturbing activities (blasting, excavating, grading, and other activities) that loosen soil and increase the potential for erosion. Because these impacts are short-term and can be mitigated, impacts on geology and soils would be SMALL. Construction activities could cause short-term impacts such as an increase in soil erosion at the proposed site. Soil erosion could result from wind action and rain, although rainfall in the vicinity of the proposed site is low. Compaction of soils due to heavy vehicle traffic would increase the potential for soil erosion via runoff. Impacts would be SMALL.

Impacts on soils during operations at the proposed facility would also be SMALL because activities would not increase the potential for soil erosion beyond that for the surrounding area. The impacts to soil quality from atmospheric deposition of pollutants during operations would be SMALL.

Land disturbance associated with decommissioning could temporarily increase the potential for soil erosion at the proposed EREF site, resulting in impacts similar to (but less than) those during the preconstruction/construction phase. As a result, impacts to soils due to decontamination and decommissioning activities would be SMALL.

Water Resources

<u>SMALL</u>. During preconstruction and construction, stormwater runoff would be diverted to a stormwater detention basin, thus the potential for contaminated stormwater discharging to water bodies on adjacent properties is low. No surface water sources would be used. Natural surface water bodies are absent within and near the proposed EREF site, and groundwater occurs at depths of 202 meters (661 feet) to 220 meters (722 feet). Annual maximum groundwater usage rates from the Eastern Snake River Plain (ESRP) aquifer in Bonneville County during preconstruction and construction comprise about 16 percent of the annual water right appropriation that has been transferred to the proposed property for use as industrial water. Therefore, impacts on surface water quality, the regional water supply, and groundwater quality during preconstruction and construction would be SMALL.

Water usage rates during operations would remain well within the water right appropriation. Both average and peak annual water use requirements would be less than 1 percent of the total groundwater usage from the ESRP aquifer. No process effluents would discharge to the retention or detention basins or into surface water. Therefore, liquid effluents would have a

SMALL impact on water resources. Because all the water discharged to the Cylinder Storage Pads Stormwater Retention Basins would evaporate, the basins would have a SMALL impact on the quality of water resources. The site Stormwater Detention Basin seepage would also have a SMALL impact on water resources of the area because no wastewater would be discharged to the basin.

Since the usage and discharge impacts to water resources during the decommissioning phase would be similar to those during construction, the impacts to water resources would remain SMALL.

Ecological Resources

SMALL TO MODERATE. Preconstruction activities such as land clearing could result in direct impacts due to habitat loss and wildlife mortality as well as indirect impacts to ecological resources in surrounding areas, primarily from fugitive dust and wildlife disturbance. Approximately 75 hectares (185 acres) of sagebrush steppe habitat and 55 hectares (136 acres) of nonirrigated pasture would be eliminated. Impacts on plant communities and wildlife from preconstruction would be MODERATE. Construction activities that could impact ecological resources include constructing the proposed UF_6 storage pads and EREF buildings. However, most construction activities would occur in areas that would have already been disturbed by preconstruction activities. Impacts on vegetation would occur primarily from any additional vegetation clearing. Impacts would include the generation of fugitive dust, spread of invasive species, changes in drainage patterns, soil compaction, erosion of disturbed areas, potential sedimentation of downgradient habitats, and accidental releases of hazardous or toxic materials (e.g., fuel spills). These activities could also result in some wildlife mortality and would cause other wildlife to relocate as a result of noise, lighting, traffic, and human presence. Collisions with construction equipment and other vehicles may cause some wildlife mortality. No rare or unique plant communities, or threatened or endangered species, have been found or are known to occur on the proposed site, although habitat on the proposed property is known to be used by greater sage-grouse (a Federal candidate species). Construction (and preconstruction) activities are not expected to result in population-level impacts on any Federally listed or State-listed species, which the U.S. Fish and Wildlife Service has stated are not present on the proposed EREF property. Impacts of construction of the proposed facility would be SMALL.

Operation of the proposed EREF could result in impacts on wildlife and plant communities as a result of noise, lighting, traffic, human presence, air emissions, and retention/detention ponds. However, these impacts would be SMALL.

Vegetation and wildlife that became established near the proposed facility could be affected by decommissioning activities. Impacts during decommissioning would be similar to those during construction and would be SMALL.

Noise

SMALL. Most of the major noise-producing activities (site clearing and grading, excavations [including the use of explosives], utility burials, construction of onsite roads [including the US 20 interchanges], and construction of the ancillary buildings and structures) would occur during preconstruction. Noise impacts from initial preconstruction activities may exceed established standards at some locations along the proposed EREF property boundary for relatively short periods of time. However, because of the distances involved, expected levels of attenuation, application of mitigation measures, and the expected limited presence of human receptors at these locations, the impacts of noise during preconstruction would be SMALL for human receptors. The nearest resident is located approximately 7.7 kilometers (4.8 miles) east of the proposed site. No residence is expected to experience unacceptable noise levels during construction. Noise impacts from construction may exceed established standards at some offsite locations for relatively short periods of time. However, because of the distances involved, expected levels of attenuation, and AES's commitment to appropriate mitigations, the impacts would be SMALL for human receptors. During the overlap period when partial operations begin while building construction continues, noise impacts from construction and operation are expected to be additive, but still substantially reduced from noise levels during initial construction.

Major noise sources associated with facility operation include the six diesel-fueled emergency generators, commuter traffic, the movement of delivery vehicles, and operation of various pumps, compressors, and cooling fans. Operational noise estimates at the proposed property boundary satisfy all relevant or potentially relevant U.S. noise standards and guidance. Residents in the vicinity of US 20, who would otherwise be unaffected by noise from the proposed EREF industrial footprint, would be impacted by slightly increased traffic noise. Noise impacts from proposed EREF operation would be SMALL.

Noise sources and levels during decommissioning would be similar to those during construction, and peaking noise levels would be expected to occur for short durations. As a result, noise impacts from decommissioning would be SMALL.

Transportation

SMALL TO MODERATE. Preconstruction activities for the proposed EREF would cause an impact on the local transportation network due to the construction of highway entrances, the daily commute of workers, daily construction deliveries, and waste shipments. Traffic slowdowns or delays would only be expected to occur at the entrance to the proposed EREF during access road construction and shift changes; the impacts on overall traffic patterns and volumes would be MODERATE on US 20 and SMALL on Interstate 15 (I-15). The primary impact would be increased traffic on nearby roads. Impacts during construction would occur from transportation of personnel, construction materials, and nonradiological waste. All traffic to and from the proposed EREF during preconstruction and construction would use US 20. Construction activities at the proposed EREF site could result in a 55 percent increase in traffic volume on US 20 (including the period when construction and operations overlap). Because traffic volume is expected to remain below the design capacity of I-15 and traffic slowdowns or delays would only be expected to occur at the entrance to the proposed EREF during shift changes, the impacts on overall traffic patterns and volumes during construction would be SMALL to MODERATE on US 20 and SMALL on I-15. For the most part, the impacts from the truck traffic to and from the proposed site during construction would be SMALL.

Operations impacts would occur from the transport of personnel, nonradiological materials, and radioactive material to and from the proposed EREF, especially during the period when construction and operation overlap. Increased traffic during facility operation would have a SMALL to MODERATE impact on the current traffic on US 20 (SMALL for any off-peak shift change). The impacts of truck traffic to and from the proposed site during operation would be SMALL. Annual transportation routine impacts and accident risks (radiological and chemical) would be SMALL.

Traffic during the initial portion of the decommissioning would be approximately the same as for the period when construction and operations overlap. Traffic after the cessation of operations would be less than during either construction or operation. Impacts on local traffic on US 20 would be SMALL to MODERATE.

Public and Occupational Health

SMALL. During preconstruction, impacts on occupational safety resulting from injuries, illnesses, and exposures to fugitive dust, pollutants, and vapors would be SMALL, based on estimates of the number of incidents. During construction, nonradiological impacts could include injuries and illnesses incurred by workers and impacts due to exposure to chemicals or other nonradiological substances. All such potential impacts would be SMALL because all activities would take place under typical construction workplace safety regulations. No radiological impacts are expected during facility construction.

Nonradiological impacts during facility operation include worker illnesses and injuries and impacts from worker or public exposure to hazardous chemicals used or present during operations, mainly uranium and HF. Due to low estimated concentrations of uranium and HF at public (proposed property boundary) and workplace receptor locations, nonradiological impacts due to exposures to hazardous chemicals (including uranium and HF) during operations would be SMALL.

Assessment of potential radiological impacts from facility operations considers both public and occupational exposures to radiation, and includes exposures to workers completing the facility construction during initial phases of operation. Exposure pathways include inhalation of airborne contaminants, ingestion of contaminated food crops, direct exposure from material deposited on the ground, and external exposure associated with the stored UF_6 cylinders. Impacts from exposure of members of the public would be SMALL. Worker exposures would vary by job type, but would be carefully monitored and maintained as low as reasonably achievable (ALARA) and impacts would be SMALL.

For a hypothetical individual member of the public at the proposed EREF property boundary and the nearest resident, the maximum annual total effective dose equivalents would be 0.014 millisievert per year (1.4 millirem per year) and 2.1×10^{-6} millisievert per year (2.1×10^{-4} millirem per year), respectively. Dose equivalents attributable to operation of the proposed EREF would be small compared to the normal background radiation range of 2.0 to 3.0 millisieverts (200 to 300 millirem) dose equivalent. This equates to radiological impacts during proposed EREF operation that would be SMALL.

The nature of decommissioning activities would be similar to that during construction and operation. Impacts from occupational injuries and illnesses and chemical exposures would be SMALL. Occupational radiological exposures would be bounded by the potential exposures during operation, because the quantities of uranium material handled would be less than or equal to that during operations. An active environmental monitoring and dosimetry (external and internal) program would be conducted to maintain ALARA doses to workers and to individual members of the public. Therefore, the impacts of decommissioning on public and occupational health would be SMALL.

Waste Management

SMALL. Solid nonhazardous wastes generated during preconstruction would be transported offsite to an approved local landfill. Hazardous wastes (e.g., waste oil, greases, excess paints, and other chemicals) generated during preconstruction would be packaged and shipped offsite to a licensed treatment, storage, and disposal facility (TSDF). Impacts from nonhazardous solid waste and hazardous waste generation during preconstruction would be SMALL due to the available current or future capacity at local and regional disposal facilities. Construction would generate about 6116 cubic meters (8000 cubic yards) of nonhazardous solid waste per year, not including recyclable materials such as scrap structural steel, sheet metal, and piping. About 23,000 liters (6200 gallons) and 1000 kilograms (2200 pounds) of hazardous waste would be generated annually. The impacts of nonhazardous and hazardous waste generation during construction would be SMALL due to the available current or future capacity at local and regional disposal facilities.

During operation, approximately 70,307 kilograms (154,675 pounds) of industrial, nonhazardous, nonradioactive solid waste and approximately 146,400 kilograms (322,080 pounds) of low-level radioactive waste (not including depleted UF_6) are expected to be generated annually. The proposed facility would also generate approximately 5062 kilograms (11,136 pounds) of hazardous wastes and 100 kilograms (220 pounds) of mixed waste annually. All wastes would be transferred to offsite licensed waste disposal facilities with suitable disposal capacity. The impacts of this waste generation would be SMALL.

During peak operation, the proposed EREF is expected to generate 1222 cylinders of depleted UF_6 annually, which would be temporarily stored on an outdoor cylinder storage pad in approved Type 48Y containers before being transported to a DOE-owned or private conversion facility. Storage of uranium byproduct cylinders at the proposed EREF would occur for the duration of, but not beyond, the proposed facility's 30-year operating lifetime. The impacts from temporary storage of depleted UF_6, from the conversion of depleted UF_6 to U_3O_8 at an offsite location, and from the transportation of the U_3O_8 conversion product to a potential disposal site would be SMALL.

During decommissioning, radioactive material from decontamination of contaminated equipment would be packaged and shipped offsite for disposal. Wastes to be disposed would include 7700 cubic meters (10,070 cubic yards) of low-level radioactive waste. Due to the availability of adequate disposal capacity, waste management impacts would be SMALL.

Socioeconomics

SMALL. Employment and income impacts were evaluated using an 11-county ROI in Idaho – including Bannock, Bingham, Blaine, Bonneville, Butte, Caribou, Clark, Fremont, Jefferson, Madison, and Power Counties. Wage and salary spending and expenditures associated with materials, equipment, and supplies would produce income and employment and local and State tax revenue, resulting in a beneficial impact. Preconstruction would create 308 jobs and $11.9 million in the first year, and 1687 jobs would be created during the peak year of construction with $65.0 million of income. Operations would produce 3289 jobs and $92.4 million in income in the first year of full operations. The jobs created include jobs at the proposed EREF and those indirectly created elsewhere in the 11-county ROI due to preconstruction, construction, and operation of the proposed EREF. Because preconstruction and construction activities would constitute less than 1 percent of total 11-county ROI employment, the economic impact of constructing the proposed EREF would, therefore, be SMALL.

As it is anticipated that a number of workers will move into the area during each phase of the proposed project, with the majority of the demographic and social impacts associated with population in-migration likely to occur in Bingham and Bonneville Counties, the impacts of the proposed EREF on population, housing, and community services are assessed for a two-county ROI, consisting of Bingham and Bonneville Counties. The migration of workers and their families into surrounding communities would affect housing availability, area community services such as healthcare, schools, and law enforcement, and the availability and cost of public utilities such as electricity, water, sanitary services, and roads resulting in an adverse impact. Because of the small number of in-migrating workers expected during preconstruction, construction, and operations, the impact on housing and community and educational services employment would be SMALL.

Decommissioning would provide continuing employment opportunities for some of the existing workforce and for other residents of the 11-county ROI. Additional, specialized decommissioning workers would also be required from outside the 11-county ROI. Expenditures on salaries and materials would contribute to the area economy, although less than during operations, and the State would continue to collect sales tax and income tax revenues. The socioeconomic impact of decommissioning activities would be SMALL.

Environmental Justice

SMALL. The potential impacts of the proposed EREF would mostly be SMALL for the resource areas evaluated. For these resources areas, the impacts on all human populations would be SMALL. Potential impacts would be SMALL to MODERATE or MODERATE in a few cases, which could potentially affect environmental justice populations; and there would be LARGE, though intermittent, short-term impacts from fugitive dist during preconstruction. However, as there are no low-income or minority populations within the 4-mile area around the proposed facility, these impacts would not be disproportionately high and adverse for these population groups.

Impacts of decommissioning would be SMALL. Because impacts on the general population would generally be SMALL to MODERATE in other resource areas, and because there are no low-income or minority populations defined according to Council on Environmental Quality (CEQ) guidelines within the 4-mile area around the proposed facility, decommissioning would not be expected to result in disproportionately high or adverse impacts on minority or low-income populations.

Accidents

SMALL TO MODERATE. Six accident scenarios were evaluated in this EIS as a representative selection of the types of accidents that are possible at the proposed EREF. The representative accident scenarios selected vary in severity from high- to intermediate-consequence events and include accidents initiated by natural phenomena (earthquake), operator error, and equipment failure. The consequence of a criticality accident would be high (fatality) for a worker in close proximity. Worker health consequences are low to high from the other five accidents that involve the release of UF_6. Radiological consequences to a maximally exposed individual (MEI) at the Controlled Area Boundary (proposed EREF property boundary) are low for all six accidents including the criticality accident. Uranium chemical exposure to the MEI is high for one accident and low for the remainder. For HF exposure to an MEI at the proposed property boundary, the consequence of three accidents is intermediate, with a low consequence estimated for the remainder. All accident scenarios predict consequences to the collective offsite public of less than one lifetime cancer fatality. Impacts from accidents would be SMALL to MODERATE. Plant design, passive and active engineered and administrative controls, and management of these controls would reduce the likelihood of accidents.

POTENTIAL ENVIRONMENTAL IMPACTS OF THE NO-ACTION ALTERNATIVE

This EIS also considers the potential environmental impacts of the no-action alternative, which are summarized below. It is assumed that preconstruction activities have taken place under the no-action alternative. The impact conclusions presented in this EIS for the no-action alternative address the impacts of denying the license, but do not include the impacts of the NRC-approved preconstruction activities. This is because a decision by the NRC not to issue the license does not cause the impacts of preconstruction under the no-action alternative. As described in Chapter 4, the anticipated environmental impacts from the no-action alternative would range from SMALL to MODERATE.

Should the nation's need for enriched uranium continue to increase and necessitate the construction and operation of another domestic enrichment facility at an alternate location, impacts could occur for each resource area and could range from SMALL to LARGE. The nature and scale of these impacts could be similar to those of the proposed action, but would depend on several facility- and site-specific factors.

Land Use

SMALL. Under the no-action alternative, AES would purchase the proposed property and restrictions on grazing and agriculture would occur. The zoning designation for the property would remain G-1 Grazing whether or not the proposed EREF is constructed. Current land uses of grazing and farming could potentially resume. Impacts to local land use would be SMALL.

Historic and Cultural Resources

SMALL TO MODERATE. Under the no-action alternative, the proposed EREF would not be constructed. Site MW004 would not be affected by NRC's licensing action, and Section 106 of the *National Historic Preservation Act* would not apply because no Federal action would be involved. However, the removal of site MW004, which has already occurred, resulted in a LARGE impact because the site no longer exists; but because AES removed this site through professional excavation and data recovery and there are other homestead sites of this type found in the region, the impact has been mitigated to a MODERATE level. No visual or noise effects would occur to the viewshed for the Wasden Complex.

Visual and Scenic Resources

SMALL. Under the no-action alternative, since the proposed EREF would not be constructed, no visual intrusions to the existing landscape would occur. The current land cover would be altered, but no large industrial structures would be constructed. The existing natural character of the area would largely remain intact. The lack of development would be consistent with BLM's VRM Class I designation for the Hell's Half Acre WSA, and no intrusions to the Wasden Complex viewshed would occur.

Air Quality

SMALL. Under the no-action alternative, the air quality impacts associated with construction and operation of the proposed EREF would not occur. The proposed site could revert to agricultural activities, which would impact ambient air quality through the release of criteria pollutants from the operation of agricultural vehicles and equipment and the release of fugitive dusts from the tilling of soils. Local air impacts associated with the no-action alternative would be SMALL.

Geology and Soils

SMALL. Under the no-action alternative, no additional land disturbance from construction would occur, and the proposed site could revert to crop production and grazing activities. Wind and water erosion would continue to be the most significant natural processes affecting the geology and soils at the proposed site. Impacts would be SMALL.

Water Resources

SMALL. Under the no-action alternative, additional water use may or may not occur, depending on future plans for the proposed property. Water resources would be unchanged. Water usage could continue at the current rate should agricultural activities resume at the proposed site. No changes to surface water quality would be expected, and the natural (intermittent) surface flow of stormwater on the proposed site would continue. No additional groundwater use or adverse changes to groundwater quality would be expected. Impacts would be SMALL.

Ecological Resources

SMALL. Most impacts on ecological resources would occur during preconstruction. The potential impacts associated with the construction, operation, and decommissioning of the proposed EREF would not occur. Revegetation of the proposed site could occur with renewal of some wildlife habitat. The land could revert to crop production and grazing activities. Impacts would be SMALL.

Noise

SMALL. Under the no-action alternative, none of the noise impacts associated with proposed EREF construction, operation, or decommissioning would occur. Land uses on the proposed EREF site could revert to previous applications, livestock grazing and/or crop production, with concomitant noise levels and SMALL impacts.

Transportation

SMALL. Under the no-action alternative, traffic volumes and patterns would remain unchanged from existing conditions. The current volume of radioactive material and chemical shipments from other sources in the area would not increase. Impacts would be SMALL.

Public and Occupational Health

SMALL. Under the no-action alternative, health impacts from construction, operation, and decommissioning would not occur. Worker and public impacts from chemical and radioactive hazards would also not occur. Should the land be returned to grazing and agriculture, current use impacts would be expected and would be SMALL.

Waste Management

SMALL. Under the no-action alternative, no proposed EREF construction, operational, or decommissioning wastes (including sanitary, hazardous, low-level radioactive wastes, or mixed wastes) would be generated or require disposition. Impacts from waste management would be SMALL.

Socioeconomics

SMALL. Under the no-action alternative, any beneficial or adverse consequences of the proposed action would not occur. All socioeconomic conditions in the 11-county ROI would remain unchanged. Impacts would be SMALL.

Population in the area surrounding the proposed EREF, in Bonneville and Bingham Counties, is expected to grow in accordance with current projections, with the total population in the region projected to be approximately 156,491 in 2013 and 168,331 in 2017. In association with population growth, the social characteristics of the region, including housing availability, school enrollment, and availability of law enforcement and firefighting resources, are expected to change over time. However, future changes in these characteristics are difficult to quantify, and no projections of their future growth are available.

Environmental Justice

SMALL. The no-action alternative would not be expected to cause any high and adverse impacts. It would not raise any environmental justice issues.

Accidents

SMALL. Under the no-action alternative, potential accidents and accident consequences from operation of the proposed EREF would not occur. Impacts would be SMALL.

COSTS AND BENEFITS OF THE PROPOSED ACTION

While there are national energy security and fiscal benefits associated with the proposed action, and local socioeconomic benefits in the 11-county ROI in which the proposed EREF would be located, there are also direct costs associated with the preconstruction, construction, and operation phases of the proposed project, as well as impacts on various environmental resources. These impacts would mostly be SMALL, and in a few cases SMALL to MODERATE, or MODERATE in magnitude and small in comparison to the local and national benefits of the proposed action. In addition, most of the impacts to environmental resources associated with the proposed action would result from preconstruction activities at the proposed site, and would also occur under the no-action alternative. The principal socioeconomic impact or benefit of the proposed EREF project would be an increase in employment and income in the 11-county ROI. Although the majority of the costs, and most of the socioeconomic impacts, of the various phases of proposed EREF development would occur in the 11-county ROI, there would be economic, fiscal and, in particular, energy security benefits, which would occur at the local, State, and national levels.

Average employment created in the 11-county ROI during the year of peak construction is estimated at 1687 full-time jobs, with $0.7 million in State income tax revenues and $5.1 million in State sales taxes. During the proposed EREF full operations phase beginning in 2022, 3289 annual jobs would be created. During this period, the State of Idaho would benefit from $1.3 million annually in income taxes, while Bonneville County would collect $3.5 million annually in property tax receipts. Although it can be assumed that some portion of paid State sales and income taxes would be returned to the 11-county ROI under revenue-sharing arrangements between each county and the State government, the exact amount that would be received by each county cannot be determined. Although there are economic and fiscal benefits associated with the proposed action in the 11-county ROI, these impacts would be SMALL.

The direct costs associated with the proposed action may be categorized by the following life-cycle stages: facility construction, operation, depleted uranium disposition, and decommissioning. In addition, costs would be incurred for preconstruction activities under both the proposed action and the no-action alternative. In addition to monetary costs, the proposed action would result in impacts on various resource areas, which are considered “costs” for the purpose of this analysis. The resource areas and corresponding impacts are described in detail in Chapter 4 of this EIS. As discussed earlier, the impacts of preconstruction and the proposed action would mostly be SMALL, and in a few cases SMALL to MODERATE, or MODERATE, for all resource areas.

The proposed action could result in the maximum annual production of 6.6 million SWUs of enriched uranium in peak years, which would represent an augmentation of the domestic supply of enriched uranium and, along with other planned new enrichment facilities, would meet the need for increased domestic supplies of enriched uranium for national energy security. Thus, the proposed action would generate national and regional benefits and costs. The national benefit would be an increase in domestic supplies of enriched uranium that would assist the national energy security need. The regional benefits would be increased employment, economic activity, and tax revenues in the 11-county ROI. Costs associated with the proposed project are, for the most part, limited to the resource areas in the 11-county ROI.

COMPARISON OF THE PROPOSED ACTION AND NO-ACTION ALTERNATIVE

The impacts of the proposed action and the no-action alternative are briefly summarized and compared below. A more detailed summary and comparison is provided in Chapter 2, Table 2-6. As discussed earlier, it is assumed that the previously discussed preconstruction activities take place under both alternatives and, therefore, the impacts associated with preconstruction activities take place regardless of which alternative is selected. As a result, the comparison of alternatives presented below and in Chapter 2 is intended to highlight the differences between the two alternatives after preconstruction activities have occurred.

Under the no-action alternative, the proposed EREF would not be constructed, operated, and decommissioned in Bonneville County, Idaho. The Paducah Gaseous Diffusion Plant in Paducah, Kentucky, the URENCO USA facility in Lea County, New Mexico, and the downblending of highly enriched uranium under the Megatons to Megawatts Program would remain the sole sources of domestically generated low-enriched uranium for U.S. commercial nuclear power plants. The URENCO USA facility is still under construction and with the ACP, which is currently under construction, may provide additional enrichment services in the future. The license application for an additional enrichment facility, the proposed GLE Facility, is currently under review by the NRC. Foreign enrichment sources would be expected to continue to supply approximately 85 percent of U.S. nuclear power plants' demand until new domestic enrichment facilities are constructed and operated.

The no-action alternative would have SMALL impacts on land use, visual and scenic resources, air quality, geology and soils, water resources, ecological resources, noise, transportation, public and occupational health, waste management, socioeconomics, environmental justice, and facility accidents, and SMALL to MODERATE impacts on historic and cultural resources. The costs and benefits of constructing, operating, and decommissioning the proposed EREF would not occur. Additional domestic enrichment facilities could be constructed in the future with impacts expected to be SMALL to LARGE, depending on facility- and site-specific conditions.

In comparison to the no-action alternative, the proposed action would also have SMALL impacts on land use, air quality, geology and soils, water resources, ecological resources, noise, public and occupational health, waste management, socioeconomics, and environmental justice, but would have SMALL to MODERATE impacts on historic and cultural resources, visual and scenic resources, transportation, and facility accidents. The proposed action would have positive impacts in the region on employment and income, and on State and Federal tax revenues.

CUMULATIVE IMPACTS

This EIS also considers cumulative impacts that could result from the proposed action when added to other past, present, and reasonably foreseeable future actions (Federal, non-Federal, or private). No ongoing or planned developments were identified within 16 kilometers (10 miles) of the proposed project location, which includes the ROI for all affected resource areas except socioeconomics, which extends to an 80.5-kilometer (50-mile) radius. Proposed developments within 80.5 kilometers (50 miles) that could contribute to a regional socioeconomic impact in combination with the proposed project include the proposed Mountain States Transmission Intertie, a proposed 500-kV electrical transmission line running between western Montana and southeastern Idaho. The preferred route lies approximately 40 kilometers (25 miles) to the west of the proposed EREF site, running north-south. Two other alternate routes lie closer, the nearest running adjacent to the western boundary of the proposed EREF property just outside of INL property, and the other route crossing US 20 about 10 miles east of the proposed EREF site. In addition, impacts from the construction of a proposed new 161-kV transmission line, a substation, and substation upgrades for the proposed EREF are addressed as cumulative impacts in this EIS, as this action is not under the NRC's jurisdiction and, therefore, not considered by the NRC to be part of the proposed action. In general, the anticipated cumulative impacts from the proposed action would be SMALL. Cumulative impacts associated with the no-action alternative would be generally less than those for the proposed action, except in terms of local job creation.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Preconstruction activities and the proposed action would result in unavoidable adverse impacts on the environment. These impacts would mostly be SMALL and SMALL to MODERATE or MODERATE in a few cases, with the potential for temporary and brief LARGE impacts on air quality from fugitive dust, and would, in most cases, be mitigated. The area needed for construction and operation of the proposed EREF would be cleared of vegetation, which would lead to the displacement of some local wildlife populations. There would be temporary impacts from preconstruction and the construction of new facilities, including increased fugitive dust, increased potential for soil erosion and stormwater pollution, and increased vehicle traffic and emissions. Water consumption from onsite wells would be relatively small, and the risk for significant adverse impacts on neighboring residential wells or public supply wells would be SMALL. During operations, workers and members of the public could be exposed to radiation and chemicals, although the impacts of these exposures would be SMALL.

Preconstruction and the proposed action would necessitate short-term commitments of resources and would permanently commit certain other resources (such as energy and water). This EIS defines short-term uses as generally affecting the present quality of life for the public (i.e., the 30-year license period for the proposed EREF) and long-term productivity as affecting the quality of life for future generations on the basis of environmental sustainability. The short-term use of resources would result in potential long-term socioeconomic benefits to the local area and the region.

Workers, the public, and the environment would be exposed to increased amounts of hazardous and radioactive materials over the short term from operations of the proposed EREF. Construction and operation would require a long-term commitment of terrestrial resources, such as land, water, and energy. Short-term impacts would be minimized by the application of appropriate mitigation measures. Upon the closure of the proposed EREF, AES would decontaminate and decommission the buildings and equipment and restore them for unrestricted use. Continued employment, expenditures, and tax revenues generated during the proposed action would directly benefit the local, regional, and State economies.

Irreversible commitment of resources refers to resources that are destroyed and cannot be restored, whereas an irretrievable commitment of resources refers to material resources that once used cannot be recycled or restored for other uses by practical means. The proposed action would include the commitment of land, water, energy, raw materials, and other natural and human-generated resources. Following decommissioning, the land occupied by the proposed facility would likely remain industrial beyond license termination. Water required during preconstruction and the proposed action would be obtained from new and existing wells at the proposed EREF property and would be replenished through natural mechanisms. Wastewaters would be treated to meet applicable standards and would evaporate. Energy used in the form of electricity and diesel fuel would be supplied through new infrastructure connecting to existing systems in the Idaho Falls area. The specific types of construction materials and the quantities of energy and materials used cannot be determined until final facility design is completed, but it is not expected that these quantities would strain the availability of these resources.

During operation of the proposed EREF, natural UF_6 would be used as feed material, requiring the mining of uranium (not licensed by the NRC) and other front end operational steps in the uranium fuel cycle (licensed by the NRC). This use of uranium would be an irretrievable resource commitment.

Even though the land used to construct the proposed EREF would be returned to other productive uses after the proposed facility is decommissioned, there would be some irreversible commitment of land at other offsite locations used to dispose of solid wastes generated by the proposed facility. In addition, wastes generated during the conversion of depleted UF_6 produced by the proposed facility and the depleted uranium oxide conversion product from the conversion of depleted UF_6 would be disposed at a licensed offsite LLRW disposal facility. Land used for disposal of these materials would represent an irreversible commitment of land. No solid wastes or depleted uranium oxide conversion product originating from the proposed EREF would be disposed of on the proposed EREF property. When the proposed facility is decommissioned, some building materials would be recycled and reused. Other materials would be disposed of in a licensed and approved offsite location, and the amount of land used to dispose of these materials would be an irretrievable land resource.

ACRONYMS AND ABBREVIATIONS

^{234}U	uranium-234 (U-234)
^{235}U	uranium-235 (U-235)
$^{235}UF_6$	uranium-235 hexafluoride
^{238}U	uranium-238 (U-238)
$^{238}UF_6$	uranium-238 hexafluoride
AAC	acceptable ambient concentration
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACP	American Centrifuge Plant
ADAMS	Agencywide Documents Access and Management System
AERMOD	AMS/EPA Regulatory Model
AES	AREVA Enrichment Services, LLC
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
APE	Area of Potential Effect
Argonne	Argonne National Laboratory
ASTM	American Society of Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
AVLIS	Atomic Vapor Laser Isotope Separation
BEA	U.S. Bureau for Economic Analysis
BLM	U.S. Bureau of Land Management
BLS	U.S. Bureau of Labor Statistics
BMP	best management practice
BSPB	Blending, Sampling, and Preparation Building
CAA	*Clean Air Act*
CAB	Centrifuge Assembly Building or Controlled Area Boundary
CaF_2	calcium fluoride
Cal/EPA	California Office of Environmental Health Hazard Assessment
CCS	Center for Climate Studies
CDC	Centers for Disease Control and Prevention
CEDE	committed effective dose equivalent
CEQ	Council on Environmental Quality
CFR	U.S. *Code of Federal Regulations*
CH_4	methane
CTF	Centrifuge Test Facility
CO	carbon monoxide
CO_2	carbon dioxide
CREP	Conservation Reserve Enhancement Program
CWA	*Clean Water Act*
CY	calendar year
D&D	decontamination and decommissioning
DDT	dichlorodiphenyltrichloroethane

DEM	Digital Elevation Model
DNFSB	Defense Nuclear Facilities Safety Board
DNL	day/night average noise level
DOC	U.S. Department of Commerce
DOE	U.S. Department of Energy
DOEQAP	DOE Quality Assurance Program
DOL	U.S. Department of Labor, U.S. Bureau of Labor Statistics
DOT	U.S. Department of Transportation
EA	Environmental Assessment
EDE	effective dose equivalent
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EMP	Effluent Monitoring Program
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ERDA	Energy Research and Development Administration
EREF	Eagle Rock Enrichment Facility
ESA	*Endangered Species Act*
ESRP	Eastern Snake River Plain
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FGR	Federal Guidance Report
FR	*Federal Register*
FTE	full-time equivalent
FWCA	*Fish and Wildlife Coordination Act*
FWS	U.S. Fish and Wildlife Service
GAO	U.S. General Accounting Office
GCRP	U.S. Global Climate Change Research Program
GDP	Gaseous Diffusion Plant
GE	General Electric
GEVS	Gaseous Effluent Ventilation System
GHG	greenhouse gas
GLE	Global Laser Enrichment
GWP	Global Warming Potential
HAP	hazardous air pollutant
HEPA	high-efficiency particulate air
HEU	high-enriched uranium
HF	hydrogen fluoride or hydrofluoric acid
HFC	hydrofluorocarbon
HPS	Health Physics Society
HRCQ	Highway Route Controlled Quantity
HVAC	heating, ventilating, and air conditioning
HUD	U.S. Department of Housing and Urban Development

I	Interstate
IAC	*Idaho Administrative Code*
ICRP	International Commission on Radiological Protection
IDAPA	*Idaho Administrative Procedures Act*
IDC	Idaho Department of Commerce
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDWR	Idaho Department of Water Resources
IGS	Idaho Geological Survey
INL	Idaho National Laboratory
IPCC	Intergovernmental Panel on Climate Change
IPCS	International Programme on Chemical Safety
IROFS	Items Relied on for Safety
IS	*Idaho Statutes*
ISA	Integrated Safety Analysis
ISAC	Idaho Sage-grouse Advisory Committee
ISACTAT	Idaho Sage-grouse Advisory Committee Technical Assistance Team
ISCORS	Interagency Steering Committee on Radiation Standards
ISTC	Idaho State Tax Commission
ITD	Idaho Transportation Department
IWRB	Idaho Water Resource Board
LCF	latent cancer fatality
L_{dn}	day/night maximum average sound level
L_{eq}	equivalent sound level
LES	Louisiana Energy Services
LEU	low-enriched uranium
LLRW	low-level radioactive waste
LOS	level of service
LTTS	Low Temperature Take-off Stations
LWR	light water reactor
MAPEP	Mixed Analyte Performance Evaluation Program
MCL	maximum contaminant level
MCNP	Monte Carlo N-Particle
MDC	minimum detectable concentration
MDEQ	Montana Department of Environmental Quality
MEI	maximally exposed individual
MFC	Materials and Fuels Complex
MLIS	molecular laser isotope separation
MOA	Memorandum of Agreement
MRI	Midwest Research Institute
MSL	mean sea level
MW(e)	Megawatt electric
NAAQS	National Ambient Air Quality Standards
NCDC	National Climatic Data Center
NCES	National Center for Education Statistics

NCRP	National Council on Radiation Protection and Measurements
NEF	National Enrichment Facility
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NEPA	*National Environmental Policy Act of 1966*
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	*National Historic Preservation Act of 1966*
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Technology
NLCD 1992	National Land Cover Data 1992
NMFS	National Marine Fisheries Service
NMVOC	nonmethane volatile organic compound
NNL	National Natural Landmark
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	nitrogen oxides
NPCR	National Program of Cancer Registries
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRCP	National Council on Radiation Protection
NRCS	U.S. Natural Resources Conservation Service
NRHP	*National Register of Historic Places*
NWS	National Weather Service
O_3	ozone
OECD	Organisation for Economic Co-operation and Development
OEL	occupational exposure levels
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PFC	perfluorocarbon
PGA	peak ground acceleration
PM	particulate matter
$PM_{2.5}$	particulate matter equal to or smaller than 2.5 micrometers in diameter
PM_{10}	particulate matter equal to or smaller than 10 micrometers in diameter
PNNL	Pacific Northwest National Laboratory
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
PWR	pressurized water reactor
RAB	Restricted Area Boundary
RAI	Request for Additional Information
RCRA	*Resource Conservation and Recovery Act*

REMP	Radiological Environmental Monitoring Program
RMP	Rocky Mountain Power or range management plan
ROI	region of influence
ROW	right-of-way
SAAQS	State Ambient Air Quality Standards
SARA	*Superfund Amendments and Reauthorization Act*
SBM	Separations Building Module
SDWA	*Safe Drinking Water Act*
SER	Safety Evaluation Report
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Office(r)
SILEX	separation of isotopes by laser excitation
SMCL	secondary maximum contaminant level
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SPL	sound pressure level
SUNSI	Sensitive Unclassified Non-Safeguards Information
SVOC	semivolatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
SWU	separative work unit
TEDE	Total Effective Dose Equivalent
TI	transportation index
TLD	thermoluminescent dosimeter
TRAGIS	Transportation Routing Analysis Geographic Information System
TSB	Technical Support Building
TSDF	treatment, storage, and disposal facility
U_3O_8	triuranium octaoxide
UO_2F_2	uranyl fluoride
UBC	uranium byproduct cylinder
UF_4	uranium tetrafluoride
UF_6	uranium hexafluoride
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
URENCO	URENCO Group
USACE	U.S. Army Corps of Engineers
U.S.C.	*United States Code*
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEC	U.S. Enrichment Corporation
USGS	U.S. Geological Survey
USSLWG	Upper Snake Sage-grouse Local Working Group
VOC	volatile organic compound
VRI	visual resource inventory

VRM	visual resource management
VTM	vehicle miles traveled
WSA	Wilderness Study Area

APPENDIX A
ENVIRONMENTAL SCOPING SUMMARY REPORT

ENVIRONMENTAL IMPACT STATEMENT SCOPING PROCESS

SCOPING SUMMARY REPORT

Proposed AREVA Enrichment Services, LLC
Eagle Rock Enrichment Facility
Bonneville County, Idaho

1. INTRODUCTION

On December 30, 2008, AREVA Enrichment Services LLC (AES) submitted its original application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility to be located near Idaho Falls, Idaho. An Environmental Report was also submitted by AES at that time. On April 24, 2009, AES resubmitted its application to request an increase in enrichment capacity.

If licensed, the facility would enrich uranium for use in manufacturing commercial nuclear fuel for use in power reactors. Feed material would be natural (not enriched) uranium in the form of uranium hexafluoride (UF_6), which contains the uranium-235 isotope. AES proposes to use centrifuge technology to enrich this isotope in the UF_6 to up to 5 percent by weight. The centrifuge would operate at below atmospheric pressure and would have a capacity up to 6.6 million separative work units (SWU). The enriched UF_6 would be transported to a fuel fabrication facility, while the depleted UF_6 would be stored onsite until it is sold, disposed of commercially, or taken by the U.S. Department of Energy.

In accordance with NRC regulations in 10 CFR Part 51 and the National Environmental Policy Act (NEPA), the NRC is preparing an Environmental Impact Statement (EIS) on the proposed facility as part of its decision making process. The EIS will examine the potential environmental impacts associated with the proposed AES facility in parallel with the review of the license application. In addition to the EIS, the NRC staff will prepare a Safety Evaluation Report (SER) on health and safety issues raised by the proposed action. The SER will document the NRC staff evaluation of the safety of the activities proposed by AES in its license application and the compliance with applicable NRC regulations.

On May 4, 2009, NRC published a Notice of Intent in the *Federal Register* (74 *Federal Register* 20508-20509) to prepare an EIS and to conduct the public scoping process, in accordance with the NEPA process. The scoping process is designed to help determine the range of actions, alternatives, and potential impacts to be considered in the EIS, and to identify significant issues related to the proposed action. The NRC solicits input from the public and other agencies in order to focus on issues of genuine concern.

On June 4, 2009, the NRC staff held a public scoping meeting in Idaho Falls, Idaho, to receive both oral and written comments from interested parties. The meeting began with the staff providing a description of the NRC's role, responsibilities, and mission. This was followed by an overview of the licensing process, including information on the safety review and environmental review processes. Also, NRC staff provided Information on the means for the public's participation. Most of the meeting time was spent taking comments from attendees regarding the scope of the environmental review.

After publishing the draft EIS, NRC will invite the public to comment on that document. NRC will announce the availability of the draft EIS, the dates of the public comment period, and information about the public meeting in the *Federal Register*, on NRC's AREVA Enrichment Services Gas Centrifuge Facility Web site (http://www.nrc.gov/materials/fuel-cycle-fac/arevanc.html), and in the local news media. After evaluating comments on the draft EIS, the NRC staff will issue a final EIS that will serve as the basis for the NRC's consideration of environmental impacts in its decision on the proposed enrichment facility.

This report summarizes the determinations and conclusions reached in the scoping process. It is organized into four main sections. Section 1 provides an introduction and background information on the environmental review process. Section 2 summarizes the comments and concerns expressed by government officials, agencies, organizations, and the public. Section 3 identifies the issues that the draft EIS will address, and Section 4 identifies issues that are not within the scope of the draft EIS. Where appropriate, Section 4 also identifies other occasions in the decision making process where issues that are outside the scope of the draft EIS may be considered.

2. ISSUES RAISED DURING THE SCOPING PROCESS

2.1 OVERVIEW

The public scoping process is an important component in determining the major issues that the NRC should address in the draft EIS. The comments provided by the public addressed several subject areas related to the proposed AES facility and the development of the draft EIS.

Members of the public were able to submit comments on the scope of the AES enrichment facility EIS by e-mail, postal mail, and by speaking and/or submitting written comments at the public scoping meeting held in Idaho Falls, Idaho, on June 4, 2009. The scoping period began on May 4, 2009 and ended June 19, 2009.

Comments were received from 131 individuals or organizations. Approximately 120 individuals not affiliated with the NRC attended the June 4, 2009, public scoping meeting.

Most of the scoping comments (89) were received by e-mail; 37 people provided oral comments at the scoping meeting (two of these had also sent e-mail comments); and 7 people sent their comments by postal mail. Some people used more than one submittal method; they were not counted twice. The scoping meeting transcript (ML 091980464) and the written comments are available on NRC's Electronic Reading Room Web site at http://www.nrc.gov/reading-rm.html.

In addition to private citizens, commenters included:

- Shoshone-Bannock Tribes
- A representative of the Governor of Idaho
- Representatives for Idaho's U.S. Senators
- A representative for the U.S. Congressman, 2nd District of Idaho
- Three members of the Idaho State House of Representatives
- A member of the Idaho State Senate
- The mayor of Idaho Falls
- U.S. Environmental Protection Agency, Region 10
- Greater Idaho Falls Chamber of Commerce
- Bonneville County Commissioners
- Representatives of other organizations and businesses, including:
  - A Partnership for Science and Technology
  - Auto Building Trade and Construction Council

- – Carpenter and Millwright Local Union, No. 808
- – Cooper, Roberts, Simonsen Associates
- – Diversified Metal Products
- – Eastern Idaho Regional Medical Center
- – Forde Johnson Oil Company
- – Friends of the Earth
- – Grow Idaho Falls
- – Healthy Environmental Alliance of Utah (HEAL Utah)
- – Idaho Conservation League
- – Idaho Falls Regional Development Alliance
- – Idaho Families for the Safest Energy
- – Idaho State University
- – International Brotherhood of Electrical Workers, Local 449
- – Mayor's Youth Advisory Council (Idaho Falls)
- – Snake River Alliance
- – Tri-Valley Cares

The following general topics categorize the comments received during the public scoping period:

- NEPA and public participation
- Need for the proposed facility
- Alternatives
- Ecology
- Air quality and climate
- Geology and seismicity
- Water
- Land use and visual resources
- Human health
- Nuclear waste and hazardous materials
- Socioeconomics and cost
- Cultural resources and environmental justice
- Transportation
- Accidents
- Nonproliferation and security issues
- Cumulative impacts, and
- Miscellaneous topics

In addition to raising important issues about the potential environmental impacts of the proposed facility, some commenters offered opinions and concerns that typically would not be included in the subject matter of an EIS – these include general opinions about AES or issues that are more appropriately considered in the SER. Comments of this type are taken into consideration by the NRC staff, but they do not point to significant environmental issues to be analyzed. Other statements may be relevant to the proposed action, but they have no direct bearing on the evaluation of alternatives or on the decision making process involving the proposed action. For instance, general statements of support for or opposition to the proposed project fall into this category. Again, comments of this type have been noted but are not used in defining the scope and content of the EIS.

Section 2.2 summarizes the comments received during the public scoping period. Most of the issues raised have a direct bearing on the NRC's analysis of potential environmental impacts.

2.2 SUMMARY OF ISSUES RAISED

General comments supporting the facility: Nearly 50 percent of commenters expressed general support for the project. Many commenters provided specific reasons for their support, including: (1) the need for a domestic supply of enriched uranium to power the Nation's current and future nuclear reactors; (2) the need to produce more nuclear energy, which would reduce greenhouse gases and reduce the country's dependence on foreign oil; (3) the region's qualified workforce and long history in nuclear-related research and development; (4) the safety and efficiency of centrifuge technology; (5) the benefits to employment and other economic factors; and (6) AREVA's track record regarding safe operations, environmental stewardship, and community relations.

General comments opposing the facility: Approximately 30 percent of commenters stated their opposition to the project; in general, they stated that the increased risks to people and the environment outweighed the economic benefits. Many commenters mentioned that they thought AREVA had a poor track record in France, specifically they claimed that there had been routine dumping of radioactive liquids into the English Channel and a series of recent (2008) radioactive leaks and spills that were not reported to the public in a timely manner. Some commenters claimed that AREVA's mining activities in Niger over the past 40 years had depleted the local drinking water and radioactively contaminated the ground in the nearby town.

General concerns: Several commenters who were supportive of the proposed action noted that there were legitimate questions about potential environmental impacts that must be addressed in the draft EIS. Many commenters identified specific resource areas for which impacts should be addressed in the draft EIS. These included socioeconomic issues, water and air quality, waste management, noise, land use, geology and soils, cultural and environmental justice, ecology, public and occupational health, transportation, and security infrastructure impacts. More details on these issues can be found in the following sections of this scoping summary report.

The NRC staff will consider the comments provided during development of the EIS for the facility.

2.2.1 NEPA and Public Participation

Several commenters requested that public meetings be held in additional locations across the State to provide people throughout Idaho with the opportunity to comment on the proposal. Boise was mentioned most often, with commenters stating that it was the State capital and main population center. Other Idaho locations mentioned included Twin Falls, Coeur d'Alene, and the Wood River Valley. One commenter requested that meetings also be held in the Greater Yellowstone ecosystem area (specifically Wyoming), since that region's tourist industry could be adversely affected by having a nuclear facility in the vicinity.

Commenters pointed out that the impacts of the enrichment facility would not be limited to the Idaho Falls region. Most frequently mentioned were the tax incentives for the AREVA project that some thought were passed by the Idaho State Legislature and would affect Idahoans statewide. Other reasons given were that regions outside of Idaho Falls could be affected by accidents at the facility and by radioactive waste disposal.

Commenters mentioned the need to provide a forum in which the public could discuss and be informed about the radioactive wastes that the facility would generate, how the wastes would be handled, and the differences between the enriched uranium used to power reactors and the enriched uranium used for bombs.

2.2.2 Need for the Proposed Facility

Several made the general comment that uranium enrichment was needed for clean energy (nuclear power). On the other hand, a number of commenters wanted the EIS to include an in-depth analysis of the actual need for the proposed enrichment facility. They stated that the analysis should consider current and projected worldwide uranium enrichment capacity, the continuing downblending of surplus highly enriched uranium (HEU) in Russia and U.S. weapons stockpiles, and the current and projected number of nuclear power plants. In addition, mixed oxide fuel should be analyzed as another fuel supply. One commenter asked if plutonium, thorium, or other nuclear fuels could displace existing or potential demand for enriched uranium - will there be enough fuel capacity to serve the needs of future nuclear power plants without constructing the proposed facility.

Several commenters questioned the need for the proposed enrichment facility, given that there are renewable energy sources (solar, wind, biomass, geothermal, and hydropower) that are more environmentally friendly than nuclear power. One commenter stated that energy-need projections should take energy conservation and increased energy efficiencies into account.

2.2.3 Alternatives

One commenter stated that all reasonable alternatives should be evaluated, including ones that are outside the legal jurisdiction of the NRC, and that the EIS should discuss the reasons for eliminating alternatives that are not evaluated in detail. Reasonable alternatives should include, but are not limited to, alternative sites and different enrichment techniques. The commenter asked that the environmental impacts of the proposed action and no-action alternative be presented in comparative form and that the impacts of each alternative action be listed with corresponding mitigation measures.

Another commenter wanted the increased downblending of U.S and Russian HEU, as well as plutonium- and thorium-based fuels, to be analyzed as alternatives to the Eagle Rock Enrichment Facility (EREF). The analysis should include costs and environmental impacts.

2.2.4 Ecology

A few commenters raised concerns about endangered and sensitive species in the vicinity of the proposed facility. They stated that the NRC should try to site facilities and infrastructure to avoid areas of critical habitat for species of concern and that a mitigation plan should be prepared for impacts that could not be avoided.

Commenters were particularly concerned about increased habitat fragmentation, since the project area contains habitat that is crucial to sagebrush obligate species. One commenter noted that the sagebrush steppe habitat is considered by Federal agencies as "imperiled" and an area of primary concern. One commenter specifically mentioned sage grouse, pygmy rabbits, sage thrasher, sage sparrow, and birds of prey and recommended avoiding construction in any designated areas or lands for special management for these species. This commenter also suggested that the project minimize impacts to big game winter habitat. There were also concerns about impacts to nesting habitat for migratory birds.

One commenter wanted further analysis of the impacts associated with the construction of two access roads from U.S. Highway 20 to the project site, specifically the additional risk associated with fire and the spread of invasive weeds.

2.2.5 Air Quality and Climate

Air quality: A few commenters were concerned about the potential release of radioactive, hazardous, and toxic materials into the air. Commenters asked that the EIS include the following: (1) detailed information about ambient air conditions, (2) data on emissions of criteria pollutants, (3) information about mitigation measures, (4) an equipment emissions mitigation plan to reduce particulates and emissions associated with construction activities, (5) an evaluation of radioactive and nonradioactive emissions, (6) details on the use and disposal of filters, and (7) information on air impacts associated with accidents. One commenter requested that the applicant include air monitoring and reporting plans, including guidance for public alerts and containment.

Climate change: One commenter stated that the EIS should discuss how climate change could potentially influence the proposed project area resources and vice versa, especially within sensitive areas. He mentioned, as examples, changes in hydrology, sea leave, weather patterns, precipitation rates, and chemical reaction rates.

2.2.6 Geology and Seismicity

Geology and soil: One commenter noted that construction of facilities and access roads may also inadvertently compact the soil or disturb it, thus compromising the ability of a site to handle the normal flow of organisms, nutrients, and toxic wastes. The commenter stated that the EIS analysis should include a detailed discussion of the "cumulative effects from this and other projects on the hydrologic conditions of the project area." Another commenter suggested establishing citing criteria to minimize soil disturbances and erosion on steep slopes.

Seismicity: A commenter recommended that the EIS discuss the potential for seismic risk associated with uranium enrichment activities and how this risk would be evaluated, monitored, and managed. They suggested that a seismic map be referenced or included in the EIS. The commenter stated that uranium enrichment activities could cause increased earthquake activity in tectonically active zone. Another commenter noted that eastern Idaho sits on a geologically unstable fault zone extending across southern Idaho to Yellowstone.

2.2.7 Water

Several commenters expressed concerns about adverse impacts the proposed facility would have on both surface water and groundwater. Of particular concern was the Snake River aquifer, which is located below the proposed site. The fear was that nuclear waste stored at the facility would seep into the aquifer and contaminate the groundwater.

Some commenters were concerned that water used by the facility would deplete the groundwater supply. In addition to depleting the supply, a commenter noted that the pumping action could increase existing groundwater contamination caused by seepage of toxic and radioactive contaminants into the groundwater. On the other hand, a few commenters stated that the facility would use less water than current agricultural activities.

A commenter recommended that the potential impacts to groundwater and other drinking water sources be fully analyzed and that mitigation measures be identified for significant impacts. They also stated that the EIS should document the project's "consistency with applicable stormwater permitting requirements" and include a discussion of specific mitigation measures that may be needed to reduce "adverse impacts to water quality and aquatic resources."

2.2.8 Land Use and Visual Resources

One commenter noted that the proposed AREVA facility would be located within an area of ranching and farming. There were local concerns about trespass, dust, impacts on livestock, impacts to local wells and groundwater, and traffic. Another commenter mentioned using visual resource management guidelines as an example of ways to minimize negative impacts.

2.2.9 Human Health

There were some comments related to the human health risks associated with long-term exposure to small amounts of uranium; increased risk for childhood leukemia and general concerns about cancer rates were mentioned.

One commenter questioned whether the NRC and AREVA could "scientifically demonstrate the legal requirement that this plant will not expose any member of the public to more than 10 mrem in any given year." Exposure from waste disposal was specifically mentioned. This commenter wanted the EIS to include the following: (1) an explanation as to why uranium exposure has greater health effects than are presently calculated by NRC safety standards; (2) how the alpha recoil problem is addressed by the NRC, since "alpha emitters can leak through four HEPA filters in a row, in excess of the 99.97 percent filtering rate used presently"; and (3) a response to the complaints in the report from Centers' for Disease Control and Prevention (CDC's) SENES group on the understatement of fluoride toxicity at Oak Ridge.

Another commenter wanted the EIS to describe the measures that would be taken to ensure that workers involved in the transport of radioactive materials would be protected, including those loading and unloading shipments.

2.2.10 Nuclear Waste and Hazardous Materials

Radioactive waste: Nearly 40 percent of the commenters mentioned the need to address the impacts (environmental and economic) associated with long-term storage of the nuclear waste that would be produced by the enrichment process. There were concerns that the proposed facility would be adding to the nuclear waste that is already being stored at Idaho National Laboratory, particularly since no permanent nuclear waste depository has been designated. Many commenters noted that depleted uranium is hard to store safely and becomes "more radioactive over time." Another commenter pointed out that, although the depleted uranium becomes more radioactive over time due to radioactive ingrowth, the level of radioactivity never exceeds that found in natural uranium ore deposits.

Commenters noted that the NRC is still in the process of preparing specific rules for the depleted uranium waste stream. One commenter stated that the draft EIS should include a discussion of the rulemaking process and how (or whether) the rulemaking and current licensing processes can proceed simultaneously.

Commenters wanted the draft EIS to consider the environmental impacts of a full range of disposition pathways for the depleted uranium tails, including currently available disposal sites and those that are proposed. The analyses should include indefinite storage of uranium hexafluoride, indefinite storage of some other conversion product, disposal at new-surface nuclear waste disposal sites, and disposal at deep geologic sites. Commenters wanted NRC to assess the costs of each alternative.

Some commenters asked that the draft EIS discuss the environmental impacts associated with recycle/reuse disposition pathways or deconversion of the waste to a safer form (to an oxide). They noted that the United States lacks an operational deconversion facility and that the two deconverson plants currently under construction may not be able to handle the added inventory from the Louisiana Energy Services plant in New Mexico and the proposed Eagle Rock facility.

One commenter stated that the draft EIS must provide a description of the financial assurance for the indefinite storage of the depleted uranium at the AREVA site.

Hazardous materials: A few commenters were concerned that hazardous materials from the facility would contaminate the air and water. One commenter stated that hazardous materials in retention basins have the potential to settle in sediments and be released into the air.

Commenters wanted the draft EIS to discuss the potential direct, indirect, and cumulative impacts of hazardous waste from construction and operation of the project, including waste types and volumes and transport, storage, disposal, and mitigation measures. There were also concerns about pollutants that could be associated with the ventilation system. One commenter asked that subsequent environmental documentation include a management plan for toxic and hazardous materials.

2.2.11 Socioeconomics and Costs

Several commenters mentioned positive socioeconomic impacts that the facility would bring to the community, particularly jobs. One commenter stated that he had looked into the increased housing, schooling, and transportation needs that would be expected during construction and operations phases and determined that the region would be able to accommodate them.

Many people commented on the costs of building and operating the facility, which would be partly covered by tax subsidies and increased electricity rates; cost overruns and delays in France, Poland, and Finland were cited as examples.

One commenter wanted the draft EIS to provide an analysis of the global market for uranium, including a scenario in which nuclear plants do not expand beyond current numbers or even decline. Another commenter noted that the economies of the Teton Valley, Jackson, WY, and West Yellowstone into Cody, WY, are fairly dependent on tourism. He asked that the EIS look at how many new jobs and how much new money would be brought into the region if the same amount of money were used to create and support small businesses.

Other commenters asked about the ramifications of foreign ownership (see Section 2.2.17, miscellaneous topics).

2.2.12 Cultural Resource and Environmental Justice

Cultural resources: One commenter stated that the EIS should describe the process and outcome of government-to-government consultation between the NRC and each of the Tribal governments in the vicinity of the project, any issues raised, and how those issues were addressed.

Another commenter noted that the proposed facility would be in close proximity to the Fort Hall Indian Reservation and within the aboriginal territories of the Shoshone-Bannock Tribes. This commenter stated that they would like the Heritage Tribal Office (HeTO) to be part of the cultural surveys of the proposed site and to be notified of any inadvertent cultural or archaeological discoveries.

A third commenter pointed out that the proposed site is in an area of rich and relatively well-preserved prehistoric and historic resources, noting the Wasden site, which is within one mile of the project area, and the relatively undisturbed and abundant archaeological sites within Idaho National Laboratory and on public and private lands in the vicinity.

Commenters pointed out that mitigation for all culturally sensitive items needed to be done and asked that contractors and permanent employees be informed about cultural regulations and Federal laws concerning artifacts and retrieving and removing historic items.

One commenter wanted to know if AREVA will share information about transportation routes, hazards associated with shipment, and the number of shipments. He also wanted to know if AREVA would provide training to the Tribes Emergency Management and Response staff on identifying and responding to a transportation accident on the reservation.

Another commenter questioned the transportation route of product to and from the EREF and whether AREVA will share information regarding the number of shipments and hazards of the shipments, and whether the facility will provide training to the Tribes Emergency Management and Response staff to identify and respond to a transportation accident on the reservation.

Environmental justice: One commenter stated that the EIS should include an evaluation of environmental justice populations within the project area and should address the potential for disproportionate adverse impacts to minority and low-income populations. The commenter stated that the EIS should include: information describing the process used to inform communities about the project and the potential impacts on the communities; input received from the communities; and a description on how that input was used in project-related decisions. Another commenter stated that sensitive population exposure scenarios needed to be developed from the standpoint of both workers and members of the public.

2.2.13 Transportation

Some commenters asked that the EIS include an assessment of the impacts of the transportation of the facility's feedstock, product, and waste, and of transportation-related accidents, including transportation-related emissions and possible exposures. The EIS should also describe measures that will be taken to decrease the chances of a transportation accident involving radioactive material and to ensure that workers involved in the transport of radioactive materials will be protected, including those loading and unloading shipments. One commenter want the draft EIS to include information about what form the uranium will be in when it is transported to Idaho—yellowcake, gaseous uranium tetrafluoride, or uranium hexafluoride. Alternative transportation routes and modes should be analyzed; routes and modes that present a significant risk to the public and natural resources should be avoided.

One commenter stated that the EIS should provide information about the transportation of hazardous and toxic materials to and from the project site, including amounts, methods of transport, and the types of containment vessels.

Some commenters were concerned about traffic safety on portions of U.S. Highway 20 running from Idaho Falls to the proposed EREF. They pointed out that the highway already has safety issues, since it is used by large, slow-moving agricultural machinery with many access roads on both sides. The addition of construction workers and construction traffic would add to the already congested conditions and create an increased safety risk. Commenters asked that the EIS describe local transportation safety issues and suggest solutions. One commenter wanted further analysis of the impacts associated with the construction of two access roads from U.S. Highway 20 to the project site.

One commenter noted that AREVA workers would find themselves in competition for seating on airline flights that are already filled to capacity and suggested that the region pursue a carrier to establish a new service to Las Vegas.

2.2.14 Accidents

There were a few comments concerning accidents. One commenter wanted to know how AREVA would respond to accident scenarios on the proposed site and how the public would be informed. Another was concerned about transportation accidents resulting in the release of radioactive materials to the environment and asked that the EIS describe measures that will be taken to minimize the chances of this type of accident. A third commenter stated that the draft EIS must analyze the air impacts of all potential accidents. Note: Section 2.2.13 of this summary also discusses accidents.

2.2.15 Nonproliferation and Security Issues

Nonproliferation: Several commenters were concerned that uranium enrichment could lead to the production of nuclear bombs and wondered if the use of enrichment technology could undermine U.S. efforts involving international nonproliferation.

One commenter stated that since there is a potential connection between a facility's ability to enrich uranium to fuel grade and the ability to continue enrichment to weapons grade, a proliferation analysis must be included in the draft EIS. Another commenter asked for a nonproliferation impact assessment.

A commenter stated that the analysis must include "both a technical discussion and a discussion by the U.S. Departments of State and Energy and the White House of their efforts to curtail uranium enrichment elsewhere and whether or not those efforts are affected by commercial enrichment in this country." Another commenter wanted the EIS to explain why the International Atomic Energy Agency had not been involved in the project.

Security issues: Some commenters raised concerns about fissile material (which has the potential for nuclear bomb-making) getting into the hands of terrorists and hostile countries like Iran and North Korea. They pointed out that the AREVA facility as well as the nuclear materials shipments going to and from the facility were subject to attack. One commenter asked for a detailed accounting of AREVA's plans to secure its nuclear materials at the facility and during transport. Another commenter wanted an account of the environmental impact of sabotage to the fluoride gas supply. One commenter wanted AREVA to commit to donating money to increase the local police and fire departments.

2.2.16 Cumulative Impacts

One commenter stated that the draft EIS should include a detailed discussion of the cumulative effects from this and other projects on the hydrologic conditions of the project area. On a more general level, commenters wanted the EIS to identify the current condition, describe the trend in the condition, and predict the future condition for each resource that is at risk and/or significantly impacted by the proposed project before mitigation. The EIS should identify the resources that could experience cumulative impacts, the time period over which impacts could occur, and the geographic area impacted. Parties that would be responsible for avoiding, minimizing, and mitigating adverse impacts should be identified. Another commenter wanted the draft EIS to discuss the potential direct, indirect, and cumulative impacts of hazardous waste.

2.2.17 Miscellaneous Topics

Other potential facility operations: One commenter was concerned that AREVA would become involved in the re-enrichment of reprocessed uranium. The commenter wanted a clear statement in the draft EIS by AREVA that it would not engage in re-enrichment. If this statement could not be made, the commenter wanted the draft EIS to discuss the capacity of the plant to process contaminated reprocessed uranium, the measures to protect workers from additional radiation exposures, an analysis of unique waste streams, and the transportation risks associated with shipping the reprocessed uranium by land and sea.

Another commenter wanted the draft EIS to assess the use of the plant to separate other isotopes of uranium, such as U-233, or to purify uranium-contaminated materials.

Mining and milling operations: A few commenters wanted the EIS to fully analyze the "front end" impacts associated with the operation of the proposed enrichment facility. They wanted the draft EIS to look at the environmental and human health impacts in the communities where uranium mining and milling activities were occurring. It was noted that these activities would not likely be occurring in the United States.

Foreign ownership: A few commenters raised issues about the foreign ownership of AREVA. One commenter wondered who would pay in the event of an accident and if the United States Government would argue with France over damages. Another commenter wondered what would happen if AREVA went out of business and stated that AREVA could only survive financially if it was supported by the French government. The commenter stated that U.S. taxpayers would ultimately have to cover any damages resulting from accidents, nuclear waste, and other issues associated the facility. Another commenter was concerned that profits would go to France and not to the United States.

Facility design: One commenter advocated integrating International Atomic Energy Agency safeguards for the proposed facility at the design phase. Another commenter asked if the facility design had been approved by the NRC for use in the United States.

Comments on the Environmental Report and Safety Analysis Report: One commenter stated that AREVA had adequately addressed the safety and environmental issues in the Environmental Report submitted with the NRC application. Other commenters had areas of concern including: (1) the ability of the Idaho Falls fire department to provide timely support, given its distance from the proposed facility; (2) the adequacy of the emergency backup systems; (3) the transportation analysis; and (4) the impact analysis of ecological resources, particularly the pending Endangered Species Act listings of sage grouse and the pygmy rabbit. There was also a concern that the Environmental Report was not detailed enough to ensure the reduction of impacts or appropriate mitigation plans. Commenters asked that subsequent documents provide a more detailed analysis, particularly in the areas involving water, air, and public health.

One commenter stated that AREVA was pushing the NRC to exempt it from the requirement to provide decommissioning funding assurance for the licensed operating period of the facility. The commenter noted that the EREF Safety Analysis Report (SAR) excluded "escalation, contingency, interest, tails disposition, decommissioning, and any replacement equipment" in its cost estimates. The commenter wanted the draft EIS to discuss in detail the exemptions that were being considered, particularly those listed in the SAR.

Power usage: One commenter wanted the draft EIS to analyze an additional load that the AREVA facility would add to the power grid. Another commenter wanted a commitment to use renewable energy sources (including nuclear power) to run the facility.

Out of scope issues: A few commenters specifically asked that issues raised that were not directly related to the assessment of potential impacts of the project, or the decision making process, be dismissed from the draft EIS and discussed elsewhere.

3. SUMMARY AND CONCLUSIONS

3.1 SCOPE OF THE EIS AND SUMMARY OF ISSUES TO BE ADDRESSED

NEPA (Public Law 91-90, as amended), and the NRC's implementing regulations for NEPA (10 CFR Part 51), specify in general terms what should be included in an EIS prepared by the NRC staff. Regulations established by the Council on Environmental Quality (40 CFR Parts 1500-1508), while not binding on the NRC staff, provide useful guidance. The NRC staff has also prepared environmental review guidance to its staff for meeting NEPA requirements associated with licensing actions ("Environmental Review Guidance for Licensing Actions Associated with Office of Nuclear Material Safety and Safeguards (NMSS) Programs", NUREG -1748).

Pursuant to 10 CFR 51.71(a), in addition to public comments received during the scoping process, the contents of the draft EIS will depend in part on the environmental report. In accordance with 10 CFR 51.71(b), the draft EIS will consider major points of view and objections concerning the environmental impacts of the proposed action raised by other Federal, State, and local agencies, by any affected Indian tribes, and by other interested persons. Pursuant to 10 CFR 51.71(c), the draft EIS will list all Federal permits, licenses, approvals, and other entitlements which must be obtained in implementing the proposed action, and will describe the status of compliance with these requirements. Any uncertainty as to the applicability of these requirements will be addressed in the draft EIS.

Pursuant to 10 CFR 51.71(d), the draft EIS will include a consideration of the economic, technical, and other benefits and costs of the proposed action and alternatives to the proposed action. In the draft analysis, due consideration will be given to compliance with environmental quality standards and regulations that have been imposed by Federal, State, regional, and local agencies having responsibilities for environmental protection. The environmental impact of the proposed action will be evaluated in the draft EIS with respect to matters covered by such standards and requirements, regardless of whether a certification or license from the appropriate authority has been obtained. Compliance with applicable environmental quality standards and requirements does not negate the requirement for NRC to weigh all environmental effects of the proposed action, including the degradation, if any, of water quality, and to consider alternatives to the proposed action that are available for reducing adverse effects. While satisfaction of NRC standards and criteria pertaining to radiological effects will be necessary to meet the licensing requirements of the Atomic Energy Act, the draft EIS will also, for the purposes of NEPA, consider the radiological and non-radiological effects of the proposed action and alternatives.

Pursuant to 10 CFR 51.71(e), the draft EIS will normally include a preliminary recommendation by the NRC staff with respect to the proposed action. Any such recommendation would be reached after considering the environmental effects of the proposed action and reasonable alternatives, and after weighing the costs and benefits of the proposed action.

The scoping process summarized in this report will help determine the scope of the draft EIS for the proposed facility. The draft EIS will contain a discussion of the cumulative impacts of the proposed action. The development of the draft EIS will be closely coordinated with the SER prepared by the NRC staff to evaluate the health and safety impacts of the proposed action.

The goal in writing the EIS is to present the impact analyses in a manner that makes it easy for the public to understand. This EIS will provide the basis for the NRC decision with regard to potential environmental impacts. Significant impacts will be discussed in greater detail in the EIS, and explanations will be provided for determining the level of detail for different impacts. This should allow readers of the EIS to focus on issues that were determined to be important in reaching the conclusions supported by the EIS. The following topical areas and issues will be analyzed in the EIS.

- *Public and worker safety and health.* The draft EIS will include a determination of potentially adverse effects on human health that result from chronic and acute exposures to ionizing radiation and hazardous chemicals as well as from physical safety hazards. These potentially adverse effects on human health might occur during facility construction and operation. Impacts associated with the implementation of the proposed action will be assessed under normal operation and credible accident scenarios.

- *Alternatives.* The draft EIS will describe and assess the no-action alternative and other reasonable alternatives to the proposed action. Other reasonable alternatives to the proposed action will be considered such as alternative sites, enrichment sources, or technological alternatives to the proposed centrifuge technology.

- *Waste management.* The draft EIS will discuss the management of wastes, including byproduct materials, generated from the construction and operation of the EREF to assess the impacts of generation, storage, and disposition. Onsite storage of wastes will also be included in this assessment.

- *Depleted uranium disposition.* The draft EIS will address concerns about the depleted uranium hexafluoride material, or tails, resulting from the enrichment operation over the lifetime of the proposed plant's operation. These concerns include the safe and secure storage and ultimate removal of this material from Idaho, and potential conversion of UF6 to U3O8 and ultimate disposition.

- *Water resources.* The draft EIS will assess the potential impacts on groundwater quality and water use due to the implementation of the proposed action.

- *Geology and seismicity.* The draft EIS will describe the geologic and seismic characteristics of the proposed EREF site. Evaluation of the potential for earthquakes, ground motion, soil stability concerns, surface rupturing, and any other major geologic or seismic considerations that would affect the suitability of the proposed site will be addressed in the SER rather than in the draft EIS.

- *Compliance with applicable regulations.* The draft EIS will present a listing of the relevant permits and regulations that are believed to apply to the proposed EREF. These would include air, water, and solid waste regulations and disposal permits.

- *Air quality*. The draft EIS will make determinations concerning the meteorological conditions of the site location, the ambient air quality, and the contribution of other sources. In addition, the draft EIS will assess the impacts of the EREF's construction and operation on the local air quality.
- *Transportation*. The draft EIS will discuss impacts associated with the transportation of construction material, centrifuges, and feed and tails during both normal transportation and transportation under credible accident scenarios. The impacts on local transportation routes due to workers, large vehicles delivering needed equipment and materials, and vehicles removing waste from the proposed facility will be evaluated in the draft EIS.
- *Accidents*. The draft EIS will analyze the potential environmental impacts resulting from credible accidents at the EREF. The SER will assess the impacts associated with credible accidents at the proposed EREF, both from natural events and human activities. Based on the analyses, the EIS will summarize the potential environmental impacts resulting from credible bounding accidents at the proposed facility.
- *Land use*. The draft EIS will discuss the potential impacts associated with the changes in land use from predominately rangeland to industrial.
- *Socioeconomic impacts*. The draft EIS will address the demography, the economic base, labor pool, housing, utilities, public services, education, recreation, and cultural resources as impacted by EREF. The hiring of new workers from outside the area could lead to impacts on regional housing, public infrastructure, and economic resources. Population changes leading to changes to the housing market and demands on the public infrastructure will be assessed in the draft EIS.
- *Cost/benefits*. The draft EIS will address the potential cost/benefits of constructing and operating the EREF, and will discuss the cost/benefits of tails disposition options.
- *Cultural resources*. The draft EIS will assess the potential impacts of the proposed EREF on the historic and archaeological resources of the area and on the cultural traditions and lifestyle of Indian tribes.
- *Resource commitments*. The draft EIS will address the unavoidable adverse impacts, irreversible and irretrievable commitments of resources, and the relationship between local, short-term uses of the environment and the maintenance and enhancement of long-term productivity. In addition, associated mitigative measures and environmental monitoring will be presented.
- *Ecological resources*. The draft EIS will assess the potential environmental impacts of the proposed EREF on ecological resources including plant and animal species and threatened or endangered species or critical habitat that may occur in the area. As appropriate, the assessment will include an analysis of mitigation measures to address adverse impacts.
- *Need for the facility*. The draft EIS will provide a discussion of the need for the proposed EREF and the expected benefits.

- *Decommissioning.* The draft EIS will include a discussion of facility decommissioning and associated impacts.

- *Cumulative impacts.* The draft EIS will address the potential cumulative impacts from past, present, and reasonably foreseeable activities at and near the site.

4. ISSUES CONSIDERED OUTSIDE THE SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

The purpose of an EIS is to assess the potential environmental impacts of a proposed action as part of the decision-making process of an agency-in this case, a licensing decision. As noted in Section 2.2, some issues and concerns raised during the scoping process are not relevant to the EIS because they are not directly related to the assessment of potential impacts or to the decision making process. The lack of in depth discussion in the EIS, however, does not mean that an issue or concern lacks value. Issues beyond the scope of the EIS either may not yet be ripe for resolution or are more appropriately discussed and decided in other venues.

Some of these issues raised during the public scoping will not be addressed in the EIS. Major categories of these issues not analyzed in detail in the EIS include nonproliferation concerns, security and safety issues, and credibility.

Some of these issues raised during the public scoping process for the proposed facility are outside the scope of the draft EIS, but they will be analyzed in the SER. For example, health and safety issues will be considered in detail in the SER prepared by NRC staff for the proposed action and will be summarized in the EIS. The draft EIS and the SER are related in that they may cover the same topics and may contain similar information, but the analysis in the draft EIS is limited to an assessment of potential environmental impacts. In contrast, the SER primarily deals with safety evaluations and procedural requirements or license conditions to ensure the health and safety of workers and the general public. The SER also covers other aspects of the proposed action such as demonstrating that the applicant will provide adequate funding for the proposed facility in compliance with NRC's financial assurance regulations.

APPENDIX B
CONSULTATION CORRESPONDENCE

APPENDIX B
CONSULTATION CORRESPONDENCE

B.1 Threatened and Endangered Species Consultation

June 17, 2009

Mr. Damien Miller
U.S. Fish and Wildlife Service
Eastern Idaho Field Office
4425 Burley Dr., Suite A
Chubbuck, ID 83202

Dear Mr. Miller:

SUBJECT: REQUEST FOR INFORMATION REGARDING ENDANGERED SPECIES AND CRITICAL HABITATS FOR THE PROPOSED AREVA EAGLE ROCK ENRICHMENT FACILITY LOCATED IN BONNEVILLE COUNTY, IDAHO

Dear Mr. Miller:

On December 30, 2008, AREVA Enrichment Services (AES) submitted an environmental report (ER) to the U.S. Nuclear Regulatory Commission (NRC). The ER is one part of an application for a license to authorize construction, operation, and decommissioning of a proposed uranium enrichment facility. The NRC staff is in the initial stages of developing an Environmental Impact Statement (EIS) for the proposed facility to be located near Idaho Falls, Idaho in Bonneville County. The facility, if licensed, would use a gas centrifuge based technology to enrich the isotope uranium-235 in uranium hexafluoride up to 5 percent by weight. The EIS will document the impacts associated with the construction, operation, and decommissioning of the proposed facility.

NRC requests a list of threatened or endangered species or critical habitats within the action area for the proposed facility. The proposed AES parcel is approximately 1,700 hectares (4,200 acres). AES states that the facility footprint encompasses 381 hectares (941 acres) of the site for which construction, operation, and decommissioning activities will occur. The proposed site is situated within Bonneville County, Idaho, on the north side of U.S. Highway 20, about 113 km (70 miles) west of the Idaho/Wyoming State line. The coordinates for the center of the action area are 43 degrees, 35 minutes, 7.37 seconds North and longitude 112 degrees, 25 minutes, 28.71 seconds West.

We have enclosed additional background information relating to ecological resources on the site, including a map showing the action area, as it appears in the AES ER.

We intend to use the EIS process to comply with Section 7 of the Endangered Species Act of 1973, as amended. After assessing information you provide, we will determine what additional actions are necessary to comply with the Section 7 consultation process. If you have any questions or comments, or need any additional information, please contact Gloria Kulesa of my staff at 301-415-5308.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

Enclosures: 1. Ecology Field Study Report Proposed Site for the Eagle Rock Enrichment Facility
2. Ecology Field Study Report Proposed Site for the Eagle Rock Enrichment Facility – Fall 2008 Survey
3. Sage Grouse Survey Report Proposed for the Eagle Rock Enrichment Facility

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Eastern Idaho Field Office
4425 Burley Dr., Suite A
Chubbuck, Idaho 83202
Telephone (208) 237-6975
http://IdahoES.fws.gov

JUL 15 2009

USNRC
Attn: Gloria Kulesa
MS T8 F5
11545 Rockville Pike
Rockville, MD 20854

Subject: Proposed Areva Eagle Rock Enrichment Facility in Bonneville County, Idaho. SL #09-0471

Dear Ms. Kulesa:

The U.S. Fish and Wildlife Service (Service) is writing in response to your request for information about the potential impacts to endangered, threatened, proposed, and/or candidate species from the proposed Areva Eagle Rock Enrichment Facility in Bonneville County, Idaho. The Service has not identified any issues that indicate that consultation under section 7 of the Endangered Species Act of 1973, as amended, is needed for this project. This finding is based on our understanding of the nature of the project, local conditions, and/or current information indicating that no listed species are present. If you determine otherwise or require further assistance, please contact Sandi Arena of this office at (208)237-6975 ext 102.

Thank you for your interest in endangered species conservation.

Sincerely,

Sandi Arena

for Damien Miller
Supervisor, Eastern Idaho Field Office

February 18, 2010

Damien Miller
U.S. Fish and Wildlife Service
Eastern Idaho Field Office
4425 Burley Dr., Suite A
Chubbuck, Idaho 83202

SUBJECT: REQUEST FOR INFORMATION REGARDING THREATENED OR ENDANGERED SPECIES AND CRITICAL HABITATS FOR PROPOSED TRANSMISSION LINE LOCATED IN BONNEVILLE COUNTY, IDAHO, TO POWER THE PROPOSED AREVA EAGLE ROCK ENRICHMENT FACILITY

Dear Mr. Miller:

As discussed in our earlier letter to you dated June 17, 2008, AREVA Enrichment Services LLC (AES) has submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility, and NRC is preparing an Environmental Impact Statement (EIS) in support of our licensing action for this facility. The proposed facility, the Eagle Rock Enrichment Facility (EREF), would be located in Bonneville County, Idaho, near Idaho Falls. Thank you for your July 15, 2009, response to our letter. The purpose of the present letter is to report an addition to the scope of the EREF project, a 161-kilovolt (KV) transmission line to power the facility, and request additional information for the vicinity of the proposed transmission line project.

On January 29, 2010, AES submitted supplemental information to NRC for the construction and operation of a proposed transmission line, an electrical substation, and substation upgrades. The locations of the transmission line and substations are shown in the January 29, 2010 submittal, a copy of which is enclosed. NRC's EIS for the proposed EREF will include a discussion of the impacts associated with the construction and operation of the transmission line project. NRC requests a list of threatened or endangered species and critical habitats within the action area for the proposed transmission lines and associated facilities. The action area is described below and in greater detail in the enclosure.

The new transmission line and associated structures would be located entirely on private land within Bonneville County. Rocky Mountain Power (RMP), a division of PacifiCorp, will be the builder, owner, and operator. The transmission line would originate from the existing RMP Bonneville Substation and extend in a general westward direction to the new point of service, the Twin Buttes Substation on the proposed EREF site. Beginning at the Bonneville Substation, the proposed transmission line route is west along the county road (West 65 North Street) to the existing RMP Kettle Substation, a distance of approximately 14.5 kilometers (9 miles), continuing west to the eastern portion of the EREF site, a distance of approximately 1.2 kilometer (0.75 mile), then north within the EREF site to its northern end, then west and south to the new RMP Twin Buttes Substation, for a distance of approximately 6.4 kilometers (4 miles). The area being affected by the transmission line is approximately 84 hectares (208 acres).

NRC intends to use the EIS process to comply with Section 7 of the Endangered Species Act of 1973, as amended. After assessing the information you provide, we will determine what additional actions are necessary to comply with the Section 7 consultation process.

If you have any questions regarding this request, or need additional information, please contact Stephen Lemont of my staff at 301-415-5163 or Stephen.Lemont@nrc.gov.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosure:
January 29, 2010 Ltr.

Docket No: 70-7015

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Eastern Idaho Field Office
4425 Burley Dr., Suite A
Chubbuck, Idaho 83202
Telephone (208) 237-6975
http://IdahoES.fws.gov

MAR 09 2010

Andrea Kock
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Proposed Areva Eagle Rock Transmission Line Project Species List Request, Bonneville County, Idaho
SL # 10-0242

Dear Ms. Kock:

The Fish and Wildlife Service (Service) is providing you with a list of endangered, threatened, proposed, and/or candidate species, and designated critical habitat which may occur in the area of the proposed Areva Eagle Rock transmission line project located in Bonneville, County. You requested this list by letter on February 18, 2010. This list fulfills the requirements for a species list under section 7(c) of the Endangered Species Act of 1973 (Act), as amended. If the project decision has not been made within 180 days of this letter, regulations require that you request an updated list. Please refer to the species list (SL) number shown above in all correspondence and reports.

Section 7 of the Act requires Federal agencies to assure that their actions are not likely to jeopardize the continued existence of endangered or threatened species. Federal funding, permitting, or land use management decisions are considered to be Federal actions subject to section 7. If the proposed action may affect a listed species, consultation with the Service is required. Formal consultation must be initiated for any project that is likely to adversely affect a threatened or endangered species. If a project involves a major construction activity and may affect listed species, Federal agencies are required to prepare a Biological Assessment. If a proposed species is likely to be jeopardized or if proposed critical habitat will be adversely modified by a Federal action, regulations require a conference between the Federal agency and the Service. A Federal agency may designate, in writing, you or another non-Federal entity to represent them in an informal consultation.

In a decision published in the July 9, 2007 Federal Register, the Service concluded that protections for the bald eagle (*Haliaeetus leucocephalus*) under the Act were no longer warranted. Effective August 8, 2007, the bald eagle is no longer included on the list of threatened and endangered species in the lower 48 states pursuant to the Act, and has been removed from all Idaho species lists. However, the protections provided to the bald eagle under the Bald and Golden Eagle Protection Act (BGEPA, 16 U.S.C. 668) and the Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703) will remain in place. To assist with the delisting transition, the Service has developed National Bald Eagle Management Guidelines to advise land managers and project proponents when, and under what circumstances, the protective provisions of the BGEPA and MBTA may apply to their activities. These guidelines, as well as additional information on the protection of bald eagles, are available on the Service's web site at: http://www.fws.gov/migratorybirds/baldeagle.htm. The Service also is available to provide technical assistance regarding bald eagle conservation.

In addition to listed species, transmission lines have the potential to affect migratory birds, which are afforded protection under the MBTA (40 Stat. 755; 16 U.S.C. 703-7 12). In addition to considering the potential impacts of the proposed project to listed species we recommend that you identify and implement measures to assure the project complies with the MBTA. The Service suggests your Agency review the Avian Power Line Interaction Committee's "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006" for more information on migratory birds and transmission lines (www.aplic.org). Additionally, more information on impacts to migratory birds and/or the Service's recommendations can be found on the web at http://www.fws.gov/migratorybirds.

If you have any questions about your responsibilities under section 7 of the Act, or require further information, please contact Ty Matthews of our Eastern Idaho Field Office at (208)237-6975 extension 115. Thank you for your interest in endangered species conservation.

Sincerely,

Acting Supervisor
Eastern Idaho Field Office

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington D.C. and Sacramento, California.

BONNEVILLE COUNTY, IDAHO

LISTED SPECIES	COMMENTS
Canada lynx *(Lynx canadensis)*	LT
Ute ladies'-tresses *(Spiranthes diluvialis)*	LT
Utah valvata snail *(Valvata utahensis)*	LE
Grizzly bear *(Ursus arctos)*	LT

PROPOSED SPECIES

None

CANDIDATE SPECIES[1]	
Yellow-billed cuckoo *(Coccyzus americanus)*	C
Greater Sage-Grouse (*Centrocercus urophasianus*)	C

LE - Listed Endangered
LT - Listed Threatened
XN - Experimental/Non-essential population
PT - Proposed Threatened
C - Candidate

[1]Candidate species have no protection under the Act, but are included for your early planning consideration. Candidate species could be proposed or listed during the project planning period, and would then be covered under Section 7 of the Act. The Service advises an evaluation of potential effects on candidate species that may occur in the project area.

July 14, 2010

Mr. Ty Matthews
U.S. Fish and Wildlife Service
Eastern Idaho Field Office
4425 Burley Dr., Suite A
Chubbuck, ID 83202

SUBJECT: NOTIFICATION OF THE ISSUANCE OF AND REQUEST FOR COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED AREVA ENRICHMENT SERVICES LLC EAGLE ROCK ENRICHMENT FACILITY IN BONNEVILLE COUNTY, IDAHO

Dear Mr. Matthews:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing an application submitted by AREVA Enrichment Services LLC (AES) for a license to construct, operate, and decommission a uranium enrichment facility near Idaho Falls in Bonneville County, Idaho. The proposed Eagle Rock Enrichment Facility (EREF), if licensed, would use a gas centrifuge process to enrich uranium-235 isotope found in natural uranium to concentrations up to 5 percent by weight. The enriched uranium would be used to manufacture nuclear fuel for commercial nuclear power reactors.

As part of the review of the application, the NRC has prepared a Draft Environmental Impact Statement (EIS) (NUREG-1945). The Draft EIS includes an analysis of relevant environmental issues, including potential impacts on ecological resources, and documents the NRC staff's preliminary determination regarding the environmental impacts from the preconstruction (e.g., site preparation), construction, operation, and decommissioning of the proposed uranium enrichment facility. Many of the activities required to build a uranium enrichment facility do not fall within NRC's regulatory authority and, therefore, are not "construction" as defined by the NRC. Such activities are referred to as "preconstruction" activities in Title 10 of the *U.S. Code of Federal Regulations* (10CFR) 51.45(c). The proposed 161-kilovolt (kV) electrical transmission line required to provide power to the proposed EREF also falls under this category.

By letters dated June 17, 2009, and February 18, 2010, the NRC requested information from the U.S. Fish and Wildlife Service (USFWS) on Federally listed threatened or endangered species or critical habitat that may be at or in the vicinity of the proposed EREF site and proposed transmission line project, respectively. In those letters, the NRC indicated that it intends to use the EIS process to comply with Section 7 of the Endangered Species Act of 1973, as amended (ESA); and that after assessing the information provided by the USFWS, the NRC will determine what additional actions are necessary to comply with the Section 7 consultation process. The USFWS responded to these letters as follows:

- In a letter dated July 15, 2009, the USFWS stated that no listed species are present [at the EREF site], and that no issues were identified that indicate that consultation under Section 7 of the ESA is needed for this project; and

- In a letter dated March 9, 2010, the USFWS provided a list of endangered, threatened, proposed, and candidate species that may potentially occur in the area of the proposed transmission line project. That list identified the following four Federally listed species: Canada lynx (*Lynx canadensis*), Ute ladies'-tresses (*Spiranthes diluvialis*), Utah valvate snail (*Valvata utahensis*), and Grizzly bear (*Ursus arctos*). The letter also identified the Yellow-billed cuckoo (*Coccyzus americanus*) and the Greater Sage-Grouse (*Centrocercus urophasianus*) as candidate species for listing, provided information on the status of the bald eagle (*Haliaeetus leucocephalus*), and indicated the potential of the transmission lines to affect migratory birds. However, in a subsequent telephone conversation between the NRC and you on April 15, 2010, you indicated that the list of endangered, threatened, proposed, and candidate species provided by the USFWS was for Bonneville County in general; you did not believe that these species are in the vicinity of, or potentially impacted by, the transmission line project; and consultation under Section 7 of the ESA would not be needed for these species for the project.

The Draft EIS describes the NRC staff's evaluation of the potential impact of the proposed EREF project on ecological resources. Based on this evaluation, which included consideration of the information provided by the USFWS, the NRC staff's preliminary conclusion is that the preconstruction, construction, operation, and decommissioning of the proposed project would not adversely affect any of the four Federally listed species. In the context of the National Environmental Policy Act of 1969, as amended (NEPA), under which the Draft EIS was prepared, the NRC staff's preliminary determination is that the impact on ecological resources from the preconstruction, construction, operation, and decommissioning of the proposed project would be small to moderate.

In accordance with our June 17, 2009, and February 18, 2010, letters, the NRC staff is forwarding the Draft EIS to you for your review and comment. We are requesting your comments on the Draft EIS and on our preliminary conclusions regarding listed species under USFWS purview and will address your comments in the Final EIS. Please provide any information or comments on the enclosed Draft EIS that you consider appropriate under the provisions of the NEPA, ESA, and Fish and Wildlife Coordination Act of 1934, as amended, during the comment period, which ends on Monday, September 13, 2010. Comments should be submitted either by mail to the Chief, Rules and Directives Branch, Division of Administrative Services, Office of Administration, Mailstop TWB-05-B01M, Washington, DC 20555-0001, or by e-mail to EagleRock.EIS@nrc.gov.

The NRC staff plans to hold a public meeting to discuss the contents of the Draft EIS on Thursday, August 12, 2010, at the Red Lion Hotel on the Falls Convention Center, 475 River Parkway, Idaho Falls, Idaho 83402. The meeting will convene at 7:30 p.m. and will continue until 10:00 p.m. The meeting will be transcribed and will include the following agenda items: (1) a brief presentation of NRC's roles and responsibilities and the licensing process, (2) a presentation summarizing the contents of the Draft EIS, and (3) an opportunity for interested government agencies, tribal governments, organizations, and individuals to provide comments on the Draft EIS. Additionally, the NRC staff will host informal discussions in an open house forum one hour before the start of the meeting, during which members of the public may meet and talk with NRC staff members. You and other USFWS staff are invited to attend.

If you have any questions or require additional information, please contact Mr. Stephen Lemont, Senior Project Manager, by phone at 301-415-5163, or by e-mail at Stephen.Lemont@nrc.gov.

Sincerely,

/RA/

Diana Diaz-Toro, Chief
Environmental Review Branch A
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

Enclosure:
Draft EIS

cc without enclosure: See next page

June 22, 2009

Mr. Cal Groen, Director
Idaho Fish and Game
600 South Walnut
Post Office Box 25
Boise, Idaho 83707

SUBJECT: REQUEST FOR INFORMATION REGARDING ENDANGERED SPECIES AND CRITICAL HABITATS FOR THE PROPOSED AREVA EAGLE ROCK ENRICHMENT FACILITY LOCATED IN BONNEVILLE COUNTY, IDAHO

Dear Mr. Groen:

On December 30, 2008, AREVA Enrichment Services (AES) submitted an environmental report (ER) to the U.S. Nuclear Regulatory Commission (NRC). The ER is one part of an application for a license to authorize construction, operation, and decommissioning of a proposed uranium enrichment facility. The NRC staff is in the initial stages of developing an Environmental Impact Statement (EIS) for the proposed facility to be located near Idaho Falls, Idaho in Bonneville County. The facility, if licensed, would use a gas centrifuge based technology to enrich the isotope uranium-235 in uranium hexafluoride up to 5 percent by weight. The EIS will document the impacts associated with the construction, operation, and decommissioning of the proposed facility.

NRC requests information on the following items within the action area for the proposed facility, if available:

- Endangered or threatened species, or other species of concern to the state of Idaho, that are known to be or likely to be at the proposed AREVA site, and nearest known locations based on the element occurrence database. Attached is a preliminary list of species compiled from Idaho Fish and Game (IDFG) county lists (plants) and the IDFG Snake River Basalts Ecological Section list (animals). Habitat on the site consists of sagebrush steppe, non-native grassland (primarily crested wheatgrass and cheatgrass), and irrigated crops.

- Nearest known lek sites (based on the element occurrence database), nesting habitat, brood-rearing habitat, and winter habitat for greater sage grouse, migratory status of the local population, the number of leks nears the site, and trends.

- Information on Sagebrush Reserves (location, size, species, management) or other sensitive or rare habitats in the project vicinity.

- Information on mule deer, pronghorn, and elk herds, including seasonal habitat (such as crucial winter habitat areas), local migration routes, and concerns such as population trends.

- Important migration routes for migratory birds.

- Maps or GIS shapefiles regarding species or habitats.

- Concerns of IDFG regarding potential impacts of the proposed project.

The proposed AES parcel is approximately 1,700 hectares (4,200 acres). AES states that the facility footprint encompasses 381 hectares (941 acres) of the site for which construction, operation, and decommissioning activities will occur. The proposed site is situated within Bonneville County, Idaho, on the north side of U.S. Highway 20, about 113 km (70 miles) west of the Idaho/Wyoming State line. The coordinates for the center of the action area are 43 degrees, 35 minutes, 7.37 seconds North and longitude 112 degrees, 25 minutes, 28.71 seconds West.

We have enclosed additional background information relating to ecological resources on the site, including a map showing the action area, as it appears in the AES ER.

We intend to use the EIS process to comply with Section 7 of the Endangered Species Act of 1973, as amended. After assessing information you provide, we will determine what additional actions are necessary to comply with the Section 7 consultation process. If you have any questions or comments, or need any additional information, please contact Gloria Kulesa of my staff at 301-415-5308.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

Enclosures:
1. Special Status Plants and Species
2. Ecology Field Survey Report
3. Fall 2008 Survey
4. Sage Grouse Survey Report

cc: Paul Kjellander,
ID Office of Energy Resources

Idaho Special Status Plants and Species of Greatest Conservation Need

Earth lichen (*Catapyrenium congestum*)
Gray willow (*Salix glauca*)
Green spleenwort (*Asplenium trichomanes-ramosum*)
Iodine bush (*Allenrolfea occidentalis*)
Meadow milkvetch (*Astragalus diversifolius*)
Payson's bladderpod (*Lesquerella paysonii*)
Payson's milkvetch (*Astragalus paysonii*)
Red glasswort (*Salicornia rubra*)
Slickspot peppergrass (*Lepidium papilliferum*)
Ute ladies'-tresses (*Spiranthes diluvialis*)
Western Sedge (*Carex occidentalis*)

Utah valvata snail (*Valvata utahensis*)

Northern leopard frog (*Rana pipiens*)

Ring-necked snake (*Diadophis punctatus*)

Black-crowned night-heron (*Nycticorax nycticorax*)
Blue grosbeak (*Passerina caerulea*)
Burrowing owl (*Athene cunicularia*)
California gull (*Larus californicus*)
Ferruginous hawk (*Buteo regalis*)
Franklin's gull (*Larus pipixcan*)
Juniper titmouse (*Baeolophus ridgwayi*)
Lesser goldfinch (*Carduelis psaltria*)
Merlin (*Falco columbarius*)
Northern pintail (*Anas acuta*)
Peregrine falcon (*Falco peregrinus*)
Pinyon jay (*Gymnorhinus cyanocephalus*)
Sharp-tailed grouse (*Tympanuchus phasianellus*)
Swainson's hawk (*Buteo swainsoni*)
Virginia's warbler (*Vermivora virginiae*)
White-faced ibis (*Plegadis chihi*)
Yellow-billed cuckoo (*Coccyzus americanus*)

Canada lynx (*Lynx canadensis*)
Gray wolf (*Canis lupus*)
Great Basin ground squirrel (*Spermophilus mollis*)
Grizzly bear (*Ursus arctos*)
Idaho pocket gopher (*Thomomys idahoensis*)
Little pocket mouse (*Perognathus longimembris*)
Merriam's shrew (*Sorex merriami*)
Pygmy rabbit (*Brachylagus idahoensis*)
Spotted bat (*Euderma maculatum*)
Townsend's big-eared bat (*Corynorhinus/Plecotus townsendii*)
Townsend's pocket gopher (*Thomomys townsendii*)
Wyoming ground squirrel (*Spermophilus elegans*)

Enclosure 1

IDAHO DEPARTMENT OF FISH AND GAME

600 S. Walnut/P.O. Box 25
Boise, Idaho 83707

C.L. "Butch" Otter/Governor
Cal Groen/Director

August 4, 2009

Ms. Andrea Kock,
Chief, Environmental Review Branch
Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: Request for information regarding endangered species and critical habitats for the proposed AREVA Eagle Rock Enrichment Facility located in Bonneville County, Idaho.

Dear Ms. Kock:

Idaho Department of Fish and Game (IDFG) has reviewed the above referenced request for information from the Nuclear Regulatory Commission (NRC) regarding the potential development of a uranium enrichment facility in Bonneville County, Idaho. Our interest in the project is in protecting fisheries, wildlife, plants and their habitats. To date, IDFG has been involved in this proposal as follows; (1) Our Regional Supervisor and environmental Staff Biologist from the Upper Snake Region were briefed on the potential for this project at our Idaho Falls Office in 2008 by AREVA staff while the project was still being considered, and (2) staff from the Idaho Falls office attended the Nuclear Regulatory Commission's public open house in Idaho Falls on 4 June 2009.

Resident species of fish and wildlife are the property of all citizens within the state and decisions affecting fish and wildlife therefore are the concern of all Idahoans. The Idaho Department of Fish and Game and the Idaho Fish and Game Commission, are charged with the statutory responsibility to preserve, protect, perpetuate, and manage all fish and wildlife in Idaho (Idaho Code § 36-103(a)).

Your letter contains seven information requests. We responded to those we were able to and we offer additional summary comments regarding the AREVA project.

We note that IDFG has no specific project proposal upon which to comment. The summary letter sent to us has no specifics beyond a "parcel" size, a "footprint" size, and the location of the center of the facility. This is not sufficient for us to evaluate the effects the project may have on fish, wildlife, and their habitat. You refer in your letter to an application for a license submitted to the NRC but you have not provided this application for our consideration. For IDFG to consider more general questions, such as the request for our concerns about potential impacts of the project, we will need a specific project description that depicts not only the size and location of the project but enough specifics for us to gauge potential wildlife disturbances and impacts. The proposal description should include, but not necessarily be limited to:

- Location including all boundaries, fences, developed structures, access ways such as roads and trials,
- Size of developments including buildings, parking lots, power lines, energy production facilities, etc,
- Anticipated and licensed/permitted levels of discharges from the permitted activity including light, sound, odor, and water discharges,

Keeping Idaho's Wildlife Heritage

- Associated infrastructure such as trucking centers off-site, housing for workers (both permanent and temporary), power lines to be constructed, piping for materials, and any other construction associated with the project,
- Current land use patterns and conditions of all lands to be built upon or fenced from public and wildlife access,
- Public lands (state, federal, county, local, municipal) to be fenced or restricted in any way from public access or from fish/wildlife use. Included should be proposals to mitigate for these lands lost to the public or fish and wildlife, and
- Entire project life, license life, decommissioning and clean-up schedule and penalties for noncompliance.

We offer the following in response to your seven requests. The information provided in 1) and 2) was determined using the coordinates of the project center provided in your letter and a buffer with a radius of 8 km around that point intersected with data from the Idaho Fish and Wildlife Information System which includes data on sage-grouse, at-risk animals, and at-risk plants (Accessed July 28, 2009).

1) *Endangered or threatened species and species or other species of conern :*
The IDFG Conservation Data Center contains two individual observations of Ferruginous Hawks (*Buteo regalis*) and one nest observation for ferruginous hawks. Hibernacula for Townsend's big-eared bats (*Corynohinus townsendii*) also occur in the area. Immediately west of the west-edge of the 8 km buffer is a group of lava tube caves that are important bat roosts and hibernacula. There are no known occurrences of at-risk plant species in the immediate vicinity of the project site. The nearest known occurrences of at-risk plants is 40 km NW of the site.

2) *Nearest known sage-grouse(Centrocercus urophasianus) lek sites:*
One sage-grouse lek was identified within the 8 km buffer of the center of the project. Additional leks were identified near the site but outside the buffer area. Without knowing the extent of developments associated with this project it is not possible to gauge what sage grouse habitats the project may affect. However, both "Key Sage Grouse Habitats" and "Perennial Grasslands" habitats are found along Highway 20 and fairly near the project that might be affected by the project. These habitats are described and graphed (Fig. 4-11 page 4-49) in the Conservation Plan for the Greater Sage Grouse in Idaho which is available as follows:
http://fishandgame.idaho.gov/cms/hunt/grouse/conserve_plan/

3) *Sagebrush Reserves:*
The Idaho National Engineering and Environmental Laboratory Sagebrush Steppe Ecosystem Reserve was established by proclamation in 1999. The Proclamation was signed by Secretary of Energy Bill Richardson, (for) the Regional Director, Region 1 U.S. Fish and Wildlife Service by Richard Munoz, (for) the State Director of Idaho, Bureau of Land Management by Elena Daly, (for) the Interim Director, Idaho Fish and Game by Don Wright. The Reserve itself lies both north and south of Highway 33, but does not reach as far south as Highway 20. The management plan may be found online as follows:
http://ar.inel.gov/owa/getimage_2?F_PAGE=1&F_DOC=ID-074-02-067&F_REV=00

4. *Information on mule deer, pronghorn, and elk herds and habitats:*
   IDFG manages mule deer, pronghorn antelope, and elk by analysis units that are made up of Game Management Units (GMU). We do not have information on the property you are specifically developing, but your project would potentially be in GMU 63. We have summarized data regarding these three species in Appendix A. Aerial survey information on pronghorn in the area has been collected by consultants at Idaho National Laboratory. IDFG does not consider the location of this project to be winter range or critical range for mule deer or elk. Pronghorn do frequently use lands surrounding the proposed site throughout all seasons.

5. *Important migration routes for migratory birds:*
   IDFG is unaware of any known migratory flight corridors for birds that fall near the stated center of the project. However, upon disclosure of other project developments we may reconsider this question.

6. *Maps or GIS shapefiles regarding species or habitats:*
   IDFG has hundreds of GIS layers that we work with throughout each year. As stated, this request is too vague to respond adequately.

7. *Concerns of IDFG:*
   We appreciate being asked to comment regarding this question. However, without a complete project description as discussed above, we do not have enough information to answer this question. Upon receipt of a full disclosure of the proposal IDFG staff will begin to consider and assess impacts to fish wildlife and habitats of whatever is disclosed. This is the most important question you asked us; we hope to receive a full project description so we may fulfill this request.

We look forward to further information about this project to better accommodate your information request. If you have any questions about our technical information, please contact Gary Vecellio, Environmental Staff Biologist in our Upper Snake Regional Office, (208)525-7290.

Sincerely,

Sharon W. Kiefer

Sharon W. Kiefer
Assistant Director-Policy

SWK/kc

Enclosures

Cc: S. Schmidt, G. Vecellio, L. Hebdon, IDFG
P. Kjellander, Idaho Office of Energy Resources

Appendix A. Mule deer, pronghorn, and elk herd status.
IDFG does not conduct aerial surveys to estimate mule deer, elk or pronghorn herd sizes in Unit 63. Without aerial survey data herd sizes are tracked using harvest as an index of abundance. Hunting opportunities (season length and timing) for these species have remained stable over the last five years. For mule deer in unit 63 hunter numbers and harvest during the general any weapon season have remained fairly stable (Figure 1). There are no data to suggest that the mule deer population is declining. Elk hunter numbers and harvest in Unit 63 have increased slightly over the previous five years (Figure 2). There are no data to suggest the elk population is declining, and it may be slightly increasing. Hunter success (harvest per hunter) has increased in the Unit 63 controlled, any-weapon pronghorn hunts (Figure 3). Hunter numbers and harvest during the unit 63 general archery season pronghorn hunt have increased over time (Figure 4). There are no data to suggest that pronghorn populations are declining, and they may be increasing.

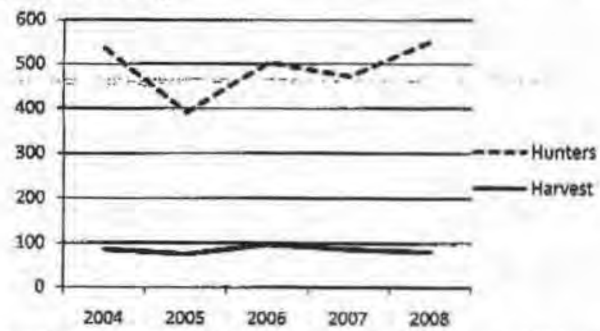


Figure 1. Unit 63 deer harvest and hunter trends from 2004 through 2008. Harvest includes whitetailed deer which averaged 31% of the harvest.

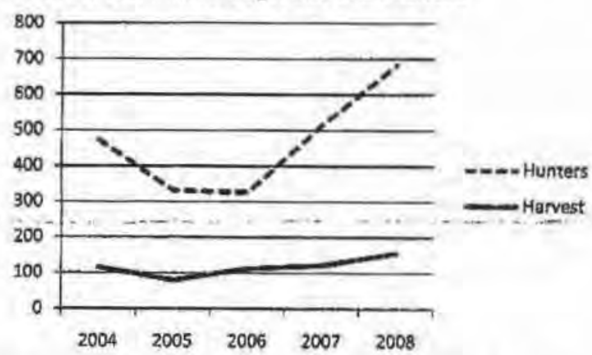


Figure 2. Unit 63 elk harvest and hunter numbers from 2004 through 2008.

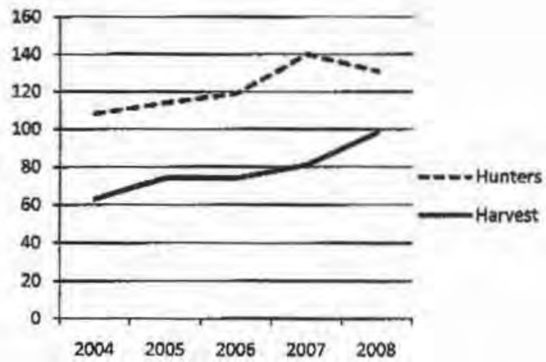


Figure 3. Unit 63 pronghorn harvest and hunter numbers for controlled hunts from 2004 through 2008.

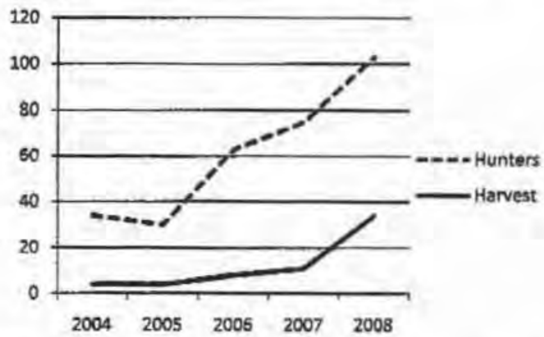
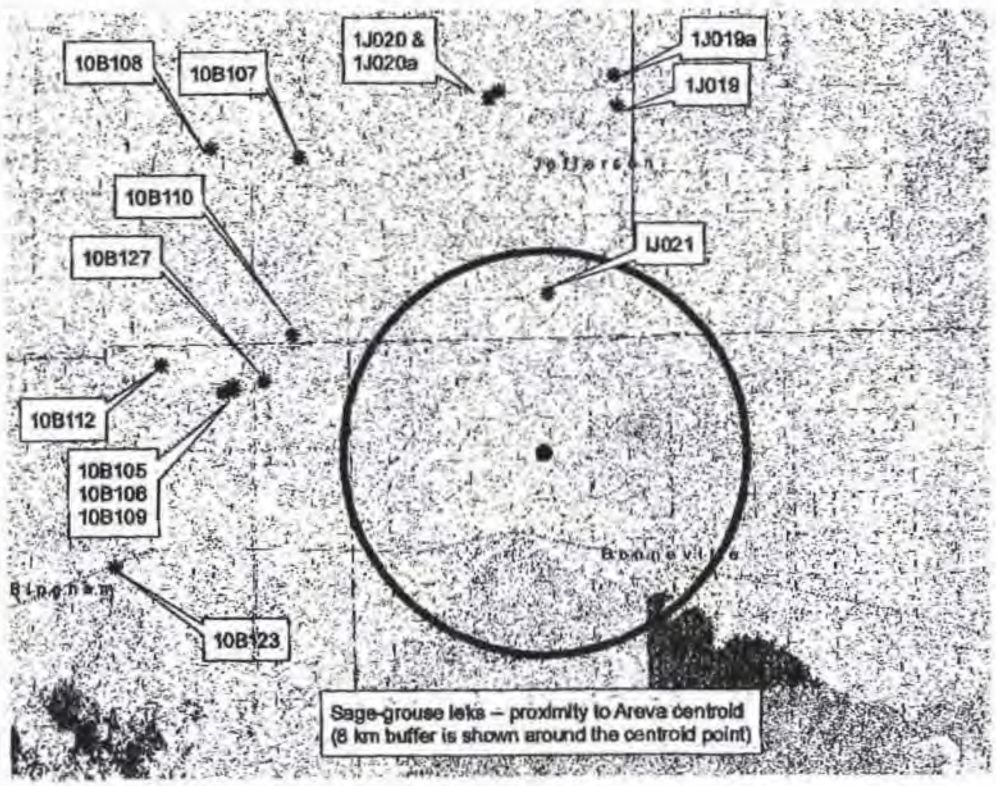


Figure 4. Unit 63 pronghorn harvest and hunter numbers for general season archery hunts from 2004 through 2008.



Location of known sage-grouse leks and 8km radius buffer associated with the center coordinates provided for the proposed Areva Uranium enrichment facility. Prepared for the Nuclear Regulatory Commission data request by Idaho Department of Fish and Game, 3 August 2009

TOTAL P.06

Lemont, Stephen

From:	Lemont, Stephen
Sent:	Wednesday, February 10, 2010 8:56 AM
To:	'sharon.kiefer@idfg.idaho.gov'
Cc:	Biwer, Bruce; Van Lonkhuyzen, Robert A.
Subject:	Continuing NRC Coordination with IDFG Regarding Ecological Issues for AREVA Eagle Rock Enrichment Facility Environmental Impact Statement
Attachments:	ID_Fish_Game_response 080409.pdf; ID_Fish_Game_request 012209.pdf; AES-O-NRC-10-00263 EREF Supplemental Info Trans Line_with_figure.pdf

Sharon W. Kiefer
Assistant Director-Policy
Idaho Department of Fish and Game
600 South Walnut
P.O. Box 25
Boise, Idaho 83707

Dear Ms. Kiefer:

I am Steve Lemont, the U.S. Nuclear Regulatory Commission's (NRC's) new Project Manager for the Environmental Impact Statement (EIS) that NRC is preparing in support of its licensing action for the proposed AREVA Enrichment Services LLC (AREVA) Eagle Rock Enrichment Facility (EREF) located in Bonneville County, Idaho. Thank you for your August 4, 2009 letter in response to NRC's letter of June 22, 2009, in which the NRC requested information regarding threatened or endangered species and critical habitats at the proposed EREF project site. In your letter, you responded to the general questions we posed, but stated that the Idaho Fish and Game (IDFG) staff would need more specific project information in order to consider and assess impacts of the proposed facility to fish, wildlife, and habitats. Copies of the above referenced IDFG and NRC letters are attached for your reference.

We apologize for not getting back to you sooner regarding the request made in your letter, but there have been a number of changes here and also on the EREF project as discussed below. The purposes of this email are to follow up with IDFG regarding the proposed EREF project, to: (1) provide you with the information you requested in your August 4, 2009 letter; (2) inform you of a change to the EREF project scope involving the addition of an electrical transmission line to power the facility; and (3) request additional information from IDFG for the EREF project site, as well as information for the transmission line route, similar to that requested previously for the EREF site.

NRC requests that you provide IDFG's response to NRC's information request below within 30 days of this email if possible.

<u>Information Requested in August 4, 2009 Letter from IDFG</u>
In response to your August 4, 2009 letter, the information you requested can be found in the NRC website for the EREF project, at http://www.nrc.gov/materials/fuel-cycle-fac/arevanc.html. Specifically, the Environmental Report (ER) that AREVA submitted to NRC for the EREF project (Environmental Report, Rev. 1, April 2009) contains information on the entire uranium enrichment facility project (see at http://www.nrc.gov/materials/fuel-cycle-fac/eagle-rock.html), with the information you requested contained in the following sections of the ER:

- Section 2.1.2 provides the location and a detailed description of the proposed site and facility.
- Section 3.1 describes the land use of the site.
- Section 3.5 describes the ecological resources of the site.
- Section 4.4 contains a description of the retention and detention basins.
- Section 4.5 describes the potential impacts to ecological resources.
- Sage Grouse Survey Report (Environmental Report, Field Study, Sage Grouse Survey Report).

1

If you have any problems accessing the above information or need additional information or clarifications, please let me know.

Electrical Transmission Line to Power the EREF
Electrical service beyond that currently existing near the proposed EREF would be required to operate the EREF. AREVA submitted supplemental information to NRC dated January 29, 2010, which shows the location of the proposed 161-kilovolt transmission line and associated structures (e.g., substations and substation upgrades), and provides information regarding its construction and operation and environmental impacts (including ecological resources). That supplemental information is also attached to this email. The transmission line is part of the proposed EREF project, and the environmental impacts of the construction and operation of this line will be addressed in the EREF EIS.

The new transmission line and associated structures would be located entirely on private property within Bonneville County. Rocky Mountain Power (RMP), a division of PacifiCorp, will be the builder, owner, and operator. The line would originate from the existing RMP Bonneville Substation and extend in a general westward direction to the new point of service, the Twin Buttes Substation on the proposed EREF site. Beginning at the Bonneville Substation, the proposed transmission line route is west along the county road (West 65 North Street) to the existing RMP Kettle Substation, a distance of approximately 14.5 kilometers (9 miles), continuing west to the eastern portion of the EREF site, a distance of approximately 1.2 kilometer (0.75 mile), then north within the EREF site to its northern end, then west and south to the new RMP Twin Buttes Substation, for a distance of approximately 6.4 kilometers (4 miles). The area being affected by the transmission line is approximately 84 hectares (208 acres).

Request for Additional Information
In accordance with our letter dated June 22, 2009, NRC requests additional information from IDFG for the EREF site, on the items listed below, beyond that provided with your August 4, 2009 letter. In addition, NRC requests information on the items listed below within the action area of the proposed transmission line and associated structures as well.

- Endangered or threatened species, or other species of concern to the State of Idaho, that are known to be or likely to be present, and nearest known locations based on the element occurrence database. Habitat in these areas consists of sagebrush steppe, post-fire plantings (crested wheatgrass and other grasses), and irrigated crops.

- Nearest known lek sites (based on the element occurrence database), nesting habitat, brood-rearing habitat, and winter habitat for greater sage grouse, migratory status of the local population, the number of leks near the site, and trends.

- Information on sensitive or rare habitats in the project vicinity.

- Information on mule deer, pronghorn, and elk herds, including seasonal habitat (such as crucial winter habitat areas), and local migration routes.

- Important migration routes for birds.

- Maps or GIS shapefiles regarding species or habitats.

- Concerns of IDFG regarding potential impacts of the proposed project.

Please contact me if you have any questions or need additional information. My contact information is provided below. The NRC appreciates your assistance and cooperation in this matter.

Thank you.

Sincerely,
Steve Lemont

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

Lemont, Stephen

From: Hebdon,Lance [lance.hebdon@idfg.idaho.gov]
Sent: Wednesday, April 14, 2010 3:07 PM
To: Lemont, Stephen; Kiefer,Sharon
Cc: Vecellio,Gary; Kemner,Don; Biwer, Bruce
Subject: RE: Sage-grouse Work by Wildlife Conservation Society

Steve-

During the conference call reference was made to some sage-grouse work being conducted by the Wildlife Conservation Society (WCS) in the vicinity of the project. We made a commitment to follow-up with and determine if the information being collected would be useful for inclusion in our comments on the AREVA project. The information being collected by the WCS is still preliminary and did not add information that would change our comments. Therefore you will not see any reference to their data. If you have questions feel free to contact me.

Lance

Lance Hebdon
Inter-Governmental Policy Coordinator
Director's Office
Idaho Department of Fish and Game
208-287-2711
lance.hebdon@idfg.idaho.gov

From: Lemont, Stephen [mailto:Stephen.Lemont@nrc.gov]
Sent: Monday, March 15, 2010 2:41 PM
To: Kiefer,Sharon
Cc: Hebdon,Lance; Vecellio,Gary; Kemner,Don; Hemker,Tom; Biwer, Bruce
Subject: RE: Teleconference to Discuss Greater Sage-grouse Issues Related to the AREVA Eagle Rock Uranium Enrichment Facility Project, Bonneville County, Idaho

How about 9:00 am Mountain Time? I will provide the bridge line after you confirm. How many lines will you need?

From: Kiefer,Sharon [sharon.kiefer@idfg.idaho.gov]
Sent: Monday, March 15, 2010 11:42 AM
To: Lemont, Stephen
Cc: Hebdon,Lance; Vecellio,Gary; Kemner,Don; Hemker,Tom
Subject: RE: Teleconference to Discuss Greater Sage-grouse Issues Related to the AREVA Eagle Rock Uranium Enrichment Facility Project, Bonneville County, Idaho

Mr. Lamont – would Wednesday morning, (3/17) preferably before 10 am work? If you will provide me the bridge line, I will make sure that our headquarters and Upper Snake regional staff have the number to call in.

From: Lemont, Stephen [mailto:Stephen.Lemont@nrc.gov]
Sent: Friday, March 12, 2010 10:42 AM
To: Kiefer,Sharon
Cc: Hebdon,Lance; Biwer, Bruce M.; Van Lonkhuyzen, Robert A.
Subject: Teleconference to Discuss Greater Sage-grouse Issues Related to the AREVA Eagle Rock Uranium Enrichment Facility Project, Bonneville County, Idaho

Dear Ms. Kiefer:

The purpose of this email is to request a teleconference with your agency to discuss questions the U.S. Nuclear Regulatory Commission (NRC) and its contractor, Argonne National Laboratory (Argonne), have regarding the recent U.S. Fish and Wildlife Service Greater Sage-grouse decision as it relates to the proposed AREVA Eagle Rock uranium enrichment facility project and associated proposed electrical transmission line in Bonneville County. My last contact with you was in an email dated February 10, 2010, regarding NRC's continuing coordination with the Idaho Department of Fish and Game (IDFG) on ecological issues for the Environmental Impact Statement (EIS) that the NRC is preparing in support of its licensing action for the AREVA Eagle Rock project. We understand that Mr. Lance Hebdon of IDFG is working on responding to the information requests in that email, and we very much appreciate that effort. With regard to the sage grouse, this includes information such as the local population in the vicinity of the proposed AREVA facility and transmission line and what areas that population uses for seasonal habitat.

Regarding the teleconference, we would like to ask about IDFG's thoughts and concerns for Eastern Idaho regarding the recent sage grouse decision, and about any suggestions, requirements and/or management guidelines you may have regarding the impacts, if any, of the proposed AREVA Eagle Rock project and transmission line on the sage grouse.

Please let me know your availability (dates and times) for a conference call next week to discuss the above matters. I will provide a bridge line for the call. In addition to myself, call participants on my end will be Bruce Biwer, the Argonne Project Manager for the Eagle Rock EIS, and Bob Van Lonkhuyzen, Argonne's ecological lead.

I look forward to hearing back from you soon.

Thanks,
Steve Lemont

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

Lemont, Stephen

From: Kiefer,Sharon [sharon.kiefer@idfg.idaho.gov]
Sent: Wednesday, April 14, 2010 6:38 PM
To: Lemont, Stephen; bmbiwer@anl.gov
Cc: Hebdon,Lance; Vecellio,Gary
Subject: IDFG Response to NRC AREVA Supplemental Request
Attachments: E-mail from NRC to Sharon Kiefer regarding additional AREVA project information 2-10-2010.txt; Response to NRC AREVA transmission supplemental request Mar 2010.docx

Steve, I apologize for a bit of delay in our information response to your request. Please contact Gary, Lance or I if there are any questions or clarifications needed. We appreciated the telephone discussion regarding sage-grouse and other issues.

Sharon W. Kiefer
Idaho Department of Fish and Game
Assistant Director-Policy
sharon.kiefer@idfg.idaho.gov
please note new email address!!
208.334.3771
P.O. Box 25
Boise, ID 83707

The Idaho Department of Fish and Game (Department) is providing this information in response to a February 10, 2010 request by Stephen Lamont of the Nuclear Regulatory Commission (NRC) to Sharon Kiefer. These items are provided in supplement to the responses provided by the Department on August 4, 2009. This response incorporates potential issues related to a power line to service the infrastructure, which was not identified in 2009.

<u>Sensitive and rare habitats or threatened species (power line only, site information previously provided)</u>

Department staff considers the areas both north and south of your proposed power line to be important habitat for lek development, rearing, and migration of sage grouse. It is likely that a new above-ground transmission line will cause direct mortality of migrating sage grouse due to grouse striking the lines during flight. The locations of sensitive species from the Idaho Natural Heritage Database and occupied sage-grouse habitats in the vicinity of the proposed right-of-way for the power line are depicted in Figure 1. Department staff is unaware of any federally-listed species within the bounds of the project.

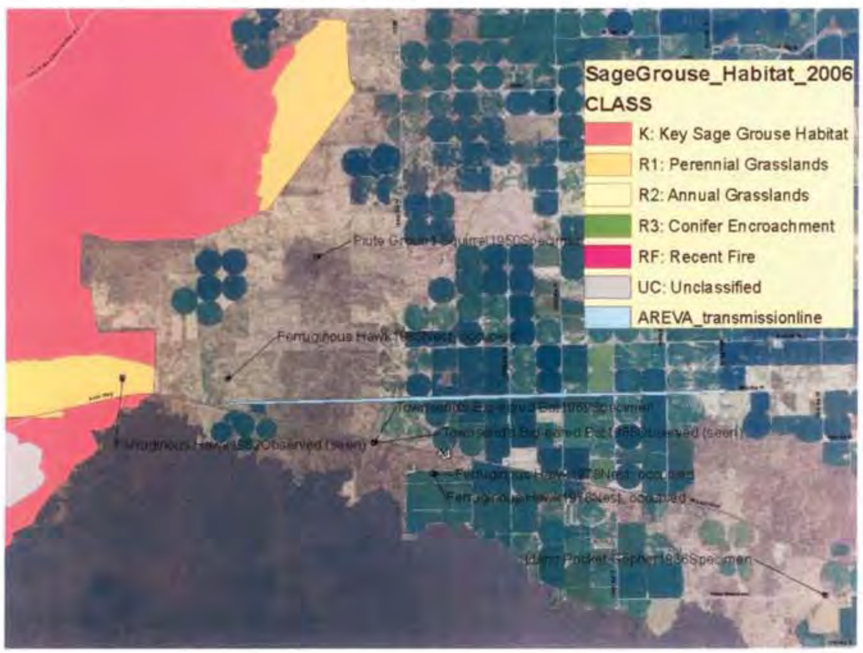


Figure 1. Location of sensitive species records from the IDFG Natural Heritage database and Sage-grouse habitat in proximity to the proposed AREVA transmission line.

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Important migration routes for birds (power line only)

The addition of a power line, or an array of suspended lines will likely cause direct mortality of sage- and sharp-tailed grouse. As grouse fly across Highway 20 and over traffic during daily or seasonal migrations, we anticipate direct mortality of these birds due to collisions with newly-erected power lines. We request consideration of burying the new sections of line – this would be the most direct and effective way to avoid potential adverse effects to sage-grouse (and other flying and migrating wildlife). Power line burial has proven feasible to protect migrating sage grouse in Clark County near Small, Idaho as negotiated and constructed in 2007. This recommendation is consistent with the Idaho Sage-Grouse Conservation Plan which recommends avoiding construction of new power lines in grouse habitat or burying the line (Idaho Sage-Grouse Advisory Committee 2006) and is consistent with Department scoping comments for the Mountain States Transmission Intertie Project (available on request). If NRC and the applicant deem that it is not possible to bury the line, the Department requests that the licensee submit a proposal to the Department and USFWS describing:

1) How the line will be marked with high-visibility deflectors to reduce collisions by birds and bats,
2) How the licensee will survey the new line for the first 5 years to detect and record any sage- and sharp-tailed grouse mortality, and
3) How the licensee will mitigate for the direct loss of birds due to power line construction.

Concerns of the Department regarding potential wildlife effects of the proposed project

The Department has considered both the uranium enrichment plant and the (single) proposed power line identified in the latest version of the application. If constructed as proposed there will be various negative effects to wildlife and their habitats, as well as potential losses of public recreation benefits and use of some public lands. The Department offers the following as our assessment of likely impacts due to the project, and we request in order of preference that NRC require in the license that:

-The licensee to take measures to avoid and reduce wildlife and wildlife-related recreation impacts and subsequently,

-The licensee be required to fully mitigate for unavoidable wildlife, habitat, and wildlife-related recreational impacts due to project construction and operation.

We believe consultation with the Department and other natural resource managers would ensure implementation of effective measures to avoid, reduce, and mitigate adverse wildlife effects and ask the NRC to support such an approach.

Sage-grouse and sharp-tailed grouse

One of the documents provided was a sage-grouse survey report (MWH 2008). The stated goal of the effort was to "determine if greater sage grouse leks were in the vicinity of the site." The survey was conducted during the week of May 5. The timing of this survey is so late that it is unlikely to have detected any leks that may have been present on the property. Additionally no efforts were made to identify other potential seasonal use (nesting or brood rearing) of the property by sage-grouse. We recommend that the consultants confer with Department biologists and adopt our techniques for lek searches and monitoring. To be useful, their grouse surveys should be repeated using more effective methods.

It is likely that the proposed project will directly impact year-round sage-grouse use through fence collision mortality and habitat loss associated with power line infrastructure (previously noted) and a fenced perimeter. Additionally, it is also likely that the proposed project will indirectly affect the adjacent available sage grouse habitat due to increased road access and human use, and increased noise disturbance.

Sharp-tailed grouse are known to exist in the area; therefore, it is likely the proposed project will have impacts to sharp-tailed grouse and sharp-tailed grouse habitat similar to that of sage grouse.

The proposed power line to the Bonneville substation will likely negatively impact sage and sharp-tailed grouse populations in the area by providing additional raptor and corvid (e.g., crows and ravens) perch sites.

Big game

The Department manages the following species classified as big game species, which may be impacted negatively by the project: Mule Deer, Elk, Moose, and Pronghorn Antelope. All of these species will be affected by losses of open (mainly private) range upon which to live and forage and the forage gleaned by open range or agricultural products produced as a function of the property's original uses. Any high fence or security perimeter fence will presumably exclude these species from access to native ranges or previously accessible agricultural habitats. However, because the actual lay-out of any perimeter fence is withheld, we are uncertain of the extent of wildlife/public exclusion through fencing or actual development. Increased noise and human disturbance will cause these species to avoid the site of the enrichment plant to an unknown degree or distance. We cannot determine at this time whether loss of this area for use by big game will cause animals to just shift to new range or actually cause other change to the herd (such as productivity, etc.).

Public Lands

The Department remains very concerned about the loss of public lands to wildlife and to wildlife-related recreation access due to the project. The Bureau of Land Management (BLM) owns and manages a parcel of land entirely within the project boundary. We are unclear about the ability of wildlife or humans to access this public land during project operation. If public land resides within a fenced area or an area of 'high security' and is inaccessible to big game or humans we would urge NRC to consider this land as permanently removed from public/wildlife use. We request that the licensee negotiate with BLM to replace similar acreage to be managed by BLM for multiple uses including wildlife habitat and human recreation. We urge NRC to necessitate this using an iterative process described below.

Similarly, the Department has concerns that human access to other surrounding BLM property for recreational use will be curtailed due to high security needs at this facility. Perhaps large wildlife will also have less access, or will be less willing to use public lands adjacent to the project due to project security or human activity. If wildlife avoid public lands surrounding the project due to noise, lights, roads, or human presence due to the facility, we urge NRC to require that the licensee study and disclose these effects, and fully mitigate for lands lost to wildlife due to project effects using the iterative process described below.

Cumulative effects of the project.

The Department has concerns that activities and developments anticipated by AREVA for operations at this site have not yet been identified. Original plans for this project were given to the public, and public support sought, when the project was depicted at a smaller scale than is currently requested. At a meeting on 18 June 2008 at IDFG offices in Idaho Falls, Department staff were told by AREVA that (1) only 30 megawatts (MW) of power would be necessary to operate this plant and (2) the water use would be equal to operation of 1 center pivot during growing season. We now see that (1) 78MW of power are required as is (2) "a dual redundant electrical supply utilizing separate feeders *(not one but two lines)* is required" (Eagle Rock Enrichment Facility Appendix H Environmental Report, Paragraph 1). As such, we find that AREVA continues to modify the project and to add project components that will cause impacts to fish, wildlife, or habitats. We understand that currently, only one power line is requested for permitting and licensing (from the Bonneville Substation to the Enrichment Plant), even though the Environmental Report describes a need for two power lines for redundancy. The Department remains concerned that post-licensing, a future action of AREVA will be to request another power line. We remain concerned that the cumulative effects of all of these incremental actions will combine to further negatively affect wildlife, habitats, and recreational human use to a degree not evaluated by requests for individual actions alone in the pre-licensing phase. The second powerline, if coming from the west, might have much higher impact to sage-grouse than the line identified to date.

We advise NRC to require complete identification of all anticipated activities (all power lines, new water rights, increased roads and traffic, lighting of the plant and surrounding desert, etc) so that the Department may assess the cumulative impacts and so that NRC may necessitate adequate protections and mitigations. We also recommend NRC include future actions be covered in the "Mitigated Protections" and mitigations license language suggested below.

Negotiated protections and mitigations

We recommend and ask that NRC adopt an approach in crafting this license similar to the iterative approach of Federal Energy Regulatory Commission (FERC) when licensing new hydroelectric facilities to require the licensee to collaborate with natural resources agencies to reach agreements to minimize and mitigate adverse effects to public trust resources as a condition of the license.

To advance successful negotiations of a package of adequate natural resource protections and commensurate mitigations, we ask NRC to devise a collaborative team to work with the licensee to include the Department. We offer that the Idaho Office of Species Conservation, the USFWS, and BLM would also be appropriate agency participants.

Citation

Idaho Sage-grouse Advisory Committee. 2006. Conservation Plan for the Greater Sage-grouse in Idaho. http://fishandgame.idaho.gov/cms/hunt/grouse/conserve_plan/

Lemont, Stephen

From:	Lemont, Stephen
Sent:	Tuesday, June 08, 2010 2:57 PM
To:	'Kiefer,Sharon'
Cc:	lance.hebdon@idfg.idaho.gov; 'gary.vecellio@idfg.idaho.gov'; Kemner,Don; 'tom.hemker@idfg.idaho.gov'; KAY Jim (AREVA NP INC); Biwer, Bruce; 'Van Lonkhuyzen, Robert A.'
Subject:	Additional Sage Grouse Information for AREVA Eagle Rock Project 060810

Sharon,

After I shared the Idaho Department of Fish and Game's April 14, 2010, comments on the subject project with AREVA, AREVA commissioned North Wind, Inc. to conduct a supplementary sage grouse survey for the Eagle Rock site and transmission line right-of-way. You can access the report for that study, dated May 13, 2010, via the following download link: https://webapps.anl.gov/filetransfer/downloader/940198422265150/. (NOTE: This download link is good only for 30 days from yesterday.) Also included in the download link are the reports of four other ecological surveys that are referenced in the North Wind report, some of which you may not have seen previously.

Please contact me if you have any questions or need additional information.

Regards,
Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

From:	Lemont, Stephen
To:	Hebdon,Lance
Cc:	Kiefer,Sharon; Biwer, Bruce M.; Van Lonkhuyzen, Robert A.
Subject:	RE: Eagle Rock Enrichment Facility
Date:	Wednesday, September 08, 2010 10:04:31 AM
Attachments:	Additional Sage Grouse Information for AREVA Eagle Rock Project 060810.msg

Hi, Lance. Environmental Report (ER), Rev. 2 (AES, 2010) is a voluminous document that includes numerous appendices. In NRC's electronic document filing system, known as the Agencywide Documents Access and Management System (or ADAMS), this ER document is broken down into numerous parts. Publicly available portions of ER Rev. 2 are accessible electronically from NRC's public website for the AREVA Eagle Rock project, under License Application, at http://www.nrc.gov/materials/fuel-cycle-fac/eagle-rock.html. When you get to that web page, you will see a tabular listing of all the various parts of Rev. 2 of the license application, beginning with the parts of the Safety Analysis Report, Rev. 2. Scroll down to see the parts of Environmental Report, Rev.2; and web links to these are provided (i.e., click on the ADAMS Accession # (ML#) for each)..

I would like to point out that ER Rev. 2 is merely the original ER into which AREVA incorporated all the supplementary information it had provided to the NRC through approximately March/April 2010. I believe we already provided you with, or otherwise directed you to, all of the documentation relevant to ecology, but you are certainly free to look through what we have in the website. The supplementary sage grouse survey report that we directed you to in the attached email was provided by AREVA subsequent to, and therefore is not included in, ER Rev.2.

If you need additional assistance, please let me know.

Thanks,
Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

From: Hebdon,Lance [mailto:lance.hebdon@idfg.idaho.gov]
Sent: Wednesday, September 08, 2010 9:52 AM
To: Lemont, Stephen
Cc: Kiefer,Sharon
Subject: Eagle Rock Enrichment Facility

Stephen-
In reviewing the DEIS for the Eagle Rock Enrichment Facility I saw a reference to a

document cited as (AES, 2010) AREVA Enrichment Services, LLC. "Eagle Rock Enrichment Facility
4 Environmental Report, Rev. 2." Bethesda, Maryland. April.

Would you be able to send me an electronic copy of the report or give me a link where I can download it?

Thank you for your assistance,
Lance

Lance Hebdon
Inter-Governmental Policy Coordinator
Idaho Department of Fish and Game
208-287-2711
lance.hebdon@idfg.idaho.gov

The attachment referred to in this document is included in Section B.1 of Appendix B, directly preceding this document.

B.2 National Historic Preservation Act Consultation

June 17, 2009

Ms. Janet Gallimore, Executive Director
Idaho State Historical Society
2205 Old Penitentiary Road
Boise, Idaho 83712

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT SECTION 106 PROCESS FOR AREVA EAGLE ROCK ENRICHMENT FACILITY

Dear Ms. Gallimore:

On December 30, 2008, AREVA Enrichment Services (AES) submitted an environmental report (ER) to the U.S. Nuclear Regulatory Commission (NRC). The ER is one part of an application for a license to authorize construction, operation, and decommissioning of a proposed uranium enrichment facility. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) for the proposed facility to be located near Idaho Falls, Idaho in Bonneville County. The facility, if licensed, would use a gas centrifuge enrichment technology to enrich the isotope uranium-235 in uranium hexafluoride up to 5 percent by weight. The EIS that NRC is preparing will document the environmental impacts associated with the construction, operation, and decommissioning of the proposed facility.

The proposed AES parcel is approximately 1,700 hectares (4,200 acres). In November 2008, AES commissioned an archeological survey of the facility's footprint which involves approximately 381 hectares (941 acres) of the total parcel. The report is attached along with a map showing the area of potential effect, as it appears in the AES ER. As a result of the surveys, AES recorded a number of isolated finds and concluded that one find (MW004) was potentially eligible for inclusion in the National Register of Historic Places. AES proposes minimizing any adverse impacts through a mitigation plan for this find.

In the ER, AES indicated their submission of the archeological surveys to your office. As required by 36 CFR 800.4(a), the NRC is requesting the views of the State Historic Preservation Officer on any further actions necessary to identify historic properties that may be affected by the construction, operation, and decommissioning of the proposed facility, including whether find MW004 should be included in the National Register of Historic Places.

We intend to use the EIS process to comply with Section 106 of the National Historic Preservation Act of 1966, as described in 36 CFR Part 800.8. After assessing information you provide, we will determine any additional actions that are necessary to comply with the Section 106 consultation process. If you have any questions or comments, or need any additional information, please contact Gloria Kulesa of my staff on 301-415-5308.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

Enclosure: Volume Report

September 16, 2009

Ms. Susan Pengilly
Deputy State Historic Preservation Officer
Idaho State Historical Society
2205 Old Penitentiary Road
Boise, Idaho 83712

SUBJECT: NOTIFICATION OF AN EXEMPTION REQUEST FROM U.S. NUCLEAR REGULATORY COMMISSION'S (NRC) REGULATED ACTIONS SUBMITTED BY AREVA ENRICHMENT SERVICES (AES)

Dear Ms. Pengilly:

On June 11, 2009, my staff sent a letter to the office of Idaho State Historical Society requesting input on identifying any cultural or historic properties that may be affected by the construction, operation and decommissioning of the proposed facility. We look forward to receiving your written feedback soon and will incorporate the details of your response within our environmental impact statement (EIS).

In addition, we want to communicate pertinent and new information to your office. On June 17, 2009, AREVA Enrichment Services (AES) requested an exemption that would allow them to commence certain activities prior to NRC's completion of its environmental review under Title 10 of the Code of Federal Regulations, Part 51 (10 CFR 51) and the Nuclear Regulatory Commission's issuance of a Materials License for the Eagle Rock Enrichment Facility under 10 CFR 70.

NRC's approval of the exemption would permit AES to undertake the following list of actions. These actions do not affect radiological health and safety or common defense and security. As such, NRC has determined that these activities do not require a license.

- Clearing, Grading and Erosion Control
- Excavation, Including Rock Blasting and Removal
- Construction of Storm Water Detention Pond, Highway Access and Site Roads
- Installation of Utilities, Storage Tanks and Fences
- Installation of Parking Areas, Construction Buildings, Offices, Warehouses and Guardhouses.

If approved, the exemption would allow AREVA to commence the above pre-construction activities before NRC completes its licensing determination. AREVA plans on performing this pre-construction work in September 2010. The approval to perform pre-construction does not equate to approval of a license to construct, operate and decommission a facility. AREVA assumes the risk of completing these activities and then not receiving a license to construct and operate the facility.

The pre-construction activities of both the environmental impacts above and construction of the facility will be considered in NRC's environmental impact statement which will be issued after pre-construction activities begin. We will continue to communicate with you regarding important issues for NRC to consider on assessing the environmental impacts of these pre-construction and construction activities.

NRC anticipates completing its review of the exemption request by mid December 2009. If approved, AES will supplement its Environmental Report to distinguish between the environmental impacts of the construction activities covered by the exemption and construction activities which will not be undertaken until after issuance of a license by the NRC. This supplement will allow NRC staff to consider the impacts of pre-construction in its cumulative impact analysis within the EIS.

Please respond by October 15, 2009 with any comments or concerns that you may have on this subject. If you have any questions or comments with regard to this request from AES, or need any additional information, please contact Mathews George of my staff on 301-415-7065.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

February 17, 2010

Janet Gallimore
Executive Director and State Historic
Preservation Officer
Idaho State Historical Society
2205 Old Penitentiary Road
Boise, Idaho 83712

SUBJECT: CONTINUING CONSULTATION UNDER THE NATIONAL HISTORIC PRESERVATION ACT SECTION 106 PROCESS FOR THE PROPOSED AREVA EAGLE ROCK ENRICHMENT FACILITY

Dear Ms. Gallimore:

The U.S. Nuclear Regulatory Commission (NRC) previously contacted your office by letter dated June 17, 2009, informing you of the submittal by AREVA Enrichment Services LLC (AES) of an application to the NRC for a license to construct, operate and decommission a gas centrifuge uranium enrichment facility in Bonneville County, Idaho. The proposed facility, the Eagle Rock Enrichment Facility (EREF), would be located approximately 20 miles west of Idaho Falls. As discussed in our June 17, 2009 letter, NRC is developing an Environmental Impact Statement (EIS) for the proposed EREF. The purposes of the present letter are to inform you: (1) that the project scope has been modified to include the construction and operation of a 161-kilovolt (KV) electrical transmission line needed to power the proposed EREF; and (2) of a change to the Area of Potential Effect (APE) for the EREF site.

<u>Transmission Line</u>

On January 29, 2010, AES submitted supplemental information to NRC for the construction and operation of a proposed transmission line, an electrical substation, and substation upgrades. The submittal updates and supersedes AES' previous transmission line addendum dated December 4, 2009, (Supplemental Information, EREF Environmental Report, Appendix H, EREF 161-KV Transmission Line Project). A Cultural Resource Inventory report was included with the December 4, 2009, supplement. NRC understands that AES sent copies of both the December 4, 2009 and January 29, 2010, submittals to your office. The locations of the transmission line and substations are shown in AES' January 29, 2010, submittal. NRC's EIS for the proposed EREF will now include a discussion of the impacts associated with the construction and operation of the transmission line and associated substations. Likewise, our Section 106 consultation for the EREF project will expand to include the proposed transmission line right-of-way and other lands needed for this line and associated structures.

The new transmission line and associated structures would be located entirely on private land within Bonneville County. Rocky Mountain Power (RMP), a division of PacifiCorp, will be the builder, owner, and operator. The transmission line would originate from the existing RMP Bonneville Substation and extend in a general westward direction to the new point of service, the Twin Buttes Substation on the proposed EREF site. In AES' updated proposal, there will be no use of Bureau of Land Management and U.S. Department of Energy (Idaho National Laboratory) lands, as there was in AES' December 4, 2009, proposal.

Beginning at the Bonneville Substation, the proposed transmission line route is west along the county road (West 65 North Street) to the existing RMP Kettle Substation, a distance of approximately 14.5 kilometers (9 miles), continuing west to the eastern portion of the EREF site, a distance of approximately 1.2 kilometer (0.75 mile), then north within the EREF site to its northern end, then west and south to the new RMP Twin Buttes Substation, for a distance of approximately 6.4 kilometers (4 miles). The area being affected by the transmission line is approximately 84 hectares (208 acres).

As discussed above, as part of its December 4, 2009, supplement, AES commissioned an archeological survey of the APE associated with the transmission line and associated structures (see Cultural Resource Inventory). This survey, which identified nine sites that are recommended potentially eligible for inclusion on the National Register of Historic Places, encompassed a large area that included much of the area of the presently proposed transmission line shown in AES' January 29, 2010, submittal. However, to NRC's knowledge, none of the nine historic properties identified are within the presently proposed transmission line right-of-way. AES stated in its January 29, 2010, submittal that there are no cultural or historical resources along the proposed transmission line corridor.

EREF Project Site APE

Additionally, AES has indicated that the APE for the EREF project site has been modified. The original APE encompassed 240 hectares (597 acres). Based on an August 28, 2009, submission by AES to NRC, an additional 26 hectares (64 acres) was added to the main project APE, increasing the EREF project site APE to 265 hectares (656 acres). The additional acreage was surveyed by AES' archaeological contractor with no historic properties identified. NRC understands that AES provided your office with a copy of the report on this survey (Amendment to: A Class III Cultural Resource Inventory of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho, Western Cultural Resource Management, Inc., August 28, 2009).

If you have any questions regarding the project, or need additional information, please contact Stephen Lemont of my staff at 301-415-5163 or Stephen.Lemont@nrc.gov.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No: 70-7015

Bruce M. Biwer
Environmental Systems Engineer
Radiological Health Risk Section

Environmental Science Division
Argonne National Laboratory
9700 South Cass Avenue, Bldg.240
Argonne, IL 60439

1-630-252-5761 phone
1-630-252-4624 fax
bbiwer@anl.gov

Argonne NATIONAL LABORATORY

April 16, 2010

Ms. Suzi Pengilly
Idaho State Historic Preservation Office
210 Main Street
Boise, ID 83702

Dear Ms. Pengilly,

Enclosed are copies of the additional documents that you indicated were needed by your office to conduct a review of the proposed AREVA Eagle Rock Enrichment Facility (EREF) in Bonneville County. The documents included are:

1) details of the proposed 161-kV transmission line required to power the EREF as provided in the February 18, 2010 submittal from AREVA Enrichment Services LLC (AES) to the U.S. Nuclear Regulatory Commission (NRC), also included are a set of higher resolution figures of the proposed transmission line corridor that were provided by AES under separate cover,

2) the MW004 treatment plan and the analysis of obsidian artifacts in the February 19, 2010 submittal from AES to the NRC (Enclosures 2 and 3, respectively, in that document), and

3) the report "AMMENDMENT TO: A CLASS III CULTURAL RESOURCE INVENTORY OF THE PROPOSED EAGLE ROCK ENRICHMENT FACILITY BONNEVILLE COUNTY, IDAHO" that details the survey of the additional 64 acres on the EREF property.

Please contact Steve Lemont at the NRC (301-415-5163 or stephen.lemont@nrc.gov) if you have any further questions.

Sincerely,

Bruce M. Biwer

Bruce M. Biwer, Ph.D.
Environmental Science Division

cc: S. Lemont, NRC
D. O'Rourke, ANL
R. Van Lonkhuyzen, ANL

IDAHO STATE HISTORICAL SOCIETY

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C.L. "Butch" Otter
Governor of Idaho

Janet L. Gallimore
Executive Director

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Archaeological Survey of Idaho
210 Main Street
Boise, Idaho 83702-7264
Office: (208) 334-3847
Fax: (208) 334-2775

Historical Museum and Education Programs
610 North Julia Davis Drive
Boise, Idaho 83702-7695
Office: (208) 334-2120
Fax: (208) 334-4059

Historic Preservation Office
210 Main Street
Boise, Idaho 83702-7264
Office: (208) 334-3861
Fax: (208) 334-2775

Old Penitentiary and Historic Sites
2445 Old Penitentiary Road
Boise, Idaho 83712-8254
Office: (208) 334-2844
Fax: (208) 334-3225
Statewide Sites
- Franklin Historic Site
- Pierce Courthouse
- Rock Creek Station & Stricker Homesite

Public Archives and Research Library
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 334-3356
Fax: (208) 334-3198
- Public Archives
- Research Library
- Oral History

North Idaho Office
112 W. Fourth Street, Suite 7
Moscow, ID 83843
Office: (208) 882-1540
Fax: (208) 882-1763

May 3, 2010

Stephen Lemont
Nuclear Regulatory Commission
Environmental Review Branch
U.S. Nuclear Regulatory Commission
Washington D.C., 20555-0001

RE: AREVA Eagle Rock Enrichment Facility, Bonneville County, Idaho

Dear Mr. Lemont:

Our office has received information on the expanded footprint, proposed 161 kV transmission line, and archaeological treatment plan for AREVA's proposed Eagle Rock Enrichment Facility in Bonneville County, Idaho. Our comments on each project component and associated document(s) are outlined below. We have also provided guidance on the next steps in the Section 106 review process.

1. **Expanded Footprint:** AREVA wishes to expand the originally proposed footprint for the enrichment facility by 64 acres. The expansion was surveyed by Western Cultural Resource Management and documented in a report dated August 28, 2009. Two sites and seven isolates were identified within the expansion area. We agree that sites AR-2 and AR-3 are not eligible for the National Register of Historic Places for the reasons stated in the report. Although not addressed in the report, we also recommend that the isolates (IF-19 through IF-25) are not eligible.

   Before we can accept this report, however, we will need the following: 1) two copies of the report and site forms; and 2) maps showing the site locations attached to *each* site form. These requirements apply to this submission and any future archaeological reports and forms submitted to the Idaho SHPO. For backup and local reference, we send the second copy of the report and forms to the regional repository. In this case, we will send the second copy to the Museum of Natural History in Pocatello.

2. **Transmission Line:** We received a report and site forms completed by North Wind documenting archaeological survey of two proposed alternate routes for a transmission line to the planned Eagle Rock facility.

We found this report and the project proposal difficult to follow. To remedy this, we first recommend that the report by reformatted to discuss each alternate route separately with archaeological findings and potential effects described by route. The alternatives should be clearly marked on maps in the report.

As the preferred alternative is now known, it too can be shown on a map, and its specific findings and effects discussed in the report. It should be clearly pointed out that no federal land is involved in the preferred alternative, if that is still the case.

The environmental document presents good maps that should be included in the revised archaeological report. Also, the aerials recently sent showing the final surveyed areas (Figure 1, Sheet 1; Figure 1, Sheet 2, etc.) should be included in the revised report.

We will need to receive two copies of the revised report and two copies of each site form. A map should be attached to each site form. It appears that we do not have maps for isolate R1 and for archaeological sites R3 and R7. Archaeological site forms are filed separately from the IHSI forms, so we need a map attached to each.

What is NNR1? It appears on figure 13, but we cannot find any other reference to it.

3. **Treatment of Site MW004 and Analysis of Obsidian Artifacts:**
   We support the proposed treatment of site MW004. We should receive two copies of the report that documents the investigations along with two copies of photographs and other appendices or attachments.

   We appreciate receiving the letter report on the XRF analysis.

4. **Next steps:** When the project design is finalized and all of the archaeological survey and site evaluations have been completed, the NRC should draft a Memorandum of Agreement (MOA) that outlines mitigation measures. The agreed upon Treatment Plan should be referenced as planned mitigation, and the XRF can be listed as completed mitigation. If monitoring is required, that too should be described in the MOA.

   We will be happy to review a draft of the MOA. NRC also needs to notify the Advisory Council on Historic Preservation of the adverse effect and determine the Council's participation. If the Council chooses to not participate, NRC and our office will conclude the agreement with Argonne (and/or AREVA) as concurring parties. Mitigation documentation will then be sent to our office for review and acceptance.

We appreciate your cooperation. If you have any questions, please do not hesitate to call me at 208-334-3847, ext. 107.

Sincerely,

Susan Pengilly

Susan Pengilly
Deputy SHPO and
Compliance Coordinator

cc: Bruce M. Biwer, Ph.D., Environmental Science Division, Argonne National Laboratory

From: Suzi Pengilly
To: Lemont, Stephen
Subject: RE: NRC Letter to ACHP re: Adverse Effect to Historic Property and MOA for AREVA Eagle Rock Enrichment Facility, Bonneville County, Idaho
Date: Wednesday, September 01, 2010 10:11:59 AM

The letter looks very thorough and complete. IT should be all they need, and they likely won't want to be involved, but you never know.

Thanks,
Suzi.

From: Lemont, Stephen [mailto:Stephen.Lemont@nrc.gov]
Sent: Wednesday, September 01, 2010 9:09 AM
To: Suzi Pengilly
Cc: Biwer, Bruce M.; danorourke@anl.gov; Van Lonkhuyzen, Robert A.
Subject: NRC Letter to ACHP re: Adverse Effect to Historic Property and MOA for AREVA Eagle Rock Enrichment Facility, Bonneville County, Idaho

Hi, Suzi. Now that we've gotten past the completion of our Draft EIS and public meetings, the NRC staff has been able to prepare and send the subject letter to ACHP. You will be receiving a copy in the mail, but I have attached an advance copy for your reference. NRC is now in the process of drafting the MOA discussed in the letter.

By the way, thank you for your comments on our Draft EIS.

Regards,
Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

The attachment referred to in this document is provided later in Section B.2 of Appendix B. It is the letter to Mr. Reid Nelson, Director, Federal Agency Programs, Advisory Council on Historic Preservation, dated August 31, 2010.

Biwer, Bruce M.

From:	Lemont, Stephen [Stephen.Lemont@nrc.gov]
Sent:	Wednesday, September 29, 2010 12:21 PM
To:	Suzi Pengilly
Subject:	RE: Update on Section 106 Issues for the Proposed AREVA Eagle Rock Enrichment Facility Project in Bonneville County 092910

Suzi,

Do you still also need two copies of the expanded footprint report, including the site forms and maps?

Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

From: Suzi Pengilly [mailto:Suzi.Pengilly@ishs.idaho.gov]
Sent: Wednesday, September 29, 2010 12:21 PM
To: Lemont, Stephen
Subject: RE: Update on Section 106 Issues for the Proposed AREVA Eagle Rock Enrichment Facility Project in Bonneville County

Stephen,
Thank you for the update. With regard to the transmission line report, the only version that we have is dated December 4, 2009. Therefore, we still need two copies of the revised version.

Thanks,
Suzi.

From: Lemont, Stephen [mailto:Stephen.Lemont@nrc.gov]
Sent: Monday, September 27, 2010 10:12 AM
To: Suzi Pengilly
Cc: 'Biwer, Bruce M.'; O'Rourke, Daniel J.; Van Lonkhuyzen, Robert A.
Subject: Update on Section 106 Issues for the Proposed AREVA Eagle Rock Enrichment Facility Project in Bonneville County

Suzi,

The purpose of this email is to follow up on your letter to me dated May 3, 2010 (see attached) and in so doing, provide you with an update on Section 106 activities by the U.S. Nuclear Regulatory Commission (NRC) for the proposed AREVA Eagle Rock Enrichment Facility (EREF) project. Also, I want to thank you for your July 22, 2010 comments on the Draft Environmental Impact Statement (EIS), which indicated your finding that the Historic and Cultural Properties sections accurately reflect the identification efforts conducted to date under Section 106 of the National Historic Preservation Act.

The discussion below follows the order of topics addressed in your May 3, 2010 letter, and includes some questions and issues to which I need your response:

1. **Expanded Footprint:** You requested two (2) copies of the August 28, 2009 report by Western Cultural Resource Management, including site forms and maps showing the site locations attached to *each* site form. I believe you are referring to the report, "Amendment to: A Class III Cultural Resource Inventory of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho," Prepared by Western Cultural Resource Management, Inc., August 28, 2009. The NRC does not have the requested maps so I plan to ask AREVA to send you the two copies of the report and site forms with the maps included. However, before I do that, please let me know if you still need these items.

2. **Transmission Line:** You also requested two (2) copies of the report on the transmission line portion of the project, including site forms, maps, and clarifications of various issues. The NRC does not have some of the requested items so I plan to ask AREVA to send you the two copies of the report with the additional items and any necessary clarifications included. However, before I do that, please note and/or respond to the following:

    a. First, I want to point out that it appears from statements in your letter that you were not reviewing the most recent version of the cultural resource survey report for the proposed transmission line route. In January 2010, AREVA decided to drop and no longer consider the proposed transmission line coming from west of the proposed EREF site, which would have been located partially on lands of the Bureau of Land Management and Idaho National Laboratory. Thus, the proposed transmission line coming from the west is no longer part of the proposed EREF project. Accordingly, it was not addressed in the NRC's Draft EIS.

    b. AREVA is currently proposing a single transmission line coming from the Bonneville Substation that is located east of the proposed EREF site, and has selected a route for that line that involves no Federal land. The archaeological and historical survey report on this single, preferred route was prepared by North Wind, Inc., and is dated January 21, 2010 ("Archaeological and Historic Survey Report, Archaeological Survey of Idaho. In: *Eagle Rock Enrichment Facility Transmission Line,*" NWI 10247.001, Prepared by North Wind, Inc., January 21, 2010.). I thought AREVA had sent a copy of that report to your office.

    c. Please let me know if you still need the two copies of North Wind's January 21, 2010 archaeological and historical survey report on the transmission line portion of the project, including site forms, maps, and clarifications (as necessary) of various issues.

3. **Treatment of Site MW004 and Analysis of Obsidian Artifacts:** Thank you for your support and acceptance of the proposed treatment of site MW004 and of the letter report of the XRF analysis of obsidian artifacts. The NRC has asked AREVA to provide your office with two copies of the requested report that documents the investigations associated with the treatment of site MW004, along with two copies of photographs and other appendices or attachments.

4. **Next steps:** As you know, in a letter dated August 31, 2010, the NRC notified the Advisory Council on Historic Preservation (ACHP) of the adverse effect on site MW004 and invited ACP to participate in the Section 106 consultation for the project. As I believe you also know, in a letter dated September 20, 2010, the ACHP responded that they do not believe that their participation in the consultation is needed at this time.

    Also, the NRC is in the process of preparing a draft Memorandum of Agreement (MOA) for the project. I believe I mentioned during our conference call on July 19, 2010, that our legal counsel had developed a rough draft of the MOA. That rough draft is currently being revised by our legal counsel, after which it will be reviewed by NRC management. We will then send the MOA to your office and to the other parties for review. Please note that Argonne would not be a party to the MOA as they are serving only as consultant to the NRC for preparation of the EIS.

We also discussed during our July 19, 2010 conference call that The Shoshone-Bannock (S-B) Tribes would not be a party to the MOA because they have shown little interest in the project. However, based on a meeting that NRC staff had with the S-B Tribes on August 11, 2010 (the day before our public meeting on the Draft EIS in Idaho Falls) and on comments received from the tribes on the Draft EIS, the NRC is now considering inviting the S-B Tribes to be a concurring party on the MOA.

I look forward to receiving your responses to the questions and issues raised above. Please contact me if you have any questions or need additional information.

Thanks,
Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

The attachment referred to in this document is provided earlier in Section B.2 of Appendix B. It is the letter to Stephen Lemont, Nuclear Regulatory Commission, dated May 3, 2010.

Biwer, Bruce M.

From:	Suzi Pengilly [Suzi.Pengilly@ishs.idaho.gov]
Sent:	Thursday, October 14, 2010 9:38 AM
To:	Lemont, Stephen
Cc:	Biwer, Bruce M.; O'Rourke, Daniel J.; Van Lonkhuyzen, Robert A.
Subject:	RE: Further Update on Section 106 Activities for the AREVA Eagle Rock Enrichment Facility Project 101410

Thank you for the update--
suzi.

From: Lemont, Stephen [Stephen.Lemont@nrc.gov]
Sent: Wednesday, October 13, 2010 2:20 PM
To: Suzi Pengilly
Cc: Biwer, Bruce M.; O'Rourke, Daniel J.; Van Lonkhuyzen, Robert A.
Subject: Further Update on Section 106 Activities for the AREVA Eagle Rock Enrichment Facility Project

Hi, Suzi. This is to bring you up to date on the latest Section 106 activities for the subject project:

- As you may already know, AREVA's consultant began work last week on the mitigation of site MW006. It is my understanding that they are coordinating with Ken Reid of your office regarding the progress and interim findings of the mitigation work. I have asked AREVA to have their consultant prepare and submit a report on the mitigation, in accordance with the request in your May 3, 2010 letter; and AREVA has indicated their intention to do so.

- On October 8, 2010, the NRC sent a letter to The Shoshone-Bannock Tribes, inviting them to be a concurring party on the MOA. A copy of that letter is attached, although you will also be receiving a copy in the mail. On October 8, I gave Willie Preacher of the Tribes advance notice of this letter and what it is about.

- The NRC's attorneys are continuing to work on the draft MOA for the project.

- On October 11, 2010, I was informed by AREVA that the "expanded footprint" and "transmission line" reports and associated information requested in your May 3, 2010 letter were mailed out on that day. I had requested that they send the reports directly to you, but please keep on the lookout for them just in case they didn't. Please contact me if you don't receive the reports in the very near future. Also, if after you receive the reports you find that you have any questions or need additional information, please let me know. We look forward to receiving your comments on those reports.

Thanks,
Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

The attachment referred to in this document is provided later in Section B.2 of Appendix B. It is the letter to Chairman Small, the Shoshone-Bannock Tribes, dated October 8, 2010.

Biwer, Bruce M.

From:	Suzi Pengilly [Suzi.Pengilly@ishs.idaho.gov]
Sent:	Monday, October 18, 2010 1:10 PM
To:	Lemont, Stephen
Cc:	Biwer, Bruce M.; O'Rourke, Daniel J.; Van Lonkhuyzen, Robert A.
Subject:	RE: Further Update on Section 106 Activities for the AREVA Eagle Rock Enrichment Facility Project 101810

I recei ved the reports today, but have not looked at them. I will let you know if anything is missing.

From: Lemont, Stephen [mailto:Stephen.Lemont@nrc.gov]
Sent: Wednesday, October 13, 2010 2:20 PM
To: Suzi Pengilly
Cc: Biwer, Bruce M.; O'Rourke, Daniel J.; Van Lonkhuyzen, Robert A.
Subject: Further Update on Section 106 Activities for the AREVA Eagle Rock Enrichment Facility Project

Hi, Suzi. This is to bring you up to date on the latest Section 106 activities for the subject project:

- As you may already know, AREVA's consultant began work last week on the mitigation of site MW006. It is my understanding that they are coordinating with Ken Reid of your office regarding the progress and interim findings of the mitigation work. I have asked AREVA to have their consultant prepare and submit a report on the mitigation, in accordance with the request in your May 3, 2010 letter; and AREVA has indicated their intention to do so.

- On October 8, 2010, the NRC sent a letter to The Shoshone-Bannock Tribes, inviting them to be a concurring party on the MOA. A copy of that letter is attached, although you will also be receiving a copy in the mail. On October 8, I gave Willie Preacher of the Tribes advance notice of this letter and what it is about.

- The NRC's attorneys are continuing to work on the draft MOA for the project.

- On October 11, 2010, I was informed by AREVA that the "expanded footprint" and "transmission line" reports and associated information requested in your May 3, 2010 letter were mailed out on that day. I had requested that they send the reports directly to you, but please keep on the lookout for them just in case they didn't. Please contact me if you don't receive the reports in the very near future. Also, if after you receive the reports you find that you have any questions or need additional information, please let me know. We look forward to receiving your comments on those reports.

Thanks,
Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

The attachment referred to in this document is provided later in Section B.2 of Appendix B. It is the letter to Chairman Small, the Shoshone-Bannock Tribes, dated October 8, 2010.

From: Lemont, Stephen [mailto:Stephen.Lemont@nrc.gov]
Sent: Wednesday, January 26, 2011 10:01 AM
To: Suzi Pengilly
Cc: Biwer, Bruce M.; O'Rourke, Daniel J.; Van Lonkhuyzen, Robert A.
Subject: Section 106 Consultation Update and Questions - AREVA Eagle Rock Enrichment Facility

Suzi,

This is to provide you with an update on the U.S. Nuclear Regulatory Commission's (NRC's) Section 106 consultation efforts and activities related to the proposed AREVA Eagle Rock Enrichment Facility (EREF) project in Bonneville County, and to ask you some questions regarding the process.

UPDATE

Following is an update on recent Section 106 efforts and activities for the subject project:

- On December 22, 2010, the Shoshone-Bannock Tribes accepted the NRC's invitation to be a concurring party on the Memorandum of Agreement (MOA) for the proposed EREF project.

- The NRC has developed a draft MOA that is currently undergoing internal review by our management and legal counsel. When that review is complete, which will be in the near term, it will be distributed by the NRC for review and comment, to the Idaho State Historic Preservation Office, AREVA, and the Shoshone-Bannock Tribes.

- The NRC is currently working on completing the Final Environmental Impact Statement (EIS) for the project, and will provide you with copies when it is completed. The Final EIS will provide updated information on impacts to historic and cultural resources and on associated mitigation, and will discuss that an MOA is being developed.

QUESTIONS

Please respond to the following questions related to the Section 106 process for the proposed EREF project:

1. Regarding the two hard copies of the "expanded footprint" and "transmission line" reports that AREVA sent to you in October 2010, you had indicated in earlier correspondence that you received those reports. Does your office have any comments on those reports, or are they acceptable as is?

2. AES provided other cultural resources survey reports and related documents, these are listed in Attachment A to this email (items 2 and 3 in the attachment are the "expanded footprint" and "transmission line" reports, respectively.) I believe that you are aware of, and have reviewed and accepted, all of the documents listed in Attachment A. However, do you still need two hard copies of, and/or do you have any concerns with, any of these reports.

3. I understand from AREVA that their archaeological consultant, Western Cultural Resource Management, Inc. (WCRM) was in contact with Dr. Kenneth Reid of your office throughout their professional excavation and data recovery activities at site MW004, and that WCRM sent Dr. Reid the attached letter report dated November 17, 2010 (Attachment B). In the first paragraph of your attached November 26, 2010 letter

to AREVA (Attachment C), you referenced a "data recovery report" that Dr. Reid reviewed and accepted for this project. With regard to that data recovery report:

a. Is that report the WCRM letter report dated November 17, 2010 (i.e., Attachment B)?
b. Did you receive from AREVA the two hard copies of that report that you requested in your November 26, 2010 letter?
c. Does your statement in your November 26, 2010 letter regarding Dr. Reid's acceptance of the data recovery report constitute your office's approval that the site MW004 mitigation has been completed to your office's satisfaction?
d. If Dr. Reid does, in fact, consider the site MW004 mitigation to be complete, can you please send me a letter to that effect?

I look forward to hearing back from you on this update and on receiving your responses to my questions. If you need additional information, please let me know.

Thanks,
Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

Attachment A
Cultural Resource Reports and Documents Provided by AREVA for the Eagle Rock Enrichment Facility Project

1. A Class III Cultural Resource Inventory of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho (Volume I: Report and Volume II: Cultural Resource Documentation). Prepared by Western Cultural Resource Management, Inc. November 21, 2008.

2. Amendment to: A Class III Cultural Resource Inventory of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho. Prepared by Western Cultural Resource Management, Inc. August 28, 2009. **NOTE: This is the "expanded footprint" report.**

3. Archaeological and Historic Survey Report, Archaeological Survey of Idaho. In: *Eagle Rock Enrichment Facility Transmission Line.* NWI 10247.001. Prepared by North Wind, Inc. January 21, 2010. **NOTE: This is the "transmission line" report.**

4. Letter to U.S. Nuclear Regulatory Commission from Jim A. Kay, Licensing Manager, AREVA Enrichment Services LLC. Subject: Response to Request for Additional Information - AREVA Enrichment Services LLC Environmental Report for the Eagle Rock Enrichment Facility - RAI 6.a. *Unanticipated Discovery Plan.* September 18, 2009

5. A Treatment Plan for Historic Site MW004 in the Area of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho. Prepared by Western Cultural Resource Management, Inc. January 28, 2010. (This includes the obsidian artifacts report at the end.)

WCRM
WESTERN CULTURAL RESOURCE MANAGEMENT, INC.

November 17, 2010

Kenneth Reid, Ph.D.
State Archaeologist
Deputy State Historic Preservation Officer
Idaho State Historical Society
210 Main Street
Boise, ID 83702

Dear Dr. Reid,

This letter is to summarize Western Cultural Resource Management's data recovery activities for the Eagle Rock Enrichment Facility Project located in Bonneville County, Idaho (west of Idaho Falls) and to request a notice-to-proceed for our client, AREVA Enrichment Services, LLC (AES). Data recovery was conducted by WCRM from October 5 to November 8, 2010, and is now complete.

Project Background
AES is preparing an application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission a gas centrifuge uranium enrichment plant called the Eagle Rock Enrichment Facility in Bonneville County. WCRM conducted cultural resource inventories of the proposed project area in 2008 and 2009, surveying a total of 1,005 acres and identifying and recording 13 new archaeological sites and 25 isolated finds (Ringhoff et al. 2008; Estes and Raley 2009). One of the sites, MW04 (a historic homestead with a small prehistoric lithic scatter), was determined eligible to the National Register of Historic Places by the NRC under 36 CFR part 60.4, Criteria A and D. The State Historic Preservation Office (SHPO) concurred with this determination in a letter dated September 29, 2009.

WCRM prepared a data recovery plan detailing treatment recommendations to mitigate adverse impacts of the proposed facility to the eligible archaeological site, MW04 (Ringhoff and Stoner 2010). This plan also includes the collection of all known obsidian bifacial tools within the project so that they can be chemically sourced through x-ray fluorescence analysis, per the recommendation of the Idaho SHPO.

Summary of Recommended and Completed Treatment
Table 1 shows the recommended treatment described in the data recovery plan as well as what activities took place during the data recovery effort. Recommended treatment for site MW04 included mapping the entire site with a total station transit, collecting a representative sample of surface historic artifacts, excavating up to six 1 x 1 m units in Feature 1 (a dugout), doing a Class III+ artifact inventory of Feature 8 (a historic refuse concentration) as well as excavating one 1 x

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1 m unit in that feature, and excavating one 1 x 1 m unit in Feature 7 (a possible privy). Additionally, 11 obsidian bifacial tools from multiple sites and isolated finds in the project area were to be collected.

All treatment proposed in the data recovery plan was completed or attempted. Not all the obsidian tools could be relocated, but all other activities were completed at least to the extent described in the treatment plan. Additionally, the treatment of Feature 1 required more work than originally proposed due to the unexpected discovery of a wood floor. While only six excavation units were initially recommended for that feature, 27 units were ultimately excavated in order to expose the extent of the wood floor (see Figures 1-4).

Table 1. Recommended and Completed Treatment of Cultural Resources for the Eagle Rock Enrichment Facility Project

Location	Recommended Treatment	Completed Treatment
MW04 - General site	Detailed mapping of entire site using total station transit.	Detailed mapping of entire site using total station transit.
MW04 - General site	Collection of a representative sample of diagnostic historic artifacts.	Collection of a representative sample of diagnostic historic artifacts.
MW04 – Feature 1 (dugout)	Linear series of up to six 1 x 1 m units to be excavated by hand, with at least one placed outside the feature.	Grid of 27, 1 x 1 m units (including one placed outside the feature) excavated by hand. Initial 6 units placed in a line along middle of feature, with additional units added as necessary to expose entire extent of feature's wood floor (an unexpected discovery).
MW04 – Feature 7 (possible privy)	One 1 x 1 m unit placed over feature and excavated by hand to a sufficient depth to determine if feature is cultural.	One 1 x 1 m unit placed over feature and excavated by hand in ten arbitrary 10 cm deep levels, with a 1.25 m deep auger test placed at the bottom. No cultural materials were revealed.
MW04 – Feature 8 (historic refuse concentration)	Set up a surface grid of 1 x 1 m units to cover entire feature and do a Class III+ artifact inventory for each unit. Collect a representative surface sample of the feature's artifacts. Excavate by hand one 1 x 1 m unit to determine presence or absence of subsurface materials.	Set up a surface grid of twelve 1 x 1 m units to cover entire feature and did a Class III+ artifact inventory for each unit. Collected a representative surface sample of the feature's artifacts. Excavated by hand one 1 x 1 m unit to determine presence or absence of subsurface materials; no subsurface cultural materials were identified.
Multiple sites and IFs throughout the area previously inventoried by WCRM	Collect 11 obsidian bifacial tools.	Collected 4 of the 11 known obsidian bifacial tools; 7 could not be relocated. One previously unidentified tool was also found and collected, bringing the total number of obsidian tools collected up to 5.

At this time, field work related to the treatment of cultural resources related to this project is complete. WCRM is preparing a detailed final report that will contain discussion and analysis of the results of the data recovery. We respectfully request that a notice-to-proceed be granted to the project proponent, AES.

If you have any questions or comments, feel free to call me (775-358-9003).

Sincerely,

J Sigler

Jennifer Sigler, M.A., RPA
Project Manager
WCRM, Inc.

Jim Kay (AES)
Stacy Thomson (Areva NP)
Tom Lennon (WCRM)


Figure 1. Feature 1 during excavation, with bed frame on wood floor of dugout. View facing southwest.


Figure 2. Wood floor of dugout (Feature 1) exposed in its entirety. View facing south.

Figure 3. Wood floor of dugout (Feature 1) exposed in its entirety. View facing west.

Figure 4. Feature 1 with all excavation completed. View facing east.

References Cited

Estes, Mark and Jaclyn Raley
2009 *Amendment To: A Class III Cultural Resource Inventory of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho.* Prepared by Western Cultural Resource Management, Inc., Sparks, Nevada for AREVA Enrichment Services, LLC, Bethesda, Maryland.

Ringhoff, Mary and Edward J. Stoner
2010 *A Treatment Plan for Historic Site MW04 in the Area of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho.* Prepared by Western Cultural Resource Management, Inc., Sparks, Nevada for AREVA Enrichment Services, LLC, Bethesda, Maryland.

Ringhoff, Mary, Edward J. Stoner, Collette Chambellan, and Steve Mehls
2008 *A Class III Cultural Resource Inventory of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho.* Prepared by Western Cultural Resource Management, Inc., Sparks, Nevada for AREVA Enrichment Services, LLC, Bethesda, Maryland.

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Attachment C

IDAHO STATE HISTORICAL SOCIETY

"The History and Preservation People"

Our mission: to educate through the identification, preservation, and interpretation of Idaho's cultural heritage.

www.idahohistory.net

C.L. "Butch" Otter
Governor of Idaho

Janet L. Gallimore
Executive Director

Administration
2205 Old Penitentiary Road
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Archaeological Survey of Idaho
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Historical Museum and Education Programs
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Office: (208) 334-2120
Fax: (208) 334-4059

Historic Preservation Office
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Fax: (208) 334-2775

Historic Sites Office
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Boise, Idaho 83712-8254
Office: (208) 334-2844
Fax: (208) 334-3225

Public Archives and Research Library
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Boise, Idaho 83712-8250

Public Archives
Office: (208) 334-2620
Fax: (208) 334-2626

Research Library
Office: (208) 334-3356
Fax: (208) 334-3198

Oral History
Office: (208) 334-3863
Fax: (208) 334-3198

November 26, 2010

James A. Kay
Licensing Manager
AREVA
Solomon Pond Park
400 Donald Lynch Boulevard
Marlborough MA 01752

RE: Geotechnical Borings at the Propose Twin Buttes Substation within Cultural Resource Site 10BV246 (MW004), Eagle Rock Enrichment Facility, Bonneville County, Idaho

Dear Mr. Kay:

Thank you for requesting our views on geotechnical drilling within the boundaries of site 10BV246 (MW004) for the proposed Twin Buttes Substation. While Dr. Reid did review and accept the data recovery report for this project, *we will need two hard copies of the report sent to us in the mail. We do not accept reports via email.*

With this said, we agree that you can proceed with the geotechnical drilling at this location. As you know, however, we will need to have a fully signed Memorandum of Agreement from the Nuclear Regulatory Commission before construction of the facility can begin.

We appreciate your cooperation. If you have any questions, please feel free to contact me at 208-334-3847, ext. 107.

Sincerely,

Susan Pengilly
Deputy SHPO and
Compliance Coordinator

Cc: Stephen Lemont, NRC

The Idaho State Historical Society is an Equal Opportunity Employer.

August 31, 2010

Mr. Reid Nelson
Director, Federal Agency Programs
Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Avenue, Suite 803
Washington, DC 20004

SUBJECT: NOTIFICATION OF ADVERSE EFFECT TO A HISTORIC PROPERTY AND ASSOCIATED MEMORANDUM OF AGREEMENT FOR PROPOSED AREVA ENRICHMENT SERVICES LLC EAGLE ROCK ENRICHMENT FACILITY PROJECT IN BONNEVILLE COUNTY, IDAHO

Dear Mr. Nelson:

With this letter, in accordance with 36 CFR 800.6(a)(1), the U.S. Nuclear Regulatory Commission (NRC) is notifying the Advisory Council on Historic Preservation (ACHP) of an adverse effect to site MW004 (John Leopard Homestead), as a result of the proposed AREVA Enrichment Services LLC (AES) Eagle Rock Enrichment Facility (EREF) project in Bonneville County, Idaho. The John Leopard Homestead is a *National Register of Historic Places (*NRHP)-eligible site. The NRC is drafting a Memorandum of Agreement (MOA) regarding the mitigation of the adverse effect to the John Leopard Homestead.

For your reference, this letter includes background on the NRC's activities pursuant to Section 106 of the *National Historic Preservation Act of 1966*, as amended (NHPA) to date, as well as a summary of the cultural resource information contained in the Draft Environmental Impact Statement (EIS) (NUREG-1945) for the proposed EREF. A copy of the EREF Draft EIS was provided to you by the NRC with a letter dated July 14, 2010 (Enclosure 1). In addition, the Draft EIS is available through the NRC's *Agencywide Documents Access and Management System* (ADAMS), at http://www.nrc.gov/reading-rm/adams.html. From this website, enter the Accession Number for the Draft EIS, ML101890384. The Draft EIS also may be accessed on the internet at http://webwork.nrc.gov:300/reading-rm/doc-collections/nuregs/staff/sr1945/.

Pursuant to 36 CFR 800.6(a)(1), the NRC staff invites the ACHP to participate in the NHPA Section 106 consultation for this project and requests your response within 15 calendar days of receipt of this letter and enclosures.

BACKGROUND

The NRC staff is reviewing an application submitted by AES for a license to construct, operate, and decommission a uranium enrichment facility, the proposed EREF, near Idaho Falls in Bonneville County, Idaho. AES submitted the original license application to the NRC on December 30, 2008. AES proposes to locate the facility in Bonneville County, Idaho, approximately 32 kilometers (20 miles) west of Idaho Falls. Revisions to the license application were submitted on April 23, 2009 (Revision 1), and April 30, 2010 (Revision 2). The proposed EREF, if licensed, would use a gas centrifuge process to enrich uranium-235 isotope found in natural uranium to concentrations up to 5 percent by weight. The enriched uranium would be used to manufacture nuclear fuel for commercial nuclear power reactors. As part of the review of the application, the NRC has conducted an environmental review and prepared a Draft EIS, which includes an analysis of relevant environmental issues, including potential impacts on historic and cultural resources, and documents the NRC staff's preliminary determination regarding the environmental impacts from the preconstruction (e.g., site preparation), construction, operation, and decommissioning of the proposed EREF. The NRC is the lead Federal agency, in accordance with 36 CFR 800.1(a).

Note that many of the activities required to build a uranium enrichment facility (e.g., site clearing and grading, excavation, erection of fences, erection of support buildings) do not fall within the NRC's regulatory authority and, therefore, are not "construction" as defined by the NRC (see 10 CFR 51.4). Such activities are referred to as "preconstruction" activities in 10 CFR 51.45(c).

SECTION 106 CONSULTATION

By letter dated June 17, 2009 (Enclosure 2), the NRC staff initiated consultation under Section 106 of the NHPA with the Idaho State Historic Preservation Office (ID SHPO) concerning the proposed EREF project. Also, by the letter dated June 17, 2009 (Enclosure 2), and a supplemental letter dated February 17, 2010 (Enclosure 3), the NRC staff notified the ID SHPO that it will comply with its obligations under Section 106 of the NHPA, using the process set forth in 36 CFR 800.8(c). Pursuant to 36 CFR 800.8(c), the NRC staff is using the preparation of the EIS required by the *National Environmental Policy Act of 1969*, as amended (NEPA), to comply with its obligations under Section 106 of the NHPA. The NRC staff is using 36 CFR 800.8(c) in lieu of the procedures set forth in 36 CFR 800.3 through 36 CFR 800.6. As indicated below, consultation with the ID SHPO is ongoing.

In letters dated July 29, 2009 (Enclosure 4), and February 19, 2010 (Enclosure 5), the NRC staff also contacted the Shoshone-Bannock Tribes, identified as having potential interest in the proposed undertaking. To date, the Shoshone-Bannock Tribes have not responded to our consultation letters.

DRAFT EIS PRELIMINARY FINDINGS

To evaluate the potential impacts to historic and cultural resources resulting from the proposed EREF project, the NRC staff visited the proposed EREF site in June 2009, reviewed cultural resources survey reports prepared by AES's archaeological contractors, and conducted an independent historic and cultural resources records review. Preliminary findings regarding historical and cultural resources are summarized below and further discussed in the Draft EIS, Sections 3.3, 4.2.2, 4.2.16.2, and 4.3.2.

NOTE: Enclosures 6, 7, 10 and 12 identified below contain sensitive information and are withheld from public disclosure.

<u>**Proposed EREF Project Site**</u>

In the Draft EIS, the NRC staff presented its determination that the Area of Potential Effect (APE) for the NHPA Section 106 review of the proposed EREF project site is the 240-hectare (592-acre) portion of the proposed site that would be directly affected by preconstruction, construction, and operations activities. Two archaeological surveys have been undertaken by an AES archaeological contractor for the proposed project site (Enclosures 6 and 7). The contractor directly examined 407 hectares (1005 acres) of the proposed AES property, within which the 240-hectare (592 acre) APE is included. The acreage surveyed included additional areas for expansion outside the presently proposed preconstruction, construction, and operations areas, which are no longer deemed necessary by AES for the proposed project.

Thirteen archaeological sites and 24 isolated finds were identified within the APE of the proposed EREF project site. Isolated finds are isolated occurrences of cultural resource material that are not associated with subsurface remains and are not considered archaeological sites. Three of the archaeological sites were prehistoric in age, six were from the historic era, and four contained evidence from both the historic and prehistoric periods. The prehistoric sites consisted of stone tools or evidence of stone tool manufacture. The historic sites were primarily historic trash scatters consisting of cans and glass. None of the isolated finds are considered eligible for listing on the NRHP. On the basis of the survey results, nine of the sites were recommended not eligible for listing on the NRHP. Site MW004, the John Leopard Homestead, is recommended eligible for listing on the NRHP for its potential to provide information on the practices of historic era farmers in the region. Several other sites of this type have been previously identified on Idaho National Laboratory property north of the proposed EREF site (see Enclosure 8), so removal of all sites of this type from the region is unlikely. Site MW004 consists of several structural remains including a cistern, privy and historic dugout house foundation. AES's archaeological contractor conducted additional research for the three other sites found during the survey and found that these sites lacked sufficient information to be considered significant (see Enclosure 6).

Site MW004 would be directly impacted by preconstruction of the proposed EREF. Preconstruction activities would destroy this site because it would be under the footprint of the proposed facility's security fence and an electrical substation for a transmission line that would bring power to the proposed EREF (see below). In a letter dated September 29, 2010 (Enclosure 9), the ID SHPO concurred with the evaluations and recommendations in the two AES survey reports, and agreed that site MW004 is the only one of the 13 sites located in the proposed EREF site eligible for listing on the NRHP, and recommended mitigation for the impacts to site MW004 to be included as stipulations in an MOA, discussed below.

Proposed 161-kilovolt (kV) Transmission Line Project

On January 19, 2010, AES informed the NRC of a license application change involving the addition to the proposed project of an electrical transmission line to power the proposed EREF. This new 161-kV transmission line would be run to the proposed EREF from Rocky Mountain Power's Bonneville Substation located to the east of the proposed EREF site, mostly along the right-of-way (ROW) of an existing 69-kV transmission line.

In the Draft EIS, the NRC staff presented its determination that the APE for AES's proposed 161-kV transmission line project is 202.3 hectares (500 acres) for the line itself. This is derived from the 22.12-kilometer (13.74-mile) proposed transmission line ROW length and 45.72 meters (150 feet) on either side of the centerline (91.4-meter [300-foot] total width). In addition to that, there is the fenced area at the proposed modified Bonneville Substation, which is 1.3 hectares (3.1 acres), and the proposed new Twin Buttes Substation that will occupy a 2.1-hectare (5.2-acre) fenced area on the proposed EREF site itself.

Portions of the proposed Twin Buttes Substation and of the proposed transmission line adjacent to the proposed EREF were surveyed previously as part of the survey for the main portion of the proposed EREF site (Enclosure 6). The ROW for the proposed transmission line has also been surveyed by an AES archaeological contractor for the presence of historical and cultural resources (Enclosure 10). This survey examined the 202.3-hectare (500-acre) APE. No historic and cultural resources were identified in these surveys. It is currently unclear whether additional areas would be needed for some aspects of the transmission line construction (e.g., pulling and tensioning sites). AES has provided an unanticipated discoveries and monitoring plan (Enclosure 11) to the NRC and Idaho SHPO, which will be in place during preconstruction and construction and which the NRC proposes to reference in the MOA.

MEMORANDUM OF AGREEMENT

As discussed above, during its environmental review and as documented in the Draft EIS, the NRC staff identified an adverse effect to the NRHP-eligible John Leopard Homestead (site MW004) located on the proposed EREF site. Preconstruction activities would destroy site MW004 because it would be under the footprint of the proposed EREF's security fence and an onsite electrical substation for the proposed 161-kV transmission line. In its letter dated September 29, 2009 (Enclosure 9), the ID SHPO recommended mitigation of the adverse effect through data recovery, historic research for the John Leopard Homestead site, and that all obsidian bifacial tools within the EREF project area be chemically traced to their geologic sources through x-ray fluorescence (XRF) analysis. Further, the ID SHPO stated that these mitigation measures should be drafted as stipulations in an MOA.

AES subsequently provided a Treatment Plan for site MW004 (Enclosure 12) that addresses the procedures that will be employed to conduct mitigation measures recommended by the ID SHPO. At the end of this plan is a letter that reports on the completed geochemical XRF analysis of obsidian artifacts collected at the ID SHPO's request (Letter to Kenneth Reid, State Archaeologist and Deputy State Historic Preservation Officer, Idaho State Historical Society, from Edward J. Stoner, Western Cultural Resource Management, Inc. December 18, 2009.). In a letter dated May 3, 2010 (Enclosure 13), the ID SHPO expressed its support for the proposed treatment of site MW004 and requested a report from AES that documents the investigations conducted as part of the mitigation along with photographs and other appropriate appendices and attachments.

The NRC is currently in the process of drafting an MOA as requested by the ID SHPO. As recommended in the ID SHPO's September 29, 2009, letter (Enclosure 9), AES's Treatment Plan (Enclosure 12) will be referenced with regard to the mitigation of site MW004; and as additionally stated in the ID SHPO's May 3, 2010, letter (Enclosure 13), the XRF analysis will be listed as completed mitigation, and any required monitoring will be described. Also, because AES has indicated that final design of the proposed EREF and associated 161-kV transmission line project will not be completed until after the NRC license is issued, the draft MOA will also address the survey by AES for historic cultural resources of any previously un-surveyed areas that may be identified following final design (e.g., transmission line construction pulling and tensioning sites). As such, AES's unanticipated discoveries and monitoring plan mentioned above (Enclosure 11) will be referenced in the draft MOA. The purpose of this plan is to: (1) monitor and protect existing and known archaeological sites and historic properties located within the proposed EREF site; (2) set forth the process for dealing with discoveries of human remains or previously unidentified archaeological sites that are discovered during activities that cause surface or subsurface disturbances and may result in an irreversible loss of the resource; and (3) establish procedures for evaluation and treatment of unanticipated discoveries in accordance with 36 CFR 800.13.

Proposed signatories to this MOA will be the NRC, the ID SHPO, AES, and the ACHP, if it so chooses. Because the Shoshone-Bannock Tribes have not responded to our consultation letters, they are not included as either a signatory or concurring party.

As mentioned in the introduction to this letter, the NRC staff invites the ACHP to participate in the NHPA Section 106 consultation for this project pursuant to 36 CFR 800.6(a)(1) and requests your response within 15 calendar days of receipt of this letter and enclosures. If you have any questions or require additional information, please contact the Stephen Lemont, Senior Project Manager, at (301) 415-5163, or by email at Stephen.Lemont@nrc.gov.

Sincerely,

/RA/

Diana Diaz-Toro, Chief
Environmental Review Branch A
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

Enclosures: See attached list

cc w/o enclosures: S. Pengilly, ID SHPO
J. Kay, AES

LIST OF ENCLOSURES

1. Letter to Reid Nelson, Director, Office of Federal Agency Programs, Advisory Council on Historic Preservation, from D. Diaz-Toro, Chief, Environmental Review Branch A, Environmental Protection and Performance Assessment Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission. Subject: Section 106 Consultation, Notification of the Issuance of, and Request for Comments on the Draft Environmental Impact Statement for the Proposed AREVA Enrichment Services LLC Eagle Rock Enrichment Facility in Bonneville County, Idaho. July 14, 2010. ADAMS Accession No. ML101650142.

2. Letter to Janet Gallimore, Executive Director, Idaho State Historical Society, from Andrea Kock, Chief, Environmental Review Branch, Environmental Protection and Performance Assessment Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission. Subject: Initiation of the National Historic Preservation Act Section 106 Process for AREVA Eagle Rock Enrichment Facility. June 17, 2009. ADAMS Accession No. ML091660205.

3. Letter to Janet Gallimore, Executive Director and State Historic Preservation Officer, Idaho State Historical Society, from Andrea Kock, Chief, Environmental Review Branch, Environmental Protection and Performance Assessment Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission. Subject: Continuing Consultation under the National Historic Preservation Act Section 106 Process for the Proposed AREVA Eagle Rock Enrichment Facility. February 17, 2010. ADAMS Accession No. ML100471023.

4. Letter to Chairman Alonzo A. Cohy, The Shoshone Bannock Tribes, from Andrea Kock, Chief, Environmental Review Branch, Environmental Protection and Performance Assessment Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission. Subject: Initiation of the National Historic Preservation Act Section 106 Process for AREVA Eagle Rock Enrichment Facility. July 29, 2009. ADAMS Accession No. ML092090444.

5. Letter to Chairman Alonzo A. Cohy, The Shoshone Bannock Tribes, from Andrea Kock, Chief, Environmental Review Branch, Environmental Protection and Performance Assessment Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission. Subject: Continuing Consultation under the National Historic Preservation Act Section 106 Process for the Proposed AREVA Eagle Rock Enrichment Facility. February 19, 2010. ADAMS Accession No. ML100480141.

6. A Class III Cultural Resource Inventory of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho (Volume I: Report and Volume II: Cultural Resource Documentation). Prepared by Western Cultural Resource Management, Inc. November 21, 2008. ADAMS Accession Nos. ML101330115, ML101330103, ML101330104, ML101330106, ML101330107, ML101330108, ML101330109, ML101330110, ML101330125, ML101330112, ML101330113, and ML101330114. **NOTE: These documents contain sensitive information and are withheld from public disclosure.**

7. Amendment to: A Class III Cultural Resource Inventory of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho. Prepared by Western Cultural Resource Management, Inc. August 28, 2009. ADAMS Accession No. ML101330102. **NOTE: This document contains sensitive information and is withheld from public disclosure.**

8. Personal communication from Holly Gilbert, Idaho National Laboratory, to Daniel O'Rourke, Argonne National Laboratory. Subject: Uniqueness of Late 19th Century Homestead Sites in the General Vicinity of the EREF Property. April 26, 2010. ADAMS Accession No. ML101790310.

9. Letter to George A. Harper, Vice President, Engineering, Eagle Rock Enrichment Facility, AREVA Enrichment Services LLC, from Kenneth C. Reid, State Archaeologist and Deputy State Historic Preservation Officer, Idaho State Historical Society. Subject: Class III Cultural Resource Inventory of the Proposed Eagle Rock Enrichment Facility, Bonneville County, and amendment. September 29, 2009. ADAMS Accession No. ML092810293.

10. Archaeological and Historic Survey Report, Archaeological Survey of Idaho. In: *Eagle Rock Enrichment Facility Transmission Line*. NWI 10247.001. Prepared by North Wind, Inc. January 21, 2010. ADAMS Accession Nos. ML101330124 and ML101330101. **NOTE: These documents contain sensitive information and are withheld from public disclosure.**

11. Letter to U.S. Nuclear Regulatory Commission from Jim A. Kay, Licensing Manager, AREVA Enrichment Services LLC. Subject: Response to Request for Additional Information - AREVA Enrichment Services LLC Environmental Report for the Eagle Rock Enrichment Facility - RAI 6.a. Unanticipated Discovery Plan. September 18, 2009. ADAMS Accession No. ML092640684.

12. A Treatment Plan for Historic Site MW004 in the Area of the Proposed Eagle Rock Enrichment Facility, Bonneville County, Idaho. Prepared by Western Cultural Resource Management, Inc. January 28, 2010. ADAMS Accession No. ML100540693. **NOTE: This document contains sensitive information and is withheld from public disclosure.**

13. Letter to Stephen Lemont, Environmental Review Branch, Nuclear Regulatory Commission, from Susan Pengilly, Deputy SHPO and Compliance Officer, Idaho State Historical Society. Subject: AREVA Eagle Rock Enrichment Facility, Bonneville County, Idaho. May 3, 2010. ADAMS Accession No. ML101330126.

Preserving America's Heritage

September 20, 2010

Diana Diaz-Toro, Chief
Environmental Review Branch A
Environmental Protection and Performance Assessment Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Ref: Proposed Eagle Rock Enrichment Facility Project
Bonneville County, Wyoming

Dear Ms. Diaz-Toro:

On September 1, 2010, the Advisory Council on Historic Preservation (ACHP) received your notification regarding the adverse effects of the referenced undertaking on the John Leopard Homestead, which is eligible for listing in the National Register of Historic Places. Based upon the information you provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed at this time. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, consulting party, or other party, we may reconsider this decision. Should circumstances change, and you determine that our participation is needed, please notify us accordingly.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the Idaho SHPO and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with the opportunity to review this undertaking. If you have any questions, feel free to contact Tom McCulloch at 202-606-8554, or via email at tmcculloch@achp.gov.

Sincerely,

Raymond V. Wallace

Raymond V. Wallace
Historic Preservation Technician
Office of Federal Agency Programs

ADVISORY COUNCIL ON HISTORIC PRESERVATION
1100 Pennsylvania Avenue NW, Suite 803 □ Washington, DC 20004
Phone: 202-606-8503 □ Fax: 202-606-8647 □ achp@achp.gov □ www.achp.gov

July 29, 2009

Chairman Alonzo A. Cohy
The Shoshone-Bannock Tribes
P.O. Box 306
Fort Hall, ID 83203

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT SECTION 106 PROCESS FOR AREVA EAGLE ROCK ENRICHMENT FACILITY

Dear Chairman Cohy:

On December 30, 2008, AREVA Enrichment Services (AES) submitted an environmental report (ER) to the U.S. Nuclear Regulatory Commission (NRC). The ER is one part of an application for a license to authorize construction, operation, and decommissioning of a proposed uranium enrichment facility. The NRC is in the initial stages of developing an Environmental Impact Statement (EIS) for the proposed facility to be located near Idaho Falls, Idaho in Bonneville County. The facility, if licensed, would use a gas centrifuge enrichment technology to enrich the isotope uranium-235 in uranium hexafluoride up to 5 percent by weight. The EIS that NRC is preparing will document the environmental impacts associated with the construction, operation, and decommissioning of the proposed facility.

The proposed AES parcel is approximately 1,700 hectares (4,200 acres). In November 2008, AES commissioned an archeological survey of the facility's footprint which involves approximately 381 hectares (941 acres) of the total parcel. The report is attached along with a map showing the area of potential effect, as it appears in the AES ER. As a result of the surveys, AES recorded a number of isolated finds and concluded that one find (MW004) was potentially eligible for inclusion in the National Register of Historic Places. AES proposes minimizing any adverse impacts through a mitigation plan for this find.

In the ER, AES indicated their submission of the archeological surveys to your office. As required by 36 CFR 800.4(a), the NRC is requesting the views of the tribe on any further actions necessary to identify historic properties that may be affected by the construction, operation, and decommissioning of the proposed facility, including whether find MW004 should be included in the National Register of Historic Places.

We intend to use the EIS process to comply with Section 106 of the National Historic Preservation Act of 1966, as described in 36 CFR Part 800.8. After assessing information you provide, we will determine any additional actions that are necessary to comply with the Section 106 consultation process. If you have any questions or comments, or need any additional information, please contact Mathews George of my staff on 301-415-7065.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

Enclosure: Volume Report

cc: Willie Preacher
The Shoshone-Bannock Tribes

Stan Day
AES Eagle Rock Enrichment Facility

George A. Harper, P.E.
AES Eagle Rock Enrichment Facility

September 16, 2009

Chairman Alonzo A. Cohy
The Shoshone-Bannock Tribes
P.O. Box 306
Fort Hall, ID 83203

SUBJECT: NOTIFICATION OF AN EXEMPTION REQUEST FROM U.S. NUCLEAR REGULATORY COMMISSION'S (NRC) REGULATED ACTIONS SUBMITTED BY AREVA ENRICHMENT SERVICES (AES)

Dear Chairman Cohy:

On July 29, 2009, U.S. Nuclear Regulatory Commission (NRC) staff sent a letter to the office of The Shoshone-Bannock Tribe. My staff requested input from the tribe on identifying any cultural or historic properties that may be affected by the construction, operation and decommissioning of the proposed facility. We look forward to receiving your written feedback soon and will incorporate the details of your response within our environmental impact statement (EIS).

In addition, we want to communicate pertinent and new information to your office. On June 17, 2009, AREVA Enrichment Services (AES) requested an exemption that would allow them to commence certain activities prior to NRC's completion of its environmental review under Title 10 of the Code of Federal Regulations, Part 51 (10 CFR 51) and the NRC's issuance of a Materials License for the Eagle Rock Enrichment Facility under 10 CFR 70.

NRC's approval of the exemption would permit AES to undertake the following list of actions. These actions do not affect radiological health and safety or common defense and security.

- Clearing, Grading and Erosion Control
- Excavation, Including Rock Blasting and Removal
- Construction of Storm Water Detention Pond, Highway Access and Site Roads
- Installation of Utilities, Storage Tanks and Fences
- Installation of Parking Areas, Construction Buildings, Offices, Warehouses and Guardhouses.

If approved, the exemption would allow AREVA to commence the above pre-construction activities before NRC completes its licensing determination. AREVA plans on performing this pre-construction work in September 2010. The approval to perform pre-construction does not equate to approval of a license to construct, operate and decommission a facility. AREVA assumes the risk of completing these activities and then not receiving a license to construct and operate the facility.

The pre-construction activities of both the environmental impacts above and construction of the facility will be considered in NRC's environmental impact statement which will be issued after pre-construction activities begin. We will continue to communicate with you regarding important issues for NRC to consider on assessing the environmental impacts of these pre-construction and construction activities

NRC anticipates completing its review of the exemption request by mid December 2009. If approved, AES will supplement its Environmental Report to distinguish between the environmental impacts of the construction activities covered by the exemption and construction activities which will not be undertaken until after issuance of a license by the NRC. This supplement will allow NRC staff to consider the impacts of pre-construction in its cumulative impact analysis within the EIS.

Please respond by October 15, 2009 with any comments or concerns that you may have on this subject. If you have any questions or comments with regard to this request from AES, or need any additional information, please contact Mathews George of my staff on 301-415-7065.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

cc:
Willie Preacher
The Shoshone-Bannock Tribes

Stan Day
AES Eagle Rock Enrichment Facility

George A Harper, P.E.
AES Eagle Rock Enrichment Facility

February 19, 2010

Chairman Alonzo A. Cohy
The Shoshone-Bannock Tribes
P.O. Box 306
Fort Hall, Idaho 83203

SUBJECT: CONTINUING CONSULTATION UNDER THE NATIONAL HISTORIC PRESERVATION ACT SECTION 106 PROCESS FOR THE PROPOSED AREVA EAGLE ROCK ENRICHMENT FACILITY

Dear Chairman Cohy:

The U.S. Nuclear Regulatory Commission (NRC) previously contacted you by letter dated July 29, 2009, informing you of the AREVA Enrichment Services LLC (AES) submittal of an application to NRC for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility in Bonneville County, Idaho, and NRC's preparation of an Environmental Impact Statement (EIS) in support of its licensing action for the facility. The proposed facility, the Eagle Rock Enrichment Facility (EREF), would be located about 20 miles west of Idaho Falls. The purpose of this letter is to inform you that the scope of the project has been modified to include the construction and operation of an electrical transmission line and associated structures needed to power the proposed EREF.

On January 29, 2010, AES submitted supplemental information to NRC for the construction and operation of a proposed transmission line, an electrical substation, and substation upgrades. The locations of the transmission line and substations are shown in the January 29, 2010, submittal, a copy of which is enclosed. Also, AES commissioned an archeological survey of the area of potential effect (APE) associated with the transmission line route; the Idaho State Historic Preservation Officer has a copy of the survey report. As discussed in AES' January 29, 2010, submittal, no historic properties were identified in the APE of the proposed transmission line project. NRC's EIS for the proposed EREF will include a discussion of the impacts associated with the construction and operation of this transmission line project. Likewise, NRC's Section 106 consultations for the EREF project will expand to include cultural resources along the proposed transmission line right-of-way.

The new transmission line and associated structures would be located entirely on private land within Bonneville County. Rocky Mountain Power (RMP), a division of PacifiCorp, will be the builder, owner, and operator. The transmission line would originate from the existing RMP Bonneville Substation and extend in a general westward direction to the new point of service, the Twin Buttes Substation on the proposed EREF site. Beginning at the Bonneville Substation, the proposed transmission line route is west along the county road (West 65 North Street) to the existing RMP Kettle Substation, a distance of approximately 14.5 kilometers (9 miles), continuing west to the eastern portion of the EREF site, a distance of approximately 1.2 kilometer (0.75 mile), then north within the EREF site to its northern end, then west and south to the new RMP Twin Buttes Substation, for a distance of approximately 6.4 kilometers (4 miles). The area being affected by the transmission line is approximately 84 hectares (208 acres).

As noted in our earlier letter, NRC intends to use the EIS process to comply with Section 106 of the National Historic Preservation Act, as described in 36 CFR Part 800.8. As required by 36 CFR 800.4(a), NRC is requesting the views of the tribes on any further actions necessary to identify historic properties that may be affected by the construction and operation of the proposed transmission line and associated structures. After assessing information you provide, we will determine any additional actions that are necessary to comply with the Section 106 consultation process.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions regarding the project, or need additional information, please contact Stephen Lemont, of my staff at 301-415-5163 or Stephen.Lemont@nrc.gov.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosure: As stated

Docket No: 70-7015

Lemont, Stephen

From: Lemont, Stephen
Sent: Friday, March 12, 2010 11:26 AM
To: 'Willie Preacher'
Subject: RE: Follow-up to Consultation Letters Regarding AREVA Eagle Rock Uranium Enrichment Facility, Bonneville County, Idaho

Willie,

Thank you for responding. I apologize for the misspelling of Chairman Coby's name in the letters. I noticed that too when I was preparing my email.

I look forward to hearing back from you regarding the letters.

Thanks again.

Steve

Stephen Lemont

Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

From: Willie Preacher [mailto:wpreacher@sbtribes.com]
Sent: Friday, March 12, 2010 11:06 AM
To: Lemont, Stephen
Subject: RE: Follow-up to Consultation Letters Regarding AREVA Eagle Rock Uranium Enrichment Facility, Bonneville County, Idaho

Stephen the name of our Chairman in Alonzo A. Coby, you do have it right in this letter to me, but the letter that was sent to him personally is addressed to Alonzo A. Cohy. We are reviewing the letters and will get back with you and as soon as we can. -Willie

From: Lemont, Stephen [mailto:Stephen.Lemont@nrc.gov]
Sent: Friday, March 12, 2010 8:39 AM
To: Willie Preacher
Subject: Follow-up to Consultation Letters Regarding AREVA Eagle Rock Uranium Enrichment Facility, Bonneville County, Idaho

Dear Mr. Preacher:

I am Steve Lemont, the new U.S. Nuclear Regulatory Commission (NRC) Project Manager for the Environmental Impact Statement (EIS) that the NRC is preparing in support of its licensing action for the proposed AREVA Eagle Rock uranium enrichment facility in Bonneville County. NRC contacted Chairman Coby regarding this project in a letter dated July 29, 2009, and more recently in a letter dated February 19, 2010, regarding the proposed electrical transmission line for the AREVA Eagle Rock facility. For your reference, I have attached these two letters to this email.

The purpose of this email is to follow-up on the two letters, to request the views of the Shoshone-Bannock Tribes regarding any further actions necessary to identify historic properties that may be affected by the construction, operation, and decommissioning of the proposed AREVA Eagle Rock facility and the proposed transmission line and associated structures. Find MW004, which is discussed in the July 29 letter, has been determined to be eligible for listing in the National Register of Historic Places. Any other information you may have would also be appreciated. After assessing information you provide, we will identify any further actions that are necessary to comply with the consultation process under Section 106 of the National Historic Preservation Act.

If you have any questions regarding the project, or need additional information, please contact me at 301-415-5163 or Stephen.Lemont@nrc.gov. I appreciate your assistance in this matter, and look forward to receiving your response. Thank you.

Sincerely,
Steve Lemont

Stephen Lemont

Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

October 8, 2010

Chairman Nathan Small
The Shoshone-Bannock Tribes
P.O. Box 306
Fort Hall, Idaho 83203

SUBJECT: CONTINUING CONSULTATION UNDER THE NATIONAL HISTORIC PRESERVATION ACT SECTION 106 PROCESS FOR DEVELOPMENT OF MEMORANDUM OF AGREEMENT FOR THE AREVA ENRICHMENT SERVICES LLC EAGLE ROCK ENRICHMENT FACILITY PROJECT IN BONNEVILLE COUNTY, IDAHO

Dear Chairman Small:

The Nuclear Regulatory Commission (NRC) previously contacted The Shoshone-Bannock Tribes concerning the AREVA Enrichment Services LLC (AES) proposed Eagle Rock Enrichment Facility (EREF) in Bonneville County. Our most recent consultation letter, dated February 19, 2010, concerned alterations to the project's scope for the National Historic Preservation Act (NHPA) Section 106 review. Also, with a letter dated July 14, 2010, the NRC provided a copy of the project's Draft Environmental Impact Statement (EIS) for comment.

Preliminary findings regarding historical and cultural resources are discussed in the Draft EIS, Sections 3.3, 4.2.2, 4.2.16.2, and 4.3.2. One of these findings is that the proposed project is expected to cause an adverse effect on historic site MW004, the John Leopard Homestead. Site MW004 is a multi-component site consisting of a late nineteenth century to early twentieth century homestead component and a prehistoric component. The historic component of this site has been determined eligible for listing on the National Register of Historic Places (NRHP), and consists of a dug out depression, one possible privy depression, a cement lined cistern, one trash concentration, two rock piles, and a scatter of domestic trash. The prehistoric component consists of two non-diagnostic obsidian biface fragments and two flakes.

The NRC is in the process of drafting a Memorandum of Agreement (MOA) with the Idaho State Historic Preservation Office (ID SHPO) and AES, which will address the mitigation of the impacts to site MW004. In addition, because AES has indicated that final design of the proposed EREF and associated 161-kV transmission line project will not be completed until after the NRC license is issued, the draft MOA will also address the survey by AES for historical and cultural resources of any previously un-surveyed areas that may be identified following final design (e.g., transmission line construction pulling and tensioning sites). The draft MOA will also include reference to AES's unanticipated discoveries and monitoring plan.

Pursuant to Title 36 of the *U.S. Code of Federal Regulations* (36 CFR) Part 800.6(c)(3), the NRC staff invites The Shoshone-Bannock Tribes to participate in the development of the MOA for this project as a concurring party, and requests your response within 15 calendar days of receipt of this letter. As a concurring party, The Shoshone-Bannock Tribes will have the opportunity to review the draft MOA and provide comments prior to enactment of the agreement. If you accept the NRC's invitation, please provide the name and title of, and contact information for, the tribal member with whom we would coordinate for the MOA development.

If you have any questions regarding the MOA or the EREF project, or need any additional information, please contact Stephen Lemont at 301-415-5163, or by email at Stephen.Lemont@nrc.gov.

Sincerely,

/RA/

Diana Diaz-Toro, Chief
Environmental Review Branch A
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

cc: S. Pengilly, ID SHPO
J. Kay, AES

Biwer, Bruce M.

From:	Lemont, Stephen [Stephen.Lemont@nrc.gov]
Sent:	Friday, October 29, 2010 6:54 AM
To:	wpreacher@sbtribes.com
Subject:	RE: Invitation to Participate as Concurring Party in Section 106 Memorandum of Agreement for AREVA Eagle Rock Project 102910
Attachments:	Letter to Shoshone-Bannock Tribes re Section 106 MOA Participation (ML102740387).pdf

Hi, Willie. I am just following up to find out if the council has considered the invitation in the attached letter, and if The Shoshone-Bannock Tribes would like to be a concurring party on the subject Memorandum of Agreement.

Thanks,
Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

From: Lemont, Stephen
Sent: Friday, October 08, 2010 3:30 PM
To: 'wpreacher@sbtribes.com'
Subject: Invitation to Participate as Concurring Party in Section 106 Memorandum of Agreement for AREVA Eagle Rock Project

Hi, Willie. This is to give you advance notice of a letter the U.S. Nuclear Regulatory Commission (NRC) is sending to Chairman Small regarding the development of a National Historic Preservation Act Section 106 Memorandum of Agreement (MOA) for the AREVA Eagle Rock Enrichment Facility project.

The letter, a copy of which is attached, discusses the need for, and basic content of, the MOA. However, the main purpose of the letter is to invite The Shoshone-Bannock Tribes to participate in the development of the MOA as a concurring party. In that role, The Tribes will have the opportunity to review the draft MOA and provide comments prior to enactment of the agreement. The MOA is currently being drafted by the NRC's attorneys and when ready, will be distributed for review by the parties to the agreement. These parties already include the Idaho State Historic Preservation Office and AREVA, in addition to the NRC.

Please contact me if you have any questions regarding the letter or if you need additional information. We hope the Tribes will accept the NRC's invitation and look forward to working with you on the development of the MOA. Thank you.

Sincerely,
Steve

Stephen Lemont, Ph.D.
Senior Environmental Project Manager

U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

The attachment referred to in this document is included in Section B.2 of Appendix B, directly preceding this document.

NRC FORM 699
(9-2003)

U.S. NUCLEAR REGULATORY COMMISSION

CONVERSATION RECORD

DATE
11/30/2010

TIME

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU
Willie Preacher

TELEPHONE NO.
208-478-3707

TYPE OF CONVERSATION
☐ VISIT
☐ CONFERENCE
☒ TELEPHONE
☐ INCOMING
☒ OUTGOING

ORGANIZATION
The Shoshone-Bannock Tribes, Fort Hall Indian Reservation, Idaho

SUBJECT
Follow-up on NRC Invitation to The Shoshone-Bannock Tribes to be a Concurring Party on the Section 106 Memorandum of Agreement for the AREVA Eagle Rock Project

SUMMARY *(Continue on Page 2)*
I told Mr. Preacher that I was calling to follow up on the October 8, 2010, letter that the NRC sent to Chairman Small of The Shoshone-Bannock Tribes, inviting the Tribes to be a concurring party on the National Historic Preservation Act Section 106 Memorandum of Agreement, or MOA, for the AREVA Eagle Rock project. Mr. Preacher said that he gave the letter to Carolyn Smith, the Tribes' cultural resources person; and that he would check with her and get back to me.

Continue on Page 2

ACTION REQUIRED
None.

NAME OF PERSON DOCUMENTING CONVERSATION
Stephen Lemont

SIGNATURE

DATE
11/30/2010

ACTION TAKEN

TITLE OF PERSON TAKING ACTION

SIGNATURE OF PERSON TAKING ACTION

DATE

From: Lemont, Stephen [mailto:Stephen.Lemont@nrc.gov]
Sent: Tuesday, December 21, 2010 10:19 AM
To: 'wpreacher@sbtribes.com'
Subject: Follow-up on NRC Invitation to Participate as Concurring Party in Section 106 Memorandum of Agreement for AREVA Eagle Rock Project

Willie,

The purpose of this email is to check back with you once more to find out if the Shoshone-Bannock Tribes would like to be a concurring party on the subject Memorandum of Agreement (MOA) for the AREVA Eagle Rock Enrichment Facility project. The U.S. Nuclear Regulatory Commission's (NRC's) invitation to be a concurring party was provided in the attached letter that was sent to Chairman Small on October 8, 2010. When I called you about this invitation on November 30, you mentioned that you had given the letter to Carolyn Smith, the Tribes' Cultural Resources Coordinator, and that you would check with her and get back to me.

The purpose and basic content of the MOA is discussed in the attached letter. As a concurring party, the Tribes will have the opportunity to review the draft MOA and provide comments prior to enactment of the agreement. The draft MOA is currently being completed by the NRC's attorneys and when ready, will be distributed for review by the parties to the agreement. Presently, these parties include the Idaho State Historic Preservation Office and AREVA, in addition to the NRC.

Please contact me if you have any questions regarding the attached letter or if you need additional information. We hope the Shoshone-Bannock Tribes will accept the NRC's invitation and look forward to working with you on the development of the MOA.

I look forward to receiving your reply soon. Thank you.

Sincerely,
Steve

Stephen Lemont
Senior Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-5163
Fax: 301-415-5369
Email: Stephen.Lemont@nrc.gov

The attachment referred to in this document precedes the October 29, 2010, email to Willie Preacher included in Section B.2 of Appendix B.

NRC FORM 699
(9-2003)

U.S. NUCLEAR REGULATORY COMMISSION

CONVERSATION RECORD

DATE: 12/22/2010

TIME:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU: Carolyn Smith, Cultural Resources Coordinator

TELEPHONE NO.: 208-221-0326

ORGANIZATION: The Shoshone-Bannock Tribes, Fort Hall, Idaho

SUBJECT: NRC Invitation to the Tribes to be a Concurring Party on the Section 106 MOA fo r AREVA Eagle Rock Project

TYPE OF CONVERSATION

- [ ] VISIT
- [ ] CONFERENCE
- [x] TELEPHONE
  - [ ] INCOMING
  - [x] OUTGOING

SUMMARY *(Continue on Page 2)*

I confirmed the phone message I received today from Ms. Smith that the Tribes do want to be a party to the MOA. I explained that the Tribes would be a concurring party, meaning that they would be able to comment on the draft MOA. I said that the NRC is in the process of completing the draft MOA, and that it wi ll be sent to the Idaho SHPO, AREVA, and the Tribes for review; and that I intend to hold a conference call to discuss a ll of our comments.

Ms. Smith said to mail the draft MOA to her and to Willie Preacher. I said tha t I will probably send an advance copy of the draft MOA and transmittal letter to them by email, and asked for Ms. Smith's em ail address. It is csmith@sbtribes.com.

Continue on Page 2

ACTION REQUIRED: None

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Stephen Lemont		12/22/2010

ACTION TAKEN:

TITLE OF PERSON TAKING ACTION	SIGNATURE OF PERSON TAKING ACTION	DATE

NRC FORM 699 (9-2003) PRINTED ON RECYCLED PAPER

B.3 Other Consultation

October 2, 2009

Mr. Keith Dunbar
National Park Service
Chief of Park Planning
and Environmental Compliance
909 First Avenue,
Seattle, WA 98104

Dear Mr. Dunbar:

On December 30, 2008, AREVA Enrichment Services (AES) submitted an Environmental Report (ER) to the U.S. Nuclear Regulatory Commission (NRC). The ER is one part of an application for a license to authorize construction, operation, and decommissioning of a proposed uranium enrichment facility. The NRC staff is in the initial stages of developing an Environmental Impact Statement (EIS) for the proposed facility to be located 20 miles west of Idaho Falls, Idaho in Bonneville County. The facility, if licensed, would use a gas centrifuge based technology to enrich the isotope uranium-235 in uranium hexafluoride up to 5 percent by weight. The EIS will document the impacts associated with the construction, operation, and decommissioning of the proposed facility.

The proposed location for the facility is due north of the Hell's Half Acre National Natural Landmark. The proposed AES parcel is approximately 1,700 hectares (4,200 acres). AES states that the facility footprint encompasses 381 hectares (941 acres) of the site for which construction, operation, and decommissioning activities will occur. The proposed site is situated on the north side of U.S. Highway 20. The coordinates for the center of the action area are 43 degrees, 35 minutes, 7.37 seconds North and longitude 112 degrees, 25 minutes, 28.71 seconds West. The project area is currently mixed used for open range land and agriculture.

The Hell's Half Acre National Natural Landmark is managed by the Bureau of Land Management (BLM) as a Wildlife Study Area. The BLM has been contacted by both the NRC and AES concerning the project. The NRC wants to provide the National Park Service with an opportunity to comment on the abovementioned project. The NRC is requesting the views of your office on any impacts that may be caused by the construction, operation and decommissioning of the proposed facilitity. After assessing information you provide, we will determine if any additional actions or mitigation actions are necessary.

We would like a response from your office by ***Oct 31, 2009,*** if possible. If you have any questions or comments with regard to this, or need any additional information, please contact Mathews George of my staff on 301-415-7065.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

United States Department of the Interior

NATIONAL PARK SERVICE
Pacific West Region
909 First Avenue, Fifth Floor
Seattle, Washington 98104-1060

IN REPLY REFER TO
EC-Hell's Half-Acre

December 28, 2009

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

RE: Application for license for proposed uranium enrichment facility north of Hell's Half-Acre Lava Field National Natural Landmark

Dear Ms. Kock:

Thank you for your letter dated October 2, 2009, concerning AREVA Enrichment Services' proposed uranium enrichment facility near Hell's Half-Acre Lava Field National Natural Landmark (NNL), which the National Park Service (NPS) oversees as part of the NNL program. As you know, Hell's Half-Acre Lava Field NNL is located on land owned by the Bureau of Land Management (BLM) and is a Wilderness Study Area (WSA). (Please note that it is not a Wildlife Study Area as the October letter stated.) It also appears that the State of Idaho may own sections of land within the NNL.

Hell's Half-Acre Lava Field NNL was designated in 1976 primarily for its geologic significance (e.g., single event, geologic process with a fully exposed pahoehoe lava flow). However, the NNL also provides an outstanding example of pioneer vegetation establishing itself on a lava flow. This is evidenced by numerous mosses, lichens, and ferns that have established themselves in, on, and among fractures, depressions, and small lava caves throughout the NNL/WSA. In addition, a significant number of visitors hike on trails located adjacent to the NNL/WSA, and many recreate on the lava flow within the NNL/WSA.

The Idaho National Laboratory (INL), administered by the U.S. Department of Energy, is located directly adjacent to the proposed project. The INL is an ecological field laboratory where scientists may set up long-term experiments which answer questions about human impact on the natural environment. It is a leading center for nuclear safety research, defense programs, nuclear waste technology and advanced energy concepts, and has an extensive environmental monitoring program both on- and off-site. Off-site monitoring data and information can be found at: http://www.stoller-eser.com/index.htm. DOE also funds a similar state-run monitoring program: http://www.deq.idaho.gov/inl_oversight/index.cfm.
The greatest concern that has been identified on the INL is on-site groundwater contamination. Airborne radioactive contamination has not been detected off-site. While the proposed AREVA facility is not a

TAKE PRIDE IN AMERICA

DOE project and is not officially connected with the INL, the INL has extensive information that should be relevant for developing impact analyses in the Environmental Impact Statement (EIS), because of the proposed project's close proximity to the INL. NPS recommends the following areas of analysis:

- Potential groundwater and airborne radioactive contamination that might impact the NNL/WSA.
- Lighting impacts to the dark night sky at the NNL, as well as at Craters of the Moon National Monument and Preserve (CRMO) located 45 miles west from the proposed facility.
- Cumulative impacts on the dark night sky at the NNL and CRMO, especially since there is already a significant light dome associated with the INL.
- Construction impacts, especially from excessive dust, to the unique botanical resources of the NNL (e.g., dust could settle and accumulate on these plants, including outlier juniper trees, depriving them of needed sunlight).

We would appreciate receiving a copy of the Draft EIS (please see attached instructions). Please also notify the following persons when the Draft EIS is available for review:

Mr. Steve Gibbons,
Coordinator
National Natural Landmarks Program
National Park Service
810 State Route 20
Sedro Woolley, WA 98284
Telephone: (360) 854-7203
FAX: (360) 856-1934
Email:
steve_gibbons@nps.gov

Mr. Doug Neighbor,
Superintendent
Craters of the Moon National Monument & Preserve
PO Box 29
Arco, ID 83213
Phone: (208) 527-1310
FAX: (208) 527-3073
E-mail:
doug_neighbor@nps.gov

Ms. Kelly Powell
Realty Specialist
168 S. Jackson St., 2nd Floor
Seattle, WA 98104-2853
Phone: (206) 220-4106
FAX: (206) 447-4246
Email:
kelly_powell@nps.gov

Thank you for the opportunity to provide these comments.

Sincerely,

Rory D. Westberg

Rory D. Westberg
Acting Regional Director
Phone: (206) 220-4106
FAX: (206) 220-4159
Rory_Westberg@nps.gov

Attachment

U.S. Department of the Interior
ENVIRONMENTAL REVIEW DISTRIBUTION REQUIREMENTS
September 2007

To expedite requests to the Department of the Interior (Department) for the review of environmental documents under the National Environmental Policy Act (NEPA); Section 4(f) of the Department of Transportation Act; project planning, design, and application documents under various Federal authorities; and requests for coordination and consultation early in project planning; please note the following:

Appendix III to the Council on Environmental Quality's (CEQ) regulations (49 FR 49778; December 21, 1984) lists the Director, Office of Environmental Project Review (now the Office of Environmental Policy and Compliance (OEPC)), as the individual responsible for receiving and commenting on other agencies' environmental documents. If properly followed, this process results in your agency receiving one set of comments consolidating the views of all commenting bureaus and offices within the Department. Therefore, please send all officially approved documents requesting environmental and other project review to the following address:

Director, Office of Environmental Policy and Compliance
U.S. Department of the Interior
Main Interior Building (MS 2462)
1849 C Street, NW
Washington, DC 20240

OEPC is the central coordination office for the Department on all environmental reviews proposed by other federal agencies. It is unnecessary to send copies of environmental and other project review requests to any other bureau or office within Interior, unless that bureau or office has been a part of your coordination or cooperating agency processes. However, a sufficient number of copies must still be sent to OEPC to allow distribution of the document to those Interior bureaus identified by OEPC to participate in the review process. The requested numbers of copies allow for simultaneous review throughout each bureau thus producing the Department's consolidated review in the shortest possible time. The following numbers of copies should be provided:

Twelve (12) copies of a draft and six (6) copies of a final document for projects in the Eastern United States including MN, IA, MO, AR, and LA. The same numbers of copies should be provided for projects in HI and the U.S. Territories (American Samoa, Commonwealth of Northern Mariana Islands, Guam, Puerto Rico, and U.S. Virgin Islands).

Eighteen (18) copies of a draft and nine (9) copies of a final document for projects in the Western United States westward of the western boundaries of MN, IA, MO, AR, and LA.

Eighteen (18) copies of a draft and nine (9) copies of a final document for review requests which are national in scope (e.g. agency regulations, scientific reports, special reports, program plans, and other interagency documents).

Sixteen (16) copies of a draft and eight (8) copies of a final document for projects in AK.

When a review document does not have draft and final versions, the larger number of copies is requested.

In an effort to help reduce the Federal government's cost for the reproduction of paper documents and to help reduce waste, we ask that you provide the URL for projects available on the Internet. Copies of environmental and project review documents that are available in CD-ROM or any other widely used electronic method may also be furnished in lieu of paper copies. When this is the case, we would still appreciate receiving one paper copy for our official file. Please provide an Internet address, CDs, one paper copy, or paper copies, as appropriate, directly to this office.

Appendix II to the CEQ regulations (49 FR 49754; December 21, 1984) lists Interior bureaus and offices having jurisdiction by law or special expertise on environmental quality issues. Appendix II should be used to determine appropriate Interior contacts for coordination during early planning, NEPA scoping, and other preliminary activities. Since this document may be out of date, it is recommended that you consult the following Internet addresses for the latest bureau contacts. http://ceq.eh.doe.gov/nepa/nepanet.htm or http://www.doi.gov/oepc/nepacontacts.html.

All early coordination and scoping requests, environmental assessments or reports not accompanied by project planning or design documents, findings of no significant impact, preliminary or working draft or final environmental impact statements, and similar material of a regional nature should be sent directly to Interior bureaus at the field level. It is not necessary to send copies of early coordination documents to the OEPC in Washington, DC. Please note that our Regional Environmental Officers (REO) serve as representatives of OEPC and should be contacted if there are questions about these procedures at the field level. A REO list is attached and is also available on our web site at: http://www.doi.gov/oepc/reo.html.

Representatives of your organization should establish direct working relationships with Departmental and bureau field level offices, which welcome such contact. This type of relationship is important not only during early project coordination, but also to expedite the early resolution of environmental issues that would otherwise surface during the formal review of a project document. In many cases, Interior's comments on an environmental review will designate an office at the field level for follow-up activities.

We ask that you make a wide distribution of this information throughout your organization. Such a distribution will greatly assist our agencies in better meeting our obligations under existing laws and in planning projects that will be mutually beneficial.

Attachment (REO List)

U.S. DEPARTMENT OF THE INTERIOR

OFFICE OF ENVIRONMENTAL POLICY and COMPLIANCE

REGIONAL ENVIRONMENTAL OFFICES

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1849 C STREET, NW., MS 2342
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DEPUTY DIRECTOR
MARY JOSIE BLANCHARD

MAY 7, 2007

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DENVER - CO, IA, KS, MO, MT, NE, ND, SD, UT, WY

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Denver Federal Center
Denver, CO 80225-0007
(Bldg. 56, Rm. 1003, 6th & Kipling)

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Patricia S. Port
Harry (Chip) E. Demarest
John A. Perez

Phone: 510-817-1477
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Oakland, CA 94607

PORTLAND - ID, OR, WA

Preston A. Sleeger
Trisha Allison O'Brien
Mandy Stanford

Phone: 503-231-6157
Fax: 503-231-2361
500 NE Multnomah Street, Suite 356
Portland, OR 97232-2036

ANCHORAGE - AK

Pamela A. Bergmann
Douglas L. Mutter

Phone: 907-271-5011
Fax: 907-271-4102
1689 C Street, Room 119
Anchorage, AK 99501-5126

June 24, 2009

Mr. Paul Kjellander
Office of Energy Resources
322 East Front Street
P.O. Box 83720
Boise, ID 83720

SUBJECT: REQUEST FOR INFORMATION REGARDING ENDANGERED SPECIES AND CRITICAL HABITATS FOR THE PROPOSED AREVA EAGLE ROCK ENRICHMENT FACILITY LOCATED IN BONNEVILLE COUNTY, IDAHO

Dear Mr. Kjellander:

On December 30, 2008, AREVA Enrichment Services (AES) submitted an environmental report (ER) to the U.S. Nuclear Regulatory Commission (NRC). The ER is one part of an application for a license to authorize construction, operation, and decommissioning of a proposed uranium enrichment facility. The NRC staff is in the initial stages of developing an Environmental Impact Statement (EIS) for the proposed facility to be located near Idaho Falls, Idaho in Bonneville County. The facility, if licensed, would use a gas centrifuge based technology to enrich the isotope uranium-235 in uranium hexafluoride up to 5 percent by weight. The EIS will document the impacts associated with the construction, operation, and decommissioning of the proposed facility.

NRC requests information on the following items within the action area for the proposed facility, if available:

- Endangered or threatened species, or other species of concern to the state of Idaho, that are known to be or likely to be at the proposed AREVA site, and nearest known locations based on the element occurrence database. Enclosed is a preliminary list of species compiled from Idaho Fish and Game (IDFG) county lists (plants) and the IDFG Snake River Basalts Ecological Section list (animals). Habitat on the site consists of sagebrush steppe, non-native grassland (primarily crested wheatgrass and cheatgrass), and irrigated crops.

- Nearest known lek sites (based on the element occurrence database), nesting habitat, brood-rearing habitat, and winter habitat for greater sage grouse, migratory status of the local population, the number of leks nears the site, and trends.

- Information on Sagebrush Reserves (location, size, species, management) or other sensitive or rare habitats in the project vicinity.

- Information on mule deer, pronghorn, and elk herds, including seasonal habitat (such as crucial winter habitat areas), local migration routes, and concerns such as population trends.

- Important migration routes for migratory birds.

- Maps or GIS shapefiles regarding species or habitats.

- Concerns of IDFG regarding potential impacts of the proposed project.

The proposed AES parcel is approximately 1,700 hectares (4,200 acres). AES states that the facility footprint encompasses 381 hectares (941 acres) of the site for which construction, operation, and decommissioning activities will occur. The proposed site is situated within Bonneville County, Idaho, on the north side of U.S. Highway 20, about 113 km (70 miles) west of the Idaho/Wyoming State line. The coordinates for the center of the action area are 43 degrees, 35 minutes, 7.37 seconds North and longitude 112 degrees, 25 minutes, 28.71 seconds West.

We have enclosed additional background information relating to ecological resources on the site, including a map showing the action area, as it appears in the AES ER.

We intend to use the EIS process to comply with Section 7 of the Endangered Species Act of 1973, as amended. After assessing information you provide, we will determine what additional actions are necessary to comply with the Section 7 consultation process. If you have any questions or comments, or need any additional information, please contact Gloria Kulesa of my staff at 301-415-5308.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

Enclosures:
1. Special Status Plants and Species
2. Ecology Field Survey Report
3. Fall 2008 Survey
4. Sage Grouse Survey Report

Idaho Special Status Plants and Species of Greatest Conservation Need

Earth lichen (*Catapyrenium congestum*)
Gray willow (*Salix glauca*)
Green spleenwort (*Asplenium trichomanes-ramosum*)
Iodine bush (*Allenrolfea occidentalis*)
Meadow milkvetch (*Astragalus diversifolius*)
Payson's bladderpod (*Lesquerella paysonii*)
Payson's milkvetch (*Astragalus paysonii*)
Red glasswort (*Salicornia rubra*)
Slickspot peppergrass (*Lepidium papilliferum*)
Ute ladies'-tresses (*Spiranthes diluvialis*)
Western Sedge (*Carex occidentalis*)

Utah valvata snail (*Valvata utahensis*)

Northern leopard frog (*Rana pipiens*)

Ring-necked snake (*Diadophis punctatus*)

Black-crowned night-heron (*Nycticorax nycticorax*)
Blue grosbeak (*Passerina caerulea*)
Burrowing owl (*Athene cunicularia*)
California gull (*Larus californicus*)
Ferruginous hawk (*Buteo regalis*)
Franklin's gull (*Larus pipixcan*)
Juniper titmouse (*Baeolophus ridgwayi*)
Lesser goldfinch (*Carduelis psaltria*)
Merlin (*Falco columbarius*)
Northern pintail (*Anas acuta*)
Peregrine falcon (*Falco peregrinus*)
Pinyon jay (*Gymnorhinus cyanocephalus*)
Sharp-tailed grouse (*Tympanuchus phasianellus*)
Swainson's hawk (*Buteo swainsoni*)
Virginia's warbler (*Vermivora virginiae*)
White-faced ibis (*Plegadis chihi*)
Yellow-billed cuckoo (*Coccyzus americanus*)

Canada lynx (*Lynx canadensis*)
Gray wolf (*Canis lupus*)
Great Basin ground squirrel (*Spermophilus mollis*)
Grizzly bear (*Ursus arctos*)
Idaho pocket gopher (*Thomomys idahoensis*)
Little pocket mouse (*Perognathus longimembris*)
Merriam's shrew (*Sorex merriami*)
Pygmy rabbit (*Brachylagus idahoensis*)
Spotted bat (*Euderma maculatum*)
Townsend's big-eared bat (*Corynorhinus/Plecotus townsendii*)
Townsend's pocket gopher (*Thomomys townsendii*)
Wyoming ground squirrel (*Spermophilus elegans*)

Enclosure 1

February 18, 2010

Paul Kjellander
Idaho Office of Energy Resources
322 East Front Street, Suite 560
Post Office Box 83720
Boise, Idaho 83720-0199

SUBJECT: COORDINATION REGARDING ELECTRICAL TRANSMISSION LINE FOR PROPOSED AREVA EAGLE ROCK URANIUM ENRICHMENT FACILITY, BONNEVILLE COUNTY, IDAHO

Dear Mr. Kjellander:

As discussed in our earlier letter to you dated June 24, 2009, AREVA Enrichment Services LLC (AES) has submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility. The proposed facility, the Eagle Rock Enrichment Facility (EREF), would be located in Bonneville County, Idaho, near Idaho Falls. NRC is preparing an Environmental Impact Statement (EIS) in support of its licensing action for this facility. The purpose of the present letter is to report an addition to the scope of the EREF project, a 161-kilovolt (KV) transmission line to power the facility.

On January 29, 2010, AES submitted information to NRC for the construction and operation of a proposed transmission line, an electrical substation, and substation upgrades. The locations of the transmission line and substations are shown in the January 29, 2010 submittal, a copy of which is enclosed. NRC's EIS for the proposed EREF will include a discussion of the impacts associated with the construction and operation of the transmission line project. NRC requests your office's feedback on potential impacts to electrical distribution in the area of the EREF or on any other matter related to the proposed transmission line or the EREF project itself. Also, we understand that your office coordinates with other State of Idaho agencies on energy resource matters. Therefore, please feel free to share this letter with other State agencies. NRC is already coordinating separately with the Idaho Department of Fish and Game and Idaho Department of Environmental Quality.

The new transmission line and associated structures would be located entirely on private land within Bonneville County. Rocky Mountain Power (RMP), a division of PacifiCorp, will be the builder, owner, and operator. The transmission line would originate from the existing RMP Bonneville Substation and extend in a general westward direction to the new point of service, the Twin Buttes Substation on the proposed EREF site. Beginning at the Bonneville Substation, the proposed transmission line route is west along the county road (West 65 North Street) to the existing RMP Kettle Substation, a distance of approximately 14.5 kilometers (9 miles), continuing west to the eastern portion of the EREF site, a distance of approximately 1.2 kilometer (0.75 mile), then north within the EREF site to its northern end, then west and south to the new RMP Twin Buttes Substation, for a distance of approximately 6.4 kilometers (4 miles). The area being affected by the transmission line is approximately 84 hectares (208 acres).

If you have any questions regarding this request, or need additional information, please contact Stephen Lemont of my staff at 301-415-5163 or Stephen.Lemont@nrc.gov.

Sincerely,

/RA/

Andrea Kock, Chief
Environmental Review Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosure:
January 29, 2010 Ltr.

Docket No: 70-7015

November 23, 2010

Mr. Matt McMillen, Director
Environmental Compliance Division
Loan Programs Office, DOE
U.S. Department of Energy LP 10
1000 Independence Avenue, SW
Washington, DC 20585

SUBJECT: OCTOBER 21, 2010, TELEPHONE CONVERSATION REGARDING COMPLIANCE WITH FARMLAND PROTECTION POLICY ACT FOR THE PROPOSED AREVA ENRICHMENT SERVICES LLC EAGLE ROCK ENRICHMENT FACILITY IN BONNEVILLE COUNTY, IDAHO

Dear Mr. McMillen:

The U.S. Nuclear Regulatory Commission (NRC) appreciates the participation of U.S. Department of Energy (DOE) Loan Programs Office (LPO) staff in telephone conversations with NRC staff regarding compliance with the Farmland Protection Policy Act (FPPA) for the proposed AREVA Enrichment Services LLC (AES) Eagle Rock Enrichment Facility (EREF). For this project, the NRC is currently reviewing the license application from AES, and the DOE LPO has offered AES a conditional loan guarantee.

During an October 21, 2010, telephone conversation between Mr. Joseph Montgomery, DOE LPO consultant, and Mr. Stephen Lemont of the NRC, Mr. Montgomery related the DOE LPO's decision to go through the FPPA process for the proposed EREF project, including the completion of the necessary U.S. Department of Agriculture forms over the next few weeks. This is appropriate because the DOE's loan guarantee action is subject to the requirements of the FPPA, but the NRC's licensing action is not. It was also discussed that in the Final Environmental Impact Statement the NRC is currently preparing in support of its licensing action, there will be language to the effect that (1) the DOE conditional loan guarantee action is subject to the requirements of the FPPA for purposes of the EREF project, and (2) the DOE has completed/will complete the required farmland conversion impact rating and any associated actions or determinations in compliance with the FPPA, as necessary.

Please contact Mr. Stephen Lemont of my office at 301-415-5163, or by email at Stephen.Lemont@nrc.gov, if you have any questions. Thank you.

Sincerely,

/RA/

David L. Skeen, Acting Deputy Director
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 70-7015

cc: Joseph Montgomery, DOE

APPENDIX C
AIR QUALITY ANALYSIS

APPENDIX C
AIR QUALITY ANALYSIS

Air quality modeling was performed to estimate concentration increments at the property boundary as a result of air emissions during the construction phase at the proposed Eagle Rock Enrichment Facility (EREF). Air quality modeling was performed for criteria air pollutants including sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and particulate matter (PM) (particulate matter equal to or smaller than 10 micrometers in aerodynamic diameter [PM_{10}] and particulate matter equal to or smaller than 2.5 micrometers in aerodynamic diameter [$PM_{2.5}$]). Air quality modeling for ozone (O_3) and lead was not conducted.[1] The following sections describe the air dispersion model, determination of surface characteristics, meteorological data processing, terrain data processing, and the modeling assumptions behind the results and the discussions presented in Section 4.2.4.

C.1 Selection of Air Dispersion Model

For this modeling analysis, the latest version of the AMS/EPA Regulatory MODel (AERMOD) modeling system (Version 07026) (EPA, 2009) was used. AERMOD is the U.S. Environmental Protection Agency's (EPA's) preferred or recommended model for a wide range of regulatory applications (EPA, 2009). AERMOD is a refined, steady-state plume model that incorporates air dispersion based on state-of-the-art planetary boundary layer turbulence structure and scaling concepts, building wake effects, and plume downwash for point sources. It includes treatment of both surface and elevated sources (including multiple-point, area, and volume sources) and both simple and complex terrain, and can be applied to rural and urban areas. The model uses hourly sequential preprocessed meteorological data to estimate not only airborne concentrations but also dry and wet deposition fluxes for both particulate and gaseous emissions of nonreactive pollutants for averaging times ranging from one hour to periods as long as one to multiple years.

AERMOD contains three major separate components:

- AERMET – meteorological data preprocessor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts

- AERMAP – terrain data preprocessor that incorporates complex terrain using digital elevation data

[1] At a regional level, ozone is formed by highly complex and nonlinear reactions involving nitrogen oxide (NO_x) and volatile organic compound (VOC) precursors. Air quality modeling for ozone requires extensive meteorological and emission data processing and substantial computational resources. Neither construction- nor operation-related activities would produce impacts high enough to have significant influence on regional ozone levels. No ozone modeling is therefore warranted. Air quality modeling for lead was not conducted because there are no significant sources of lead emissions related to the projected activities at the proposed EREF. Since the phase-out of leaded gasoline in the 1970s, ambient air impacts from lead emissions during construction and operation of the proposed EREF would be insignificant.

- AERMOD – air dispersion model to estimate airborne concentrations and dry/wet deposition fluxes

In addition, AERSURFACE, a surface characteristics preprocessor part of AERMOD that estimates surface characteristics including surface roughness length, albedo, and Bowen ratio for input to the AERMET was also run to complement and refine the AERMOD results. Two other related modeling programs, BPIPPRIME (a tool that calculates building parameters to account for building downwash effects of point source(s) for input to the AERMOD) and AERSCREEN (a screening model for AERMOD that produces estimates of regulatory design concentrations without the need for meteorological data and is designed to produce more conservative results than AERMOD) are also part of the AERMOD dispersion modeling system. However, neither would have produced relevant or more accurate results applicable to the proposed EREF site and were therefore not used.

C.2 Determination of Surface Characteristics

In order to compute the fluxes and stability of the atmosphere, AERMET needs three surface characteristic parameters: surface roughness length, albedo, and the Bowen ratio. The surface roughness length is a measure of irregularities at the surface, including vegetation, topography, and structures, which influence the near-surface wind stress. Surface roughness length plays the most crucial role in determining the magnitude of mechanical turbulence and the stability of the boundary layer. The typical values range from 0.001 meter (0.003 feet) over calm water surfaces and 1 meter (3.3 feet) or more over a forest or urban area. Albedo is the ratio of the amount of radiation reflected from the surface to the amount of radiation incident on the surface. Typical values range from 0.1 for thick deciduous forests to 0.9 for fresh snow. The Bowen ratio, an indicator of surface moisture, is the ratio of sensible heat flux to the latent heat flux. The Bowen ratio is used to determine the planetary boundary layer parameters for convective conditions. The typical values range from 0.1 over water to 10 over desert at midday.

Surface characteristics should represent the meteorological data at the application site. If such data is not available for the application site, then data from a nearby representative measurement site must instead be used. The proposed EREF has no onsite meteorological station. The nearest meteorological station is near the Materials and Fuels Complex (MFC) within the Idaho National Laboratory (INL) site, which is located about 11 miles (18 kilometers) west of the proposed EREF. The MFC and proposed EREF sites are located in the middle of the Eastern Snake River Plain (ESRP), which is a wide flat bow-shaped depression extending about 400 miles (640 kilometers). The elevation and terrain features and land uses surrounding the MFC area are comparable to those of the proposed EREF site. Accordingly, the MFC site is considered adequately representative of the proposed EREF site and was used as a substitute for onsite meteorological data for this assessment.

The AERSURFACE tool was developed to aid users in obtaining realistic and reproducible surface characteristic values, which is, in turn, input to AERMET. AERSURFACE requires land cover data from the U.S. Geological Survey (USGS) National Land Cover Data 1992 archives (NLCD92). These surface characteristics for the MFC site, downloaded from the USGS Web site (http://seamless.usgs.gov/), were used as representative of the land cover types around the proposed EREF site.

Seasonal surface characteristics were determined for each of twelve 30-degree sectors for this analysis. A default upwind distance of 1 kilometer (0.6 mile) from the measurement sites on the proposed EREF property was used to determine the surface roughness values, per recommendation in EPA's AERMOD Implementation Guide (EPA, 2009). A default domain defined by a 10-kilometer by 10-kilometer (6.2-mile by 6.2-mile) area centered on the measurement sites at the proposed EREF property was used for determination of albedo and Bowen ratio. To determine the Bowen ratio, the surface moisture condition around the proposed site was needed to characterize the proposed EREF site relative to climatological normals. Surface moisture conditions for the Bowen ratio were determined by year, based on the 30-year (1971–2000) annual precipitation record at the Pocatello Municipal Airport, which has more comprehensive precipitation data than other nearby meteorological sites, including National Weather Service's (NWS) MFC station (NCDC, 2009a,b). For this analysis, annual precipitation data from the MFC site for the years 2004–2008 were compared to the representative dry, normal, and wet conditions established using the 30-year Pocatello Airport precipitation data. If annual precipitation for each of these years falls within lower-30th percentile or the upper-30th percentile of the 30-year record, dry and wet conditions, respectively, are assigned. Otherwise, average moisture conditions are assigned. Year 2005 was characterized as a wet condition; 2008 was characterized as a dry condition; 2004, 2006, and 2007 were characterized as average with respect to annual rainfall. Additional inputs to affect surface characteristic values include whether the site is an airport, an arid region, or experiences continuous snow cover most of the winter. For this analysis, the MFC site was identified as a non-airport site, so the AERSURFACE model would select high surface roughness values representative of commercial and industrial land cover. For selection of an arid region such as the location of the proposed EREF, the AERSURFACE model uses the seasonal characteristics for shrubland and bare rock/sand/clay categories that are more representative of a desert area. Appropriate seasonal values for the three parameters are applied, depending on whether the site experiences continuous snow cover most of the winter.

C.3 Meteorological Data Processing

The meteorological data preprocessor AERMET requires three types of data: data collected from an onsite measurement program such as from an instrumented tower, if available; NWS hourly surface observations; and NWS twice-daily upper air soundings. As discussed above, the MFC site was assumed to represent the proposed EREF site for this assessment.

Meteorological data at the MFC site, including wind speed and direction, ambient temperature, and standard deviation of horizontal wind direction, were collected at two heights (10 and 76 meters [33 and 249 feet]). Surface wind data measured at an elevation of 1.5 meters from a nearby airport are typically used to describe surface characteristics for the site. Three airports exist within a 50-mile (80-kilometer) radius of the proposed EREF: Idaho Falls (31 kilometers [19 miles]), Pocatello (76 kilometers [47 miles]), and Rexburg (58 kilometers [36 miles]). Because of its proximity to the proposed EREF site, hourly surface meteorological data from Idaho Falls Fanning Field were used for estimating boundary layer parameters. Twice-daily upper soundings data from the NWS station in Boise, Idaho, were used. This station is located in the Western Snake River Plain and is the only station in Idaho at which upper soundings data are collected. The most recent five years (2004 to 2008) of meteorological data from the NWS station at the Idaho Falls Fanning Field Airport, together with meteorological data from MFC and upper sounding data from the NWS station in Boise, Idaho, were processed as inputs to the

AERMOD model. Table C-1 presents detailed information on surface, upper-air, and onsite meteorological stations, data file formats, anemometer heights, and distance and direction from the proposed EREF.

Typically, the wind speed threshold of sensors at monitoring stations not located at an airport is low (e.g., 0.134 meter per second [0.440 feet per second] for the MFC data), but the wind speed threshold for airport data is set at 1 meter per second (3.28 feet per second) by default in AERMET. Accordingly, AERMOD modeling results using non-airport data could be higher than using airport data. However, AERMOD tends to overpredict non-buoyant low-level releases in low-wind speed conditions (Paine and Connors, 2009), resulting in a conservative estimation of impact. An additional AERMOD run was made assuming the sensor threshold of 1 meter per second (3.28 feet per second) to determine the sensitivity of the modeling results to sensor threshold values. Tables C-2 and C-3 provide an indication of AERMOD's sensitivity to wind speed thresholds.

Figure C-1 presents a wind rose at the 10-meter (33-foot) level of the MFC station for the 2004–2008 period. The area experiences the predominant southwest–northeast wind flows at the proposed EREF site. The mountains bordering the ESRP would act to channel the prevailing west winds into a southwesterly flow due to the northeast–southwest orientation of the ESRP between the bordering mountain ranges. The prevailing wind directions are from the southwest (about 16 percent of the time) and secondarily from the south-southwest (13.3 percent). Winds from northeast and north-northeast combined occur more than 18 percent of the time. In January, winds blow equally from south-southwest, north-northeast, and northeast; in February, north-northeast winds prevail. From March through December,

Table C-1 Meteorological Data Information

Station Name	Station ID	Location (lat/long)[a]	Elevation (m)	File Format	Anemometer Height (m)	Distance & Direction from Proposed EREF[a]	Notes
Surface							
Idaho Falls Fanning Field	KIDA USAF: 725785 WBAN: 24145	43.517°N 112.067°W	1445	ISHD (TD-3505)	7.9	19 mi east-southeast	NA[b]
Upper Air							
Boise	BOI WBAN: 24131 WMO: 72681	43.57°N 116.22°W	871	FSL	NA	190 mi west	NA
Onsite							
Materials and Fuels Complex (MFC)	NA	43.594°N 112.652°W	1568	NA	10 and 76	11 mi west	Sensor threshold = 0.134 m/s

[a] Proposed EREF: latitude=43.585°N; longitude=112.425°W; elevation=1583 m.

[b] NA = not applicable.

Source: Hukari, 2009; NCDC, 2009c; NOAA, 2009.

Table C-2 Maximum Air Quality Impacts Due to Emissions Associated with Construction Activities of the Proposed Eagle Rock Enrichment Facility in Idaho (Sensor Threshold = 0.134 meter per second [0.440 feet per second])

		Concentration (μg/m^3, except ppm for CO)[b]				Percent of NAAQS/SAAQS[c]	
Pollutant[a]	Averaging Time	Maximum Increment[d]	Background[e]	Total	NAAQS/ SAAQS	Increment	Total
CO	1 hour	0.8	4.3	5.1	35	2.4	14.6
	8 hours	0.1	2.1	2.2	9	1.5	24.9
NO_2	Annual	1.0	11.3	12.3	100	1.0	12.3
SO_2	3 hours	11.3	159.7	171.0	1300	0.9	13.2
	24 hours	1.8	62.8	64.6	365	0.5	17.7
	Annual	0.1	15.7	15.8	80	0.1	19.7
PM_{10}	24 hours	355.2	52.0	407.2	150	236.8	271.5
	Annual	15.9	22.0	37.9	50	31.8	75.8
$PM_{2.5}$	24 hours	15.9	21.0	36.9	35	45.3	105.3
	Annual	1.6	6.4	8.0	15	10.5	53.2

[a] CO = carbon monoxide; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter ≤2.5 μm; PM_{10} = particulate matter ≤10μm; and SO_2 = sulfur dioxide.
[b] To convert μg/m^3 to ppm for gaseous pollutants, such as SO_2 and NO_2, divide values in μg/m^3 by the product of 40.82 and the molecular weight.
[c] NAAQS = National Ambient Air Quality Standards; SAAQS = State Ambient Air Quality Standards.
[d] For short-term (≤24 hours) averages, the highest of the second-highest modeled concentrations over five years is presented, except for PM_{10} and $PM_{2.5}$. For 24-hour PM_{10}, high-6th-high over five years (2004–2008) is presented. For $PM_{2.5}$, the highest of the five-year average of the 8th-highest concentration at each receptor is presented. For long-term (annual) average, the highest of the annual averages over five years is presented for NO_2 and SO_2. The highest of multi-year averaged annual means across the receptors are presented for PM_{10} and $PM_{2.5}$.
[e] Source: Table 4-4.

winds blow predominantly from southwest or south-southwest. Average annual wind speed is about 4.1 meters per second (9.2 miles per hour), and relatively low calm winds are recorded about 0.17 percent of the time due to low sensor threshold. Wind speeds of 4.6 meters per second (10.4 miles per hour) are the highest in spring, reducing in summer and fall, and become the lowest at 3.4 meters per second (7.7 miles per hour) in winter.

C.4 Terrain Data Processing

The AERMAP terrain data preprocessor was used to account for the effects of terrain features. The terrain elevations for source and receptor locations were estimated based on the Digital Elevation Model (DEM) elevation data in the USGS DEM format (USGS, 2008). For the AERMOD modeling, 12 vertices for the construction site of about 75 hectares (185 acres) were identified, and sixty-two receptors were placed along the property line of the proposed EREF site, the overall size of which is about 208 hectares (515 acres). No offsite receptors were

Table C-3 Maximum Air Quality Impacts Due to Emissions Associated with Construction Activities of the Proposed Eagle Rock Enrichment Facility in Idaho (Sensor Threshold = 1 meter per second [3.28 feet per second])

		Concentration (μg/m³, except ppm for CO)[b]				Percent of NAAQS/SAAQS[c]	
Pollutant[a]	Averaging Time	Maximum Increment[d]	Background[e]	Total	NAAQS/ SAAQS	Increment	Total
CO	1 hour	0.3	4.3	4.6	35	0.9	13.2
	8 hours	0.1	2.1	2.2	9	0.8	24.1
NO_2	Annual	0.8	11.3	12.1	100	0.8	12.1
SO_2	3 hours	6.3	159.7	166.0	1300	0.5	12.8
	24 hours	1.0	62.8	67.8	365	0.3	17.5
	Annual	0.1	15.7	15.8	80	0.1	19.7
PM_{10}	24 hours	189.9	52.0	241.9	150	126.6	161.3
	Annual	13.1	22.0	35.1	50	26.2	70.2
$PM_{2.5}$	24 hours	12.0	21.0	33.0	35	34.1	94.1
	Annual	1.3	6.4	7.7	15	8.6	51.3

[a] CO = carbon monoxide; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter ≤2.5 μm; PM_{10} = particulate matter ≤10 μm; and SO_2 = sulfur dioxide.

[b] To convert μg/m³ to ppm for gaseous pollutants, such as SO_2 and NO_2, divide values in μg/m³ by the product of 40.82 and the molecular weight.

[c] NAAQS = National Ambient Air Quality Standards; SAAQS = State Ambient Air Quality Standards.

[d] For short-term (≤24 hours) averages, the highest of the second-highest modeled concentrations over five years is presented except PM_{10} and $PM_{2.5}$. For 24-hour PM_{10}, high-6th-high over five years (2004–2008) is presented. For $PM_{2.5}$, the highest of the five-year average of the 8th-highest concentration at each receptor is presented. For long-term (annual) average, the highest of the annual averages over five years is presented for NO_2 and SO_2. The highest of multi-year averaged annual means across the receptors are presented for PM_{10} and $PM_{2.5}$.

[e] Source: Table 4-6.

established because most emission sources at the construction site would be either area sources or point/mobile sources with low stack height, resulting in most emissions being released at ground or near-ground level. Thus, maximum concentrations would occur in the immediate vicinity of the source and would be adequately reflected in property boundary receptors. The AREAPOLY source option was used to specify an area source as an irregularly shaped polygon of a construction site, and one elevation representative of the construction site was needed for input to the AERMOD. For receptors, AERMAP determines the elevations of receptors along with hill height scale, which is the elevation of the terrain feature that dominates the flow at a receptor of interest. The area surrounding the proposed EREF has no significant terrain features nearby, so hill height scales for all receptors were equal to their elevations.

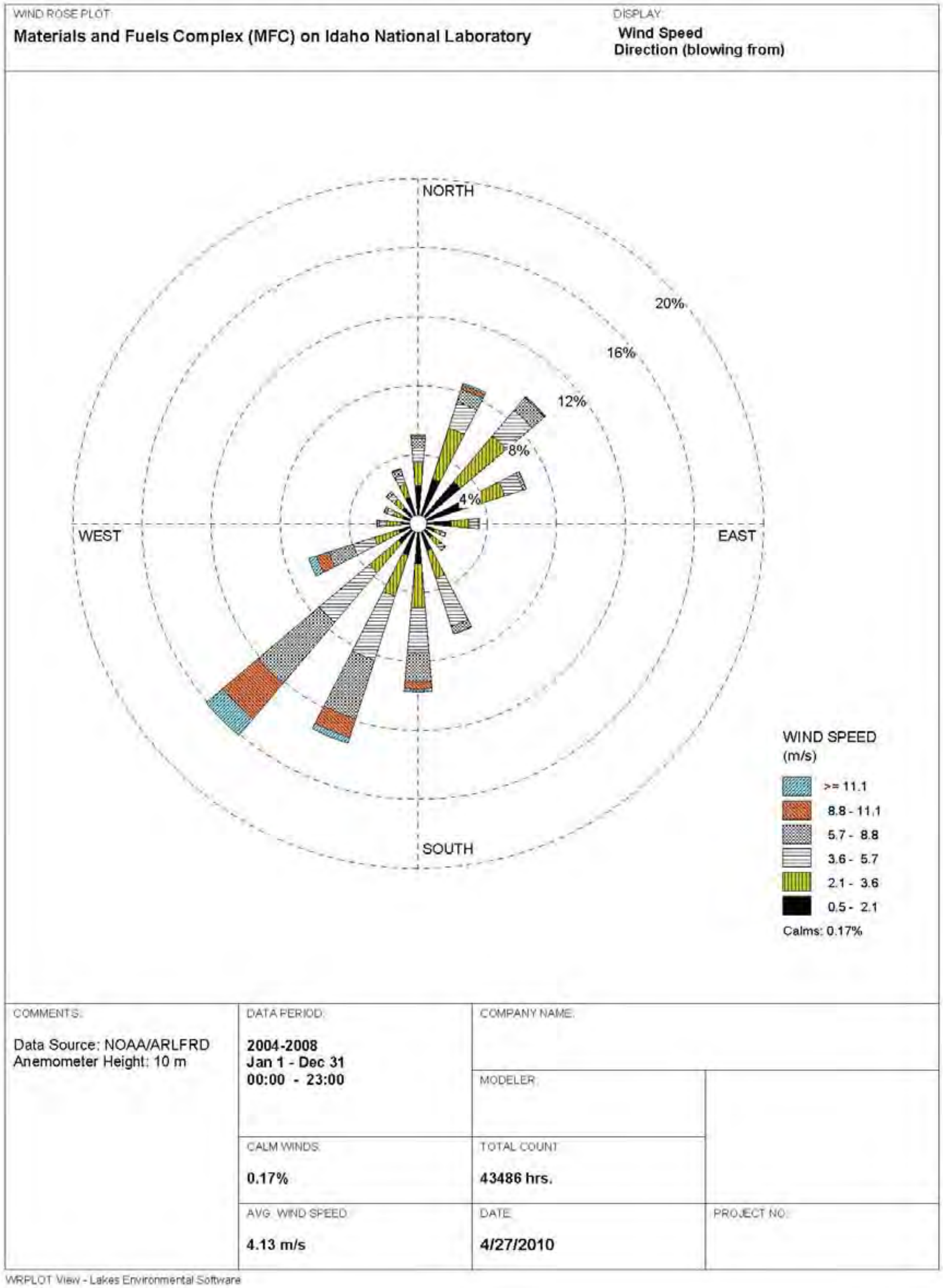

Figure C-1 Wind Rose at 10-meter (33-foot) Level at the Meteorological Station near the Materials and Fuels Complex within the Idaho National Laboratory in Idaho, 2004–2008 (data from Hukari, 2009)

C.5 Modeling Assumptions

The following assumptions were established for air quality modeling and modeling result interpretations:

- Construction activities would occur 5 days/week (or 260 days per year) and 10 hours per day work schedule (7 am to 5 pm). In AERMOD, modeling was conducted for all 365 days in a year, and maximum 24-hour concentration and annual average concentrations were selected. Annual average concentrations were adjusted by multiplying the ratio of annual working days to the possible number of days in a year (260/365).

- Dry and wet deposition mechanisms are uncertain and are not recommended by EPA to be included in regulatory compliance decisions (EPA, 2005, 2009), and thus are not recommended for inclusion for typical applications unless special cases or objectives exist (e.g., deposition impacts on vegetation). Accordingly, no dry and wet depositions for construction-related PM modeling were assumed, i.e., conservatively, all PMs were presumed to be airborne.

- For the purpose of modeling demonstrations of compliance with the National Ambient Air Quality Standards (NAAQS), the following modeled concentrations were used for comparison with the NAAQS as recommended by EPA (EPA, 2005): highest of the second-highest modeled concentrations over five years were presented for 1-hour and 8-hour CO and 3-hour and 24-hour SO_2 and the highest of the annual averages over five years were presented for annual averages for SO_2 and NO_2. For PM_{10}, high-6th-high over five years (2004–2008) was presented. For $PM_{2.5}$, the highest of the five-year average of the high-8th-high concentration at each receptor was presented. Highest of five-year average annual means across the receptors for PM_{10} and $PM_{2.5}$ were presented.

- It was assumed that about 75 hectares (185 acres) would be disturbed in any year somewhere in the 208-hectare (515-acre) proposed EREF construction site. Accordingly, emissions corresponding to disturbance of 75 hectares (185 acres) were uniformly distributed over the 208-hectare (515-acre) proposed EREF construction site. Note that modeled concentration increments are expected to be higher than values predicted here when construction activities would occur near the construction site boundary.

C.6 Modeling Results

Air quality modeling estimates concentration increments over the background. To obtain total concentrations for comparison with applicable air quality standards, these modeled concentration increments were added to measured background concentrations at ambient air quality monitoring sites operated by the Idaho Department of Environmental Quality (see Table 4-4) that are representative of the proposed EREF site.

To quantify the anticipated bias introduced by the AERMOD model in estimating dispersion concentrations in low wind speed conditions, the model was run at two low wind speed default values, 0.134 meters per second (0.440 feet per second) and the higher 1 meter per second (3.28 feet per second), with the results displayed in Tables C-2 and C-3, respectively. At either low wind speed default value, the model predicted exceedance of only the particulate standards.

However, allowing the model to use the higher low wind speed default value resulted in significant reductions in the extent to which the PM_{10} standard was exceeded, 271.5 percent to 161.3 percent, and reduced the anticipated dispersed concentrations of $PM_{2.5}$ from 105.3 percent of the standard to 94.1 percent of the standard.

During the construction phase, estimated maximum concentration increments and total concentrations are shown in Tables C-2 and C-3 for a given sensor threshold of 0.134 meter per second (0.440 feet per second) and a default AERMET sensor threshold of 1 meter per second (3.28 feet per second), respectively.

C.7 References

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APPENDIX D
TRANSPORTATION METHODOLOGY, ASSUMPTIONS, AND IMPACTS

APPENDIX D
TRANSPORTATION METHODOLOGY, ASSUMPTIONS, AND IMPACTS

D.1 Introduction

This appendix presents the detailed methodology, input parameters and assumptions, and results for the transportation impact assessment performed in this Environmental Impact Statement (EIS) for the proposed Eagle Rock Enrichment Facility (EREF). The analysis evaluates the transportation of:

- natural uranium hexafluoride (UF_6) (i.e., not enriched) feed to the proposed EREF
- enriched UF_6 product to fuel fabrication facilities and international ports
- depleted UF_6 to a conversion facility
- empty feed, product, and tails cylinders containing residual contamination
- low-level radioactive waste (LLRW) for disposal

Because rail access is not convenient to the proposed EREF site, AREVA Enrichment Services, LLC (AES) has proposed to use only heavy-haul tractor-trailer combination trucks for the transport of radioactive shipments.

The impact assessment determines the origin and destination of each type of shipment, the amount of radioactive material in each shipment and the associated packaging, and impacts to the environment from these shipments. The WebTRAGIS and RADTRAN 5 computer codes (Johnson and Michelhaugh, 2003; Weiner et al., 2008) were used extensively in this analysis and are discussed in more detail later. The appendix is organized into separate sections that describe the radioactive materials, the shipping routes, the dose assessments, and the results.

D.2 Methodology

The transportation impact assessment considers human health risks from routine transport (normal, incident-free conditions) of radioactive materials and from potential accidents. In both cases, risks associated with the nature of the cargo itself, or “cargo-related” impacts, and those related to the vehicle (regardless of type of cargo), or “vehicle-related” impacts, are considered.

The RADTRAN 5 computer code (Neuhauser and Kanipe, 2003; Weiner et al., 2008) was used in the assessment of routine (incident-free) and accident cargo-related risk to estimate the radiological impacts on collective populations. RADTRAN was originally developed by Sandia National Laboratories in the late 1970s to facilitate calculations presented in *Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes, Volumes I and II* (NUREG-0170) (NRC, 1977) and is the nationally accepted standard program for calculating the risks of transporting radioactive materials. The code has been updated several times to remain abreast of improvements in computer technology and has been used extensively to calculate population risks associated with the transportation of radioactive materials by truck, rail, air, ship, or barge.

D.2.1 Routine Transportation Risk Methodology

The radiological risk associated with routine (incident-free) transportation is cargo-related and results from the potential exposure to low levels of external radiation near a loaded shipment. It is assumed that there are no cargo-related risks posed by incident-free transport of hazardous chemicals. No direct chemical exposure to radioactive material will occur during routine transport because, as discussed in Section D.2.2.2, the packaging is designed and maintained to ensure containment and shielding of contents during normal transport. Any leakage or unintended release of radiological or chemical material is considered under accident risks.

Vehicle-related risks during routine transportation are caused by potential exposure to increased vehicular emissions. These emissions include diesel exhaust, tire and brake particulate emissions, and fugitive dust suspended from the roadbed by passing vehicles.

D.2.1.1 Collective Population Risk

The radiological risk associated with routine (incident-free) transportation results from the potential exposure to low-level external radiation in the vicinity of loaded shipments. Even under routine transportation conditions, some radiological exposure would occur. Because radiological consequences (dose) would occur as a direct result of normal operations, the probability of exposure is assumed to be 1 in RADTRAN 5. Because risk is typically defined as the product of probability and consequence/magnitude, the risk is then equivalent to the estimated dose. This risk is directly comparable to the accident risk discussed in Section D.2.2.

For routine transportation, RADTRAN 5 considers major groups of potentially exposed persons and calculates exposure risks from routine highway transportation for the following population groups:

- *Persons along the Route (Off-Link)*. Collective doses were calculated for all persons living or working within 0.8 kilometer (0.5 mile) of each side of a transportation route. The total number of persons within the 1.6-kilometer (1-mile) corridor was calculated separately for each route considered in the assessment.

- *Persons Sharing the Route (On-Link)*. Collective doses were calculated for persons in all vehicles sharing the transportation route. This group includes persons traveling in the same or opposite directions as the shipment, as well as persons in vehicles passing the shipment.

- *Persons at Stops*. Collective doses were calculated for persons who might be exposed while a shipment is stopped en route. For truck transportation, these stops include those for refueling, food, and rest.

- *Crew Members*. Collective doses were calculated for truck transportation crew members involved in the actual shipment of material. Workers involved in loading or unloading were not considered.

The doses calculated for the first three population groups were summed to yield the collective dose to the public; the dose calculated for the fourth group represents the collective dose to occupationally exposed workers.

The RADTRAN 5 calculations for routine dose generically compute the dose rate as a function of distance from a point source (Neuhauser and Kanipe, 2003). Associated with the calculation of routine doses for each exposed population group are parameters such as the radiation field strength, the source–receptor distance, the duration of exposure, vehicular speed, stopping time, traffic density, and route characteristics (such as population density). The RADTRAN manual contains derivations of the equations used and descriptions of these parameters (Neuhauser and Kanipe, 2003; Weiner et al., 2008).

D.2.1.2 Maximally Exposed Individual Risk

In addition to the assessment of the routine (incident-free) collective population risk, the risk to a maximally exposed individual (MEI) was estimated. In RADTRAN 5, the MEI is assumed to be located 30 meters (100 feet) from the transport route as the radioactive shipment passes at a speed of 24 kilometers per hour (15 miles per hour).

D.2.1.3 Vehicle-Related Risk

Vehicle-related health risks resulting from routine (incident-free) transportation are associated with the generation of air pollutants during shipment and are independent of cargo. The health endpoint assessed under routine transportation conditions was the excess latent mortality from inhalation of vehicular emissions. These emissions consist of particulate matter in the form of diesel engine exhaust, tire and brake particulates, and fugitive dust suspended from the roadway by transport vehicles. Vehicle-related risks from routine transportation were calculated for each shipment by multiplying the total distance traveled by the appropriate risk factor (i.e., for the specific type of vehicle) for pollutant inhalation, as discussed in Section D.3.6.

D.2.2 Accident Transportation Risk Methodology

The cargo-related radiological risk from transportation accidents is attributable to the potential release and dispersal of radioactive material into the environment during an accident and the subsequent exposure of the nearby population through multiple exposure pathways (i.e., inhalation, exposure to contaminated soil, or ingestion of contaminated food). Cargo-related hazardous chemical impacts on human health during transportation accidents arise from container failure and the inhalation of chemicals released during an accident.

The risk analysis for potential accidents differs fundamentally from that of routine (incident-free) transportation because occurrences of accidents are statistical in nature and the accident risk assessment is treated probabilistically. Accident risk is defined as the product of the accident consequence (dose or exposure) and the probability of the accident occurring. In this respect, the analysis estimates the collective accident risk to populations by considering a spectrum of transportation-related accidents. The spectrum of accidents was designed to encompass a range of possible accidents, including low-probability accidents that have high consequences and high-probability accidents that have low consequences (such as “fender-benders”). For radiological risk, the results for collective accident risk can be directly compared to the results for routine collective risk because the latter results implicitly incorporate a probability of occurrence of 1 if the shipment takes place.

Vehicle-related accident risks refer to the potential for transportation-related accidents and resulting fatalities caused by physical trauma, both of which are independent of cargo.

D.2.2.1 Radiological Accident Risk Assessment

The RADTRAN 5 calculation of collective accident risk uses models that quantify the range of potential accident severities and the responses of transported packages to accidents. The spectrum of accident severity is divided into several categories, each of which is assigned a conditional probability of occurrence – that is, the probability that if an accident occurs, it will be of a particular severity. Release fractions, defined as the fraction of the contents in a package that could be released in an accident, are assigned to each accident severity category on the basis of the physical and chemical form of the contents. The model takes into account the mode of transportation and the type of packaging through selection of the appropriate accident probabilities and release fractions, respectively. The accident rates, the definition of accident severity categories, and the release fractions used in this analysis are discussed further in Sections D.3.1.3, D.3.4.1, and D.3.4.2.

For accidents involving the release of radioactive material, RADTRAN 5 assumes that the material is dispersed in the environment according to standard Gaussian diffusion models. For this risk assessment, default data for atmospheric dispersion were used, representing an instantaneous ground-level release and a small-diameter source cloud (Neuhauser and Kanipe, 2003). The calculation of the collective population dose following the release and dispersal of radioactive material includes the following exposure pathways:

- external exposure to the passing radioactive cloud

- external exposure to contaminated ground

- internal exposure from inhalation of airborne contaminants

- internal exposure from the ingestion of contaminated food

For the ingestion pathway, the fraction of farmland in each State traversed was used as input to the RADTRAN code. Farmland fraction is used by RADTRAN to consider the amount of farmland that could be contaminated as a result of an accident, and subsequently lead to the ingestion of contaminated foodstuffs. The majority of each shipping route is considered rural; urban and suburban segments are generally minimized when routing radiological materials. Doses of radiation from external exposure and the ingestion or inhalation of radionuclides were calculated by applying standard dose conversion factors (Eckerman and Ryman, 1993; ICRP, 1996).

D.2.2.2 Chemical Accident Risk Assessment

The risks from exposure to hazardous chemicals during transportation-related accidents, can be either acute (resulting in immediate injury or fatality) or latent (resulting in cancer that would present itself after a period of several years). However, none of the chemicals that might be encountered in any of the transportation accidents involving UF_6 (i.e., HF and uranium compounds) is carcinogenic. As a result, no excess chemically induced latent cancers would be expected from accidental chemical releases.

The acute effects from uranium or HF intake considered were assumed to exhibit a threshold nonlinear relationship with exposure (i.e., some low level of exposure can be tolerated without inducing a health effect). To estimate risks, chemical-specific concentrations were developed for potential irreversible adverse effects (DOE, 1999a). All individuals exposed at these levels or higher following an accident were included in the transportation risk estimates.

The primary exposure route of concern with respect to accidental release of hazardous chemicals would be inhalation. Although direct exposure to hazardous chemicals via other pathways such as ingestion or absorption through the skin (dermal absorption) would also be possible, these routes would be expected to result in much lower exposure than the inhalation pathway doses for hydrogen fluoride (HF) or uranium compounds. The likelihood of acute effects would be much lower for the ingestion and dermal pathways than for inhalation.

The acute health effects end point – potential irreversible adverse effects – was considered for the assessment of cargo-related population impacts from transportation accidents involving hazardous chemicals. Past analyses of depleted UF_6 shipments have shown that the estimates of irreversible adverse effects to be approximately 1 to 3 orders of magnitude lower than the estimates of public latent cancer fatalities from radiological accident exposure (DOE, 2004a,b; NRC, 2005a). In addition, only one percent or fewer of persons experiencing irreversible adverse effects from exposure to HF or uranium compounds actually results in fatality (Policastro et al., 1997). Because radiological accident impacts would be SMALL and the relative chemical hazards would be even smaller, no further analysis of chemical hazards posed by transport was conducted for this EIS.

D.2.2.3 Vehicle-Related Accident Risk Assessment

Vehicle-related accident risk refers to the potential for transportation accidents that could directly result in fatalities not related to the nature of the cargo. This risk represents fatalities from physical trauma, and State-average rates for transportation fatalities are used in the assessment. Vehicle-related accident risks are calculated by multiplying the total distance traveled by the State-specific rates for transportation fatalities. In all cases, the vehicle-related accident risks are calculated on the basis of distances for round-trip shipment, since the presence or absence of cargo is not a factor in accident frequency.

D.3 Input Parameters and Assumptions

The principal input parameters and assumptions used in the transportation risk assessment are discussed in this section. Transportation of hazardous chemical and radioactive materials is governed by the *Hazardous Materials Transportation Act* and U.S. Department of Transportation (DOT), U.S. Nuclear Regulatory Commission (NRC), and U.S. Environmental Protection Agency (EPA) regulations. These regulations may be found in the U.S. *Code of Federal Regulations* (CFR) at 49 CFR Parts 171–178 and 383–397, 10 CFR Part 71, and 40 CFR Parts 262 and 265, respectively. State organizations are also involved in regulating such transport within their borders. All transportation-related activities must be conducted in accordance with applicable regulations of these agencies. However, the DOT and NRC have primary regulatory responsibility for shipment of radioactive materials. The regulations most pertinent to this risk assessment can be found in 49 CFR Part 173, 49 CFR Part 397, and 10 CFR Part 71.

D.3.1 Route Characteristics

The transportation route selected for a shipment determines the potentially exposed population and the expected frequency of transportation-related accidents. For truck transportation, the route characteristics most important to the risk assessment include the total shipping distance between each origin and destination and the population density along the route.

D.3.1.1 Route Selection

The DOT regulations concerning the routing of radioactive material shipments on public highways are prescribed in 49 CFR 397.101. The objectives of these regulations are to reduce the impacts of transporting radioactive materials, to establish consistent and uniform requirements for route selection, and to identify the role of State and local governments in routing radioactive materials. The regulations attempt to reduce potential hazards by prescribing that populous areas be avoided and that travel times be minimized. In addition, the regulations require that the carrier of radioactive materials ensures that the vehicle is operated on routes that minimize radiological risks, and that accident rates, transit times, population density and activity, time of day, and day of week are considered in determining risk. However, the final determination of the route is left to the discretion of the carrier.

For this analysis, all domestic shipments to and from the proposed EREF are anticipated to occur via heavy haul tractor-trailer combination trucks. There is no rail infrastructure at the proposed site, and the closest rail access is at least 20 miles away (see Section 3.10). Representative shipping routes were identified using the WebTRAGIS (Version 4.6.2) routing model (Johnson and Michelhaugh, 2003) for all truck shipments. WebTRAGIS is a Web-based version of TRAGIS (Transportation Routing Analysis Geographic Information System) and is used to calculate highway, rail, or waterway routes within the United States. The routes were selected to be reasonable and consistent with routing regulations and general practice, but they are considered only representative because the actual routes used would be chosen in the future and are often determined by the shipper. At the time of shipment, route selection would reflect current road conditions, including road repairs and traffic congestion.

The HIGHWAY data network in WebTRAGIS is a computerized road atlas that includes a complete description of the interstate highway system and of all U.S. highways. In addition, most principal State highways and many local and community highways are identified. The code is periodically updated to reflect current road conditions and has been compared with reported mileages and observations of commercial trucking firms (Johnson and Michelhaugh, 2003).

Routes are calculated within the model by minimizing the total impedance between origin and destination. The impedance is a function of distance and driving time along a particular segment of highway. Table D-1 presents a matrix of the shipping origins and destinations for the various radioactive materials.

Table D-1 Shipping Origins and Destinations[a]

Site/Facility	Feed	Product	Depleted UF_6	LLRW	Empty Feed	Empty Product	Empty Tails
Port Hope, ON	In				Out		
Metropolis, IL	In				Out		
Portsmouth, VA	In	Out			Out		In
Baltimore, MD	In	Out			Out		In
Columbia, SC		Out				In	
Richland, WA		Out				In	
Wilmington, NC		Out				In	
Clive, UT				Out			
Hanford, WA				Out			
Oak Ridge, TN				Out			
Paducah, KY			Out				In
Portsmouth, OH			Out				In

[a] In = incoming shipments to proposed EREF from origin; Out = outgoing shipments from proposed EREF to destination.
Source: AES, 2010.

Even though transportation regulations do not require restricted routing for trucking shipment of natural uranium, low-enriched uranium, or depleted uranium, routing restrictions were applied as follows:

- two drivers
- prohibit use of links prohibiting truck use
- prohibit use of ferry crossing; prohibit use of roads with hazardous materials prohibition
- Highway Route Controlled Quantity (HRCQ) preferred route
- prohibit use of roads with radioactive materials prohibition (HRCQ only)

Table D-2 presents the output from WebTRAGIS that was used in this transportation assessment. For Port Hope, Ontario, an additional 241 kilometers (150 miles) of route distance and one inspection stop were added to the WebTRAGIS output to account for the portion of the route located in Canada.

D.3.1.2 Population Density

Three population density zones – rural, suburban, and urban – were used for the population risk assessment. The fractions of travel and average population density in each zone were

Table D-2 Distance, Density, and Stop Information Generated by WebTRAGIS for Truck Route

Facility	Stops		Link Type	Distance per Trip		Population Density	
	Inspect	Rest		(km)	(mi)	(No./km^2)	(No./mi^2)
Feed Conversion, Port Hope, ON[a]	9	8	Rural	2834.7	1761.7	11.9	30.8
			Suburban	803.8	499.5	305.5	791.3
			Urban	85.0	52.9	2311.0	5985.4
Feed Conversion, Metropolis, IL	6	6	Rural	2306.0	1432.9	9.4	24.3
			Suburban	470.1	292.1	325.3	842.6
			Urban	56.1	34.8	2199.6	5697.0
International Port, Portsmouth, VA	9	8	Rural	3091.4	1921.0	12.7	32.8
			Suburban	898.2	558.1	306.4	793.7
			Urban	71.0	44.1	2216.1	5739.8
International Port, Baltimore, MD	10	9	Rural	2839.4	1764.3	12.4	32.2
			Suburban	860.4	534.6	307.9	797.5
			Urban	91.8	57.0	2291.1	5934.0
Fuel Fabrication, Columbia, SC	10	9	Rural	2867.9	1782.1	11.2	29.0
			Suburban	850.7	528.6	314.4	814.2
			Urban	77.1	47.9	2184.6	5658.1
Fuel Fabrication, Richland, WA[b]	2	3	Rural	822.7	511.2	9.8	25.4
			Suburban	149.8	93.1	305.9	792.2
			Urban	17.2	10.7	2185.7	5661.0
Fuel Fabrication, Wilmington, NC	8	10	Rural	3027.5	1881.2	11.7	30.3
			Suburban	1021.5	634.8	328.6	851.0
			Urban	87.6	54.4	2158.9	5591.5
Waste Disposal, Clive, UT[b]	1	1	Rural	378.9	235.4	10.5	27.2
			Suburban	105.0	65.3	352.7	913.5
			Urban	21.4	13.3	2360.3	6113.3
Waste Disposal, Hanford, WA[b]	2	3	Rural	856.6	532.3	9.5	24.5
			Suburban	149.2	92.7	306.4	793.6
			Urban	16.9	10.5	2174.4	5631.6
Waste Disposal, Oak Ridge, TN	7	8	Rural	2639.9	1640.4	10.7	27.7
			Suburban	642.5	399.2	310.5	804.1
			Urban	65.6	40.7	2218.1	5744.8

Table D-2 Distance, Density, and Stop Information Generated by WebTRAGIS for Truck Routes (Cont.)

Facility	Stops		Link Type	Distance per Trip		Population Density	
	Inspect	Rest		(km)	(mi)	(No./km^2)	(No./mi^2)
Depleted UF_6 Conversion, Paducah, KY	7	6	Rural	2328.7	1447.0	9.5	24.6
			Suburban	478.2	297.1	324.9	841.4
			Urban	56.1	34.8	2199.6	5697.0
Depleted UF_6 Conversion, Portsmouth, OH	8	8	Rural	2684.5	1668.1	12.1	31.2
			Suburban	645.4	401.0	295.9	766.5
			Urban	51.2	31.8	2266.0	5869.0

[a] Includes an additional 241-kilometer (150-mile) segment and one inspection stop to account for the portion of the route located in Canada. Division of the additional segment by link type is consistent with the remainder of the route (rural 76.1 percent, suburban 21.6 percent, and urban 2.3 percent).
[b] Nodes to the west of the proposed EREF were blocked to route all shipping traffic through Idaho Falls, as proposed by AES (AES, 2010).

determined using the WebTRAGIS routing model. Rural, suburban, and urban areas are characterized according to the following breakdown: rural population densities range from 0 to 54 persons per square kilometer (0 to 139 persons per square mile); suburban densities range from 55 to 1284 persons per square kilometer (140 to 3326 persons per square mile); and urban covers all population densities greater than 1284 persons per square kilometer (3326 persons per square mile). Use of these population density zones is based on an aggregation of the 11 population density zones provided in the WebTRAGIS model output (DOE, 2002). For calculation purposes, information about population density was generated at the State level and used as RADTRAN input for all routes. The population densities along a route are derived from 2000 Census data from the U.S. Census Bureau. Route-average population densities and other route characteristics are provided in Table D-2.

D.3.1.3 Accident and Fatality Rates

For calculating accident risks, vehicle accident involvement and fatality rates are taken from data provided in Saricks and Tompkins (1999). For each transport mode, accident rates are generically defined as the number of accident involvements (or fatalities) in a given year per unit distance of travel by that mode in the same year. Accident rates are derived from multiple-year averages that automatically account for such factors as heavy traffic and adverse weather conditions. For assessment purposes, the total number of expected accidents or fatalities is calculated by multiplying the total shipping distance by the appropriate accident or fatality rate.

For truck transportation, the rates presented by Saricks and Tompkins (1999) are specifically for heavy combination trucks involved in interstate commerce. Heavy combination trucks are rigs composed of a separable tractor unit containing the engine and one to three freight trailers connected to each other and the tractor. Heavy combination trucks are typically used for shipping radiological materials that would be transported to and from the proposed EREF. Truck accident rates are computed for each State on the basis of statistics compiled by the DOT

Office of Motor Carriers for 1994 to 1996. Saricks and Tompkins (1999) present accident involvement and fatality counts, estimated kilometers of travel by State, and the corresponding average accident involvement and fatality rates for the three years investigated. Fatalities (including of crew members) are deaths that are attributable to the accident and that occurred within 30 days of the accident.

The truck accident assessment presented in this EIS uses accident (fatality) rates for travel on interstate highways. The total accident risk for a route depends on the total distance traveled in each State along the route and does not rely on national average accident statistics. However, for comparative purposes, the national average truck accident rate on interstate highways presented in Saricks and Tompkins (1999) is 3.15×10^{-7} accident per truck-kilometer (5.07×10^{-7} accident per mile). Note that the accident rates used in this assessment were computed using all interstate highway shipments (regardless of the cargo), as 10 CFR Part 71 requires that HRCQ shipments be made over the interstate highway system.

D.3.2 Packaging

As noted in Section D.3, radioactive materials transported to and from the proposed EREF would be subject to both DOT and NRC shipping regulations. All shipments of UF_6 can be transported in Type A shipping containers having thermal protection (e.g., overpack or other protective assembly) that meets DOT (49 CFR Part 173) and NRC (10 CFR Part 71) requirements. Shipments of the product material are required to have fissile controls in addition to the thermal protection. However, in this assessment of the radiological impacts, any reduction in exposures due to the presence of a thermal and/or fissile overpack is ignored. Packaging for radioactive materials must be designed, constructed, and maintained to ensure that it will contain and shield the contents during normal transportation. For more highly radioactive material, the packaging must also contain and shield the contents in severe accidents. The type of packaging used is determined by the radioactive hazard associated with the packaged material. Table D-3 summarizes the shipment packaging for the shipments considered.

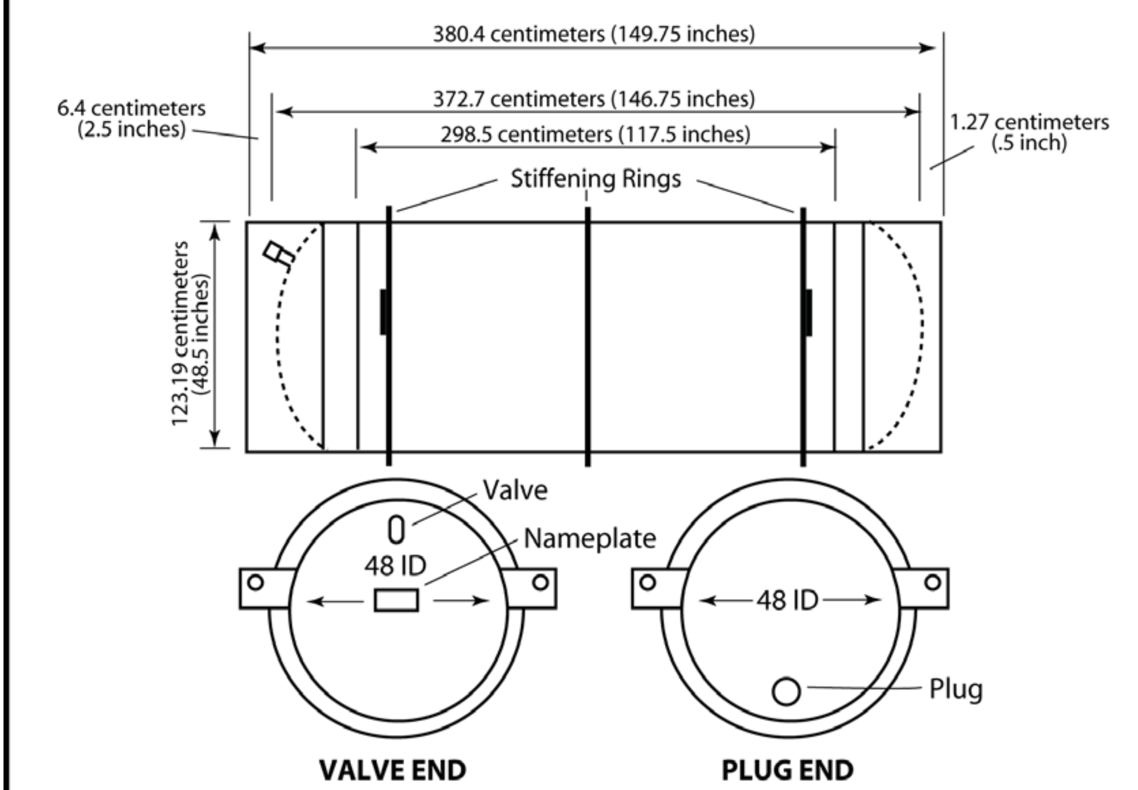
The uranium feed, depleted tails, and LLRW shipments would use Type A packaging. This type of packaging must withstand the conditions of normal transportation without loss or dispersal of the radioactive contents. "Normal" transportation refers to all transportation conditions except those resulting from accidents or sabotage. Approval of Type A packaging is obtained by demonstrating that the packaging can withstand specified testing conditions intended to simulate normal transportation. Type A packaging usually does not require special handling, packaging, or transportation equipment. The UF_6 feed and tails would be shipped in Type 48Y cylinders (USEC, 1999), and LLRW would be shipped in 55-gallon drums. The specifications for a Type 48Y cylinder are shown in Figure D-1 and Table D-4.

The enriched product would be shipped in Type 30B cylinders (USEC, 1999) within Type B overpacks. Figure D-2 and Table D-5 show the specifications of a 30B cylinder. In addition to meeting all Type A standards, Type B packaging must also provide a high degree of assurance that the package integrity will be maintained even during severe accidents, with essentially no loss of the radioactive contents or serious impairment of the shielding capability. Type B packaging must satisfy stringent testing criteria (as specified in 10 CFR 71.73) that were developed to simulate conditions of severe hypothetical accidents, including impact, puncture,

Table D-3 Annual Number of Containers and Trucks Required for Transport

Material	Type of Container	Number per Year	
		Containers	Trucks
Natural UF_6	48Y	1424	1424
Enriched UF_6	30B	1032	516
Depleted UF_6	48Y	1222	1222
LLRW	55-gallon drum	954	16
Empty feed cylinders	48Y	1424	712
Empty product cylinders	30B	1032	516
Empty depleted UF_6 cylinders	48Y	1222	611

Source: AES, 2010.



073004_04.1_TB
Source: USEC-651 (Revision 7).

Figure D-1 Schematic of a Type 48Y Cylinder (USEC, 1995)

Table D-4 Type 48Y Cylinder Specifications

Parameter	Value
Nominal diameter	122 centimeters (48 inches)
Nominal length	380 centimeters (150 inches)
Wall thickness	1.6 centimeters (0.625 inches)
Nominal tare weight	2359 kilograms (5200 pounds)
Maximum net weight	12,500 kilograms (27,560 pounds)
Nominal gross weight	14,860 kilograms (32,760 pounds)
Minimum volume	4.04 cubic meters (142.7 cubic feet)
Basic material of construction	Steel: ASTM A-516
Service pressure	1380 kilopascals gage (200 pounds per square inch gage)
Hydrostatic test pressure	2760 kilopascals gage (400 pounds per square inch gage)
Isotopic content limit	4.5 percent ^{235}U (maximum with moderation control)
Valve used	2.54-centimeter valve (1-inch valve)

Source: USEC, 1995.

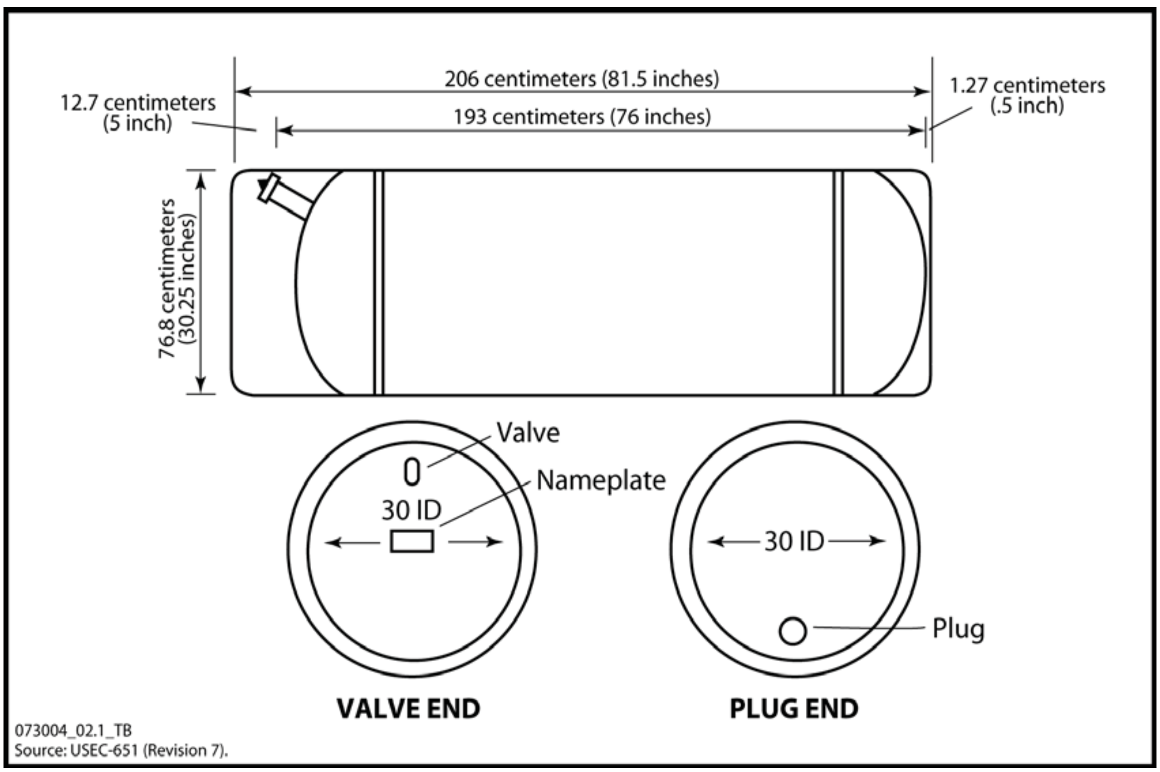


Figure D-2 Schematic of a Type 30B Cylinder (USEC, 1995)

Table D-5 Type 30B Cylinder Specifications

Parameter	Value
Nominal diameter	76 centimeters (30 inches)
Nominal length	206 centimeters (81 inches)
Wall thickness	1.27 centimeters (0.5 inches)
Nominal tare weight	635 kilograms (1400 pounds)
Maximum net weight	2300 kilograms (5000 pounds)
Nominal gross weight	2900 kilograms (6400 pounds)
Minimum volume	736 liters (26 cubic feet)
Basic material of construction	Steel: ASTM A-516
Service pressure	1380 kilopascals gage (200 pounds per square inch gage)
Hydrostatic test pressure	2760 kilopascals gage (400 pounds per square inch gage)
Isotopic content limit	5.0 percent ^{235}U (maximum with moderation control)
Valve used	2.54-centimeter valve (1-inch valve)

Source: USEC, 1995.

fire, and immersion in water. For shipping Type 30B cylinders, a UX-30 overpack would be used (to provide protection and convenience in handling through consolidation). The UX-30 has a diameter of 1.10 meters (43.5 inches) and is 2.44 meters (96 inches) in length (NRC, 2009).

D.3.3 Shipment Configurations and Number of Shipments

Several different types of radioactive materials are proposed for shipment to and from the proposed EREF. Table D-6 presents the activity (amount) of each radionuclide that would be present in containers of feed, product, depleted uranium, and LLRW. Previous EISs have incorporated one year of decay to account for delay in shipping between the generation of depleted UF_6 and any radioactive shipments. Due to the anticipated time frame of startup for the proposed EREF and the impending availability of DOE conversion services, there is no assurance that such decay would occur prior to shipment. Therefore, it was not considered in this analysis.

The radionuclide inventories for the radioactive material shipments presented in Table D-6 include a number of short-lived radionuclides that are not included in the RADTRAN 5 default library of radionuclides. Due to their short half-lives and relatively low activity, these radionuclides do not significantly contribute to the population dose in an accident scenario (incident-free doses are based on exterior dose rates and are not directly dependent on radionuclide inventory). These short-lived radionuclides are assumed to be in equilibrium with their parent radionuclides, so their internal dose contributions are included in the internal dose conversion factors of the parent radionuclides. Furthermore, this simplifying assumption is counterbalanced by the conservative assumption that there would be no decay period between generation and shipment. Therefore, use of the RADTRAN 5 default library of radionuclides in this analysis was considered adequate.

Table D-6 Curie Inventory in Selected Shipping Containers for Truck Transportation

Radionuclide	Feed (natural UF_6)	Product (enriched UF_6)	Depleted Uranium (tails/ depleted UF_6)	Depleted UF_6 Residue (heels)	Empty Product	LLRW
Thallium-207	3.84×10^{-8}	4.92×10^{-8}	1.94×10^{-8}	6.96×10^{-11}	2.45×10^{-10}	1.01×10^{-11}
Thallium-208	1.77×10^{-15}	2.26×10^{-15}	8.94×10^{-16}	3.20×10^{-18}	1.13×10^{-17}	4.63×10^{-19}
Lead-210	3.76×10^{-11}	5.68×10^{-11}	1.80×10^{-11}	6.83×10^{-14}	2.83×10^{-13}	9.87×10^{-15}
Lead-211	3.85×10^{-8}	4.93×10^{-8}	1.95×10^{-8}	6.98×10^{-11}	2.45×10^{-10}	1.01×10^{-11}
Lead-212	4.92×10^{-15}	6.30×10^{-15}	2.49×10^{-15}	8.92×10^{-18}	3.14×10^{-17}	1.29×10^{-18}
Lead-214	3.74×10^{-9}	5.64×10^{-9}	1.79×10^{-9}	6.79×10^{-12}	2.81×10^{-11}	9.82×10^{-13}
Bismuth-210	3.76×10^{-11}	5.68×10^{-11}	1.80×10^{-11}	6.83×10^{-14}	2.83×10^{-13}	9.87×10^{-15}
Bismuth-211	3.85×10^{-8}	4.93×10^{-8}	1.95×10^{-8}	6.98×10^{-11}	2.45×10^{-10}	1.01×10^{-11}
Bismuth-212	4.92×10^{-15}	6.30×10^{-15}	2.49×10^{-15}	8.92×10^{-18}	3.14×10^{-17}	1.29×10^{-18}
Bismuth-214	3.74×10^{-9}	5.64×10^{-9}	1.79×10^{-9}	6.79×10^{-12}	2.81×10^{-11}	9.82×10^{-13}
Polonium-210	1.21×10^{-11}	1.82×10^{-11}	5.78×10^{-12}	2.19×10^{-14}	9.08×10^{-14}	3.17×10^{-15}
Polonium-211	1.08×10^{-10}	1.38×10^{-10}	5.46×10^{-11}	1.96×10^{-13}	6.87×10^{-13}	2.83×10^{-14}
Polonium-212	3.15×10^{-15}	4.03×10^{-15}	1.60×10^{-15}	5.71×10^{-18}	2.01×10^{-17}	8.26×10^{-19}
Polonium-214	3.74×10^{-9}	5.64×10^{-9}	1.79×10^{-9}	6.79×10^{-12}	2.81×10^{-11}	9.82×10^{-13}
Polonium-215	3.85×10^{-8}	4.93×10^{-8}	1.95×10^{-8}	6.98×10^{-11}	2.45×10^{-10}	1.01×10^{-11}
Polonium-216	4.92×10^{-15}	6.30×10^{-15}	2.49×10^{-15}	8.92×10^{-18}	3.14×10^{-17}	1.29×10^{-18}
Polonium-218	3.74×10^{-9}	5.65×10^{-9}	1.79×10^{-9}	6.79×10^{-12}	2.81×10^{-11}	9.82×10^{-13}
Radon-219	3.85×10^{-8}	4.93×10^{-8}	1.95×10^{-8}	6.98×10^{-11}	2.45×10^{-10}	1.01×10^{-11}
Radon-220	4.92×10^{-15}	6.30×10^{-15}	2.49×10^{-15}	8.92×10^{-18}	3.14×10^{-17}	1.29×10^{-18}
Radon-222	3.74×10^{-9}	5.65×10^{-9}	1.79×10^{-9}	6.79×10^{-12}	2.81×10^{-11}	9.82×10^{-13}
Francium-223	6.13×10^{-10}	7.85×10^{-10}	3.10×10^{-10}	1.11×10^{-12}	3.91×10^{-12}	1.61×10^{-13}
Radium-223	3.85×10^{-8}	4.93×10^{-8}	1.95×10^{-8}	6.98×10^{-11}	2.45×10^{-10}	1.01×10^{-11}
Radium-224	4.92×10^{-15}	6.30×10^{-15}	2.49×10^{-15}	8.92×10^{-18}	3.14×10^{-17}	1.29×10^{-18}
Radium-226	3.74×10^{-9}	5.65×10^{-9}	1.79×10^{-9}	6.79×10^{-12}	2.81×10^{-11}	9.82×10^{-13}
Radium-228	4.41×10^{-14}	5.65×10^{-14}	2.23×10^{-14}	8.01×10^{-17}	2.81×10^{-16}	1.16×10^{-17}
Actinium-227	4.44×10^{-8}	5.69×10^{-8}	2.25×10^{-8}	8.06×10^{-11}	2.83×10^{-10}	1.17×10^{-11}
Actinium-228	4.41×10^{-14}	5.65×10^{-14}	2.23×10^{-14}	8.01×10^{-17}	2.82×10^{-16}	1.16×10^{-17}
Thorium-227	3.79×10^{-8}	4.85×10^{-8}	1.92×10^{-8}	6.87×10^{-11}	2.41×10^{-10}	9.94×10^{-12}
Thorium-228	4.91×10^{-15}	6.29×10^{-15}	2.49×10^{-15}	8.91×10^{-18}	3.13×10^{-17}	1.29×10^{-18}
Thorium-230	1.73×10^{-5}	2.61×10^{-5}	8.27×10^{-6}	3.13×10^{-8}	1.30×10^{-7}	4.53×10^{-9}

Table D-6 Curie Inventory in Selected Shipping Containers for Truck Transportation (Cont.)

Radionuclide	Feed (natural UF_6)	Product (enriched UF_6)	Depleted Uranium (tails/ depleted UF_6)	Depleted UF_6 Residue (heels)	Empty Product	LLRW
Thorium-231	1.30×10^{-1}	1.67×10^{-1}	6.58×10^{-2}	2.36×10^{-4}	8.29×10^{-4}	3.41×10^{-5}
Thorium-232	8.83×10^{-13}	1.13×10^{-12}	4.47×10^{-13}	1.60×10^{-15}	5.63×10^{-15}	2.32×10^{-16}
Thorium-234	2.82×10^{0}	4.92×10^{-1}	2.83×10^{0}	5.12×10^{-3}	2.45×10^{-3}	7.41×10^{-4}
Protactinium-231	2.80×10^{-6}	3.58×10^{-6}	1.42×10^{-6}	5.07×10^{-9}	1.78×10^{-8}	7.34×10^{-10}
Protactinium-234m	2.82×10^{0}	4.92×10^{-1}	2.83×10^{0}	5.12×10^{-3}	2.45×10^{-3}	7.41×10^{-4}
Protactinium-234	3.67×10^{-3}	6.39×10^{-4}	3.68×10^{-3}	6.66×10^{-6}	3.18×10^{-6}	9.63×10^{-7}
Uranium-234	1.92×10^{0}	2.90×10^{0}	9.18×10^{-1}	0	0	5.04×10^{-4}
Uranium-235	1.30×10^{-1}	1.67×10^{-1}	6.58×10^{-2}	0	0	3.41×10^{-5}
Uranium-236	1.79×10^{-2}	2.29×10^{-2}	9.06×10^{-3}	0	0	4.69×10^{-6}
Uranium-238	2.82×10^{0}	4.92×10^{-1}	2.83×10^{0}	0	0	7.41×10^{-4}

Source: AES, 2010.

Table D-3 presents the number of packages and number of shipments that would be required for transport to and from the proposed EREF. Uranium feed and depleted tails shipments would consist of one Type 48Y cylinder per truck, and each cylinder would contain about 12.4 metric tons (13.7 tons) of natural or depleted UF_6. Enriched UF_6 product would be shipped in Type 30B cylinders in UX-30 overpacks, two cylinders per truck (although up to five cylinders could be shipped per truck). Each 30B cylinder would contain approximately 2.3 metric tons (2.5 tons) of product. Low-level radioactive waste would be shipped in 55-gallon waste drums, 60 drums per truck. The types and amounts of LLRW that would be shipped are discussed in Section 4.2.9.2.

D.3.4 Accident Characteristics

Assessment of transportation accident risk takes into account the potential severity of transportation-related accidents and the fraction of package contents that would be released to the environment during an accident (commonly referred to as the release fraction). The method used to characterize accident severities and the corresponding release fractions for estimating both radioactive and chemical risks are described below.

D.3.4.1 Accident Severity Categories

A method to characterize the potential severity of transportation-related accidents is described in NUREG-0170, *Final Environmental Statement on the Transportation of Radioactive Material* *by Air and Other Modes* (NRC, 1977), and presented in *A Resource Handbook on DOE Transportation Risk Assessment* (DOE, 2002). The NRC method divides the spectrum of accident severities into eight categories, which are further subdivided into population zones (rural, suburban, and urban) containing the fraction of occurrence within each zone. Other studies have divided the same accident spectrum into six categories (Wilmot, 1981), 20 categories (Fischer et al., 1987), or more (Sprung et al., 2000). However, these latter studies focused primarily on accidents involving shipments of spent nuclear fuel. In this analysis, the NUREG-0170 scheme was used for all shipments.

The NUREG-0170 scheme for truck transportation accident classification is shown in Figure D-3. Severity is described as a function of the magnitudes of the mechanical forces (impact) and thermal forces (fire) to which a package may be subjected during an accident. Because all accidents can be described in these terms, severity is independent of the specific accident sequence. In other words, any sequence of events that results in an accident in which a package is subjected to forces within a certain range of values is assigned to the accident severity category associated with that range. The scheme for accident severity is designed to take into account all credible transportation-related accidents, including those accidents with low probability but high consequences and those with high probability but low consequences.

Each severity category represents a set of accident scenarios defined by a combination of mechanical and thermal forces. A conditional probability of occurrence (i.e., the probability that if an accident occurs, it is of a particular severity) is assigned to each category. These fractional occurrences (conditional probabilities) for accidents by accident severity category and population density zone are shown in Table D-7 and are used for estimating the radiological transportation risks.

Category I accidents are the least severe but the most frequent; Category VIII accidents are very severe but very infrequent. To determine the expected frequency of an accident of a given severity, the conditional probability in the category is multiplied by the accident rate (see Section D.3.1.3). Each population density zone has a distinct distribution of accident severities related to differences in average vehicular velocity, traffic density, location (rural, suburban, or urban), and other factors.

D.3.4.2 Package Release Fractions

In NUREG-0170, radiological and chemical consequences are calculated by assigning package release fractions to each accident severity category. The release fraction is defined as the fraction of package contents that could be released from the package as the result of an accident of a given severity. Release fractions take into account all mechanisms necessary to create release of material from a damaged package to the environment. The release fraction is a function of the severity of the accident, the packaging, and the physical form of the material. For instance, a low-impact accident, such as a “fender-bender,” would not be expected to cause any release of material. Conversely, a severe accident would be expected to release nearly all of the material in a shipment into the environment.

Representative release fractions for accidents involving all shipments were taken from NUREG-0170 (NRC, 1977), for both Type A and Type B packages. The recommendations in NUREG-0170 were based on best engineering judgments and have been shown to provide

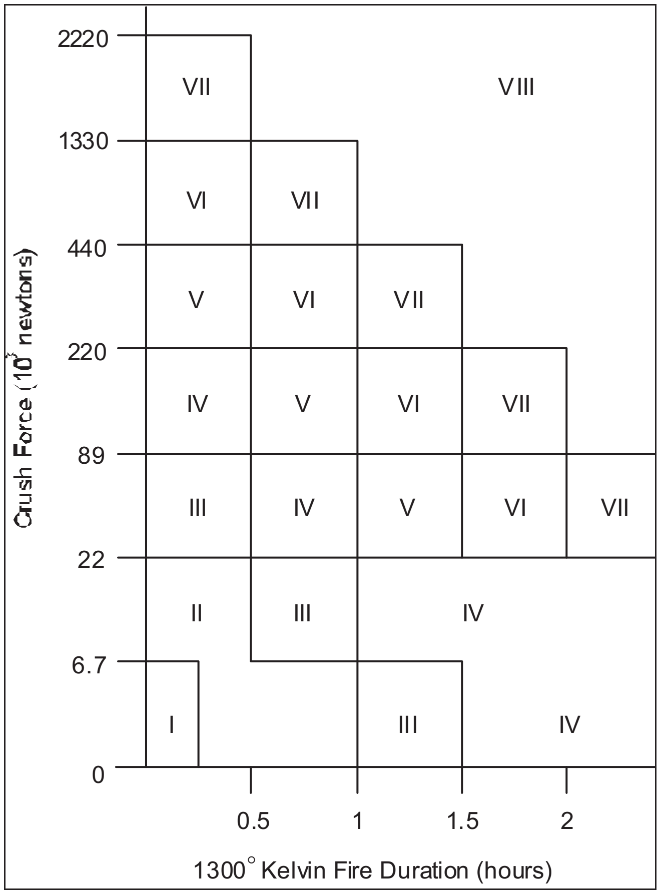


Figure D-3 Scheme for NUREG-0170 Classification by Accident Severity Category for Truck Accidents (NRC, 1977)

Table D-7 Fractional Occurrences for Accidents by Severity Category and Population Density Zone

Severity Category	Fractional Occurrence	Fractional Occurrence by Population Zone		
		Low (Rural)	Medium (Suburban)	High (Urban)
I	0.55	0.1	0.1	0.8
II	0.36	0.1	0.1	0.8
III	0.07	0.3	0.4	0.3
IV	0.016	0.3	0.4	0.3
V	0.0028	0.5	0.3	0.2
VI	0.0011	0.7	0.2	0.1
VII	8.50×10^{-5}	0.8	0.1	0.1
VIII	1.50×10^{-5}	0.9	0.05	0.05

Source: NRC, 1977; DOE, 2002.

conservative estimates of material releases following accidents (Sprung et al., 2000). Release fractions for accidents of each severity category are provided in Table D-8. As indicated in the table, the amount of material released from a package ranges from zero for minor accidents to 100 percent for the most severe accidents.

Also important for the purposes of risk assessment are the fraction of the released material that can be entrained in an aerosol (part of an airborne contaminant plume) and the fraction of the aerosolized material that is respirable (of a size that can be inhaled into the lungs). These fractions depend on the physical form of the material. Most solid materials are difficult to release in particulate form and are, therefore, relatively nondispersible. Conversely, liquid or gaseous materials are relatively easy to release if the container is breached in an accident. The aerosolized fraction and respirable fraction for all radiological shipments were conservatively assumed to be 1 for all accidents involving Type A packages (Table D-8). These values are conservative due to the lack of data on package failure under severe conditions (DOE, 2002).

D.3.4.3 Atmospheric Conditions during Accidents

Hazardous material released to the atmosphere is transported by wind. The amount of dispersion, or dilution, of the contaminant depends on the meteorologic conditions at the time of the accident. Because predicting the specific location of a transportation-related accident and the exact meteorologic conditions at the time of the accident is impossible, generic atmospheric conditions were selected for the accident risk assessment. Neutral weather conditions were assumed, represented by Pasquill atmospheric stability Class D with a wind speed of 4 meters per second (9 miles per hour). Because neutral meteorological conditions are the most frequently occurring atmospheric stability condition in the United States, these conditions are most likely to be present in the event of an accident involving a hazardous material shipment. Observations at National Weather Service meteorological stations at more than 300 U.S. locations indicate that on a yearly average, neutral conditions (represented by Pasquill Classes C and D) occur about half (50 percent) the time; stable conditions (Pasquill Classes E and F) occur about one-third (33 percent) of the time; and unstable conditions (Pasquill Classes A and B) occur about one-sixth (17 percent) of the time (Doty et al., 1976). The neutral

Table D-8 Fraction of Package Released, Aerosolized, and Respirable

Accident Severity	Release	Respirable	Aerosolized
I	0	1	1
II	0.01	1	1
III	0.1	1	1
IV	1	1	1
V	1	1	1
VI	1	1	1
VII	1	1	1
VIII	1	1	1

Source: DOE, 2002.

category predominates in all seasons, but it is most prevalent (nearly 60 percent of the observations) during winter.

D.3.5 Radiological Risk Assessment Input Parameters and Assumptions

The dose (and the corresponding risk) to populations during routine (incident-free) transportation of radioactive materials is directly proportional to the assumed external dose rate from the shipment. The actual dose rate from the shipment is a complex function of the composition and configuration of shielding and containment materials used in the packaging, the geometry of the loaded shipment, and the characteristics of the contents.

Table D-9 provides a summary of information from various sources regarding estimates of the external radiation near each type of shipping container. For the purposes of this EIS, the NRC staff has assumed the most conservative dose rate for each type of container. Dose rates are presented in terms of the transport index (TI), which is the dose rate at 1 meter (3 feet) from the surface of a package. The regulatory limit established in 49 CFR 173.441 and 10 CFR 71.47 to protect the public is 0.1 millisievert per hour (10 millirem per hour) at 2 meters (6 feet) from the outer lateral sides of the transport vehicle.

Note that in Table D-9 the external radiation levels for an empty cylinder (Type 48Y or 30B) are higher than those for a full cylinder. This occurs for two reasons. First, after UF_6 (feed, product, or depleted tail) is removed from a cylinder, the radioactive uranium daughter products that build up due to the radioactive decay of uranium collect at the bottom and form what is known as a "heel." The nature of the radiation emitted from the uranium daughter products results in a greater release of gamma radiation than occurs from just uranium. Second, uranium is very dense and an effective shield material for gamma radiation. When a cylinder is full of UF_6, the uranium daughters are distributed throughout the cylinder and emitted radiation must pass through a significant thickness of uranium (and thus can be stopped or absorbed by the uranium). Only gamma emissions from uranium daughters near the inner surface of the cylinder can penetrate the cylinder and contribute to a nearby person's radiation exposure. Because an empty cylinder contains largely vapor and no longer has the high shielding capability of solid UF_6, and because the heel concentrates the more highly radioactive uranium daughters next to the inner surface of the cylinder, the radiation levels near an empty cylinder are higher than those for a full UF_6 cylinder.

In addition to the specific parameters discussed previously, values for a number of general parameters must be specified within RADTRAN to calculate radiological risks. These general parameters define basic characteristics of the shipment and traffic and are specific to the mode of transportation; they include the speed of the vehicle, size of the crew, amount of time the shipment is stopped for rest or inspection, and density of the population sharing the shipping route. The RADTRAN user manual (Neuhauser and Kanipe, 2003; Weiner et al., 2008) contains derivations and descriptions of these parameters. The general RADTRAN input parameters used in the radiological transportation risk assessment are summarized in Table D-10; default RADTRAN values were used for input parameters not described in this appendix.

Table D-9 Direct Radiation Surrounding Shipping Containers[a]

Container	Assumed Dose Rate (mrem/hr)	Measured/Estimated Dose Rate (mrem/hr)	Source
Feed (48Y)	1.0	0.7	NRC, 2006; Table D-7
		0.2	NRC, 2005b; Table 4.12, C-8
		0.29	NRC, 2005b; Table D-7
Product (30B)	1.0	0.4	NRC, 2006; Table D-7
		0.19	NRC, 2005b; Table D-7
Depleted UF_6	1.0	1.0	DOE, 1999a; Sec. J.3.2.1.1
		0.28	NRC, 2005b; Table D-7
		0.23 (min)	Biwer et al., 2001; Table 5.4
		0.46 (max)	Biwer et al., 2001; Table 5.4
LLRW	1.0	1.0	NRC, 2006; Table D-7
		1.0	DOE, 2002; Table 4.2
		0.0042	NRC, 2005b; Table D-7
		0.5 (min)	Biwer et al., 2001; Table 5.4
		1.0 (max)	Biwer et al., 2001; Table 5.4
Empty feed	3.0	1.0	NRC, 2005b; Table C-8, D-7
		1.0	NRC, 2006; Table D-7
		3.0	AES, 2010
Empty product	5.0	1.0	Biwer et al., 2001; Table 5.4
		5.0	AES, 2010
Empty depleted UF_6	3.0	1.0	Biwer et al., 2001; Table 5.4
		3.0	AES, 2010

[a] At one meter.
To convert from millirem to millisievert, multiply by 1×10^{-2}.

D.3.6 Routine Nonradiological Vehicle Emission Risks

Vehicle-related risks during incident-free transportation include incremental risks caused by potential exposure to airborne particulate matter from fugitive dust (resuspended particulates from the roadway) and diesel exhaust emissions. The health end point assessed under routine (incident-free) transport conditions is the excess (additional) latent mortality caused by inhalation of vehicular emissions. Strong epidemiological evidence suggests that increases in ambient air concentrations of PM_{10} (particulate matter with a mean aerodynamic diameter less than or equal to 10 microns) lead to increases in mortality (EPA, 1996a,b). Currently, it is assumed that no threshold exists and that the dose–response functions for most health effects associated with PM_{10} exposure, including premature mortality, are linear over the concentration

Table D-10 RADTRAN 5 Input Parameters

Parameter	Link Type	Value
Traffic volume (vehicles/hour)[a]	Rural	1155
	Suburban	2414
	Urban	5490
Vehicle speed (kph [mph])	Rural	88 (55)
	Suburban	40 (25)
	Urban	24 (15)
Number of people in adjacent vehicle		2
Crew size		2
Distance from source to crew (m)		5
Stop time (h/km)[b]		0.0014
Population density at stops[b]	1 to 10 meters	30,000
	10 to 800 meters	340
Latest cancer risk (fatal cancer per person-rem)[c]		6.0×10^{-4}
Vehicle emission rate (fatalities/km per 1 person/km^2)		8.36×10^{-10}
Vehicle accident (fatalities/km)[d]		1.42×10^{-8}

[a] Previous EISs (and previous versions of RADTRAN) used values of 530, 760, and 2400. However, these values may underestimate current average traffic density on interstate highways (Weiner et al., 2008), which accounts for most of the mileage on routes used in this analysis.
[b] Hostick et al., 1992.
[c] EPA, 1999; ISCORS, 2002.
[d] In lieu of a national average vehicle accident rate, state-specific rates were used (Saricks and Tompkins, 1999).

ranges investigated (EPA, 1996a). Over short and long terms, fatalities (mortality) may result from life-shortening respiratory or cardiovascular diseases (EPA, 1996a; Ostro and Chestnut, 1998). The long-term fatalities are also assumed to include those from cancer.

The increased ambient air particulate concentrations caused by the transport vehicle have been related to premature latent fatalities in the form of risk factors for transportation risk assessments (Biwer and Butler, 1999). A conservative vehicle emission risk factor of 8.36×10^{-10} latent fatalities per kilometer for truck transport (Biwer and Butler, 1999) was used in this assessment. This value is for heavy combination trucks (Class VIIIB) and for areas with unit population density of one person per square kilometer (2.6 persons per square mile). One-way shipment risks are obtained by multiplying the vehicle emission risk factor by the average population density along the route and the route distance. The routine vehicle risks reported in this analysis are for round-trip travel of the transport vehicle.

The vehicle risks reported here are estimates based on the best available data. However, as is true for radiological risks, there is a large and not readily quantifiable degree of uncertainty in the vehicle emission risk factors. For example, large uncertainties exist as to the extent of increased mortality with an incremental rise in particulate air concentrations and as to whether there are threshold air concentrations that are applicable. Also, estimates of the particulate air concentrations caused by transport vehicles are dependent on location, road conditions, vehicle conditions, and weather.

As discussed by Biwer and Butler (1999), there are also large uncertainties in the human health risk factors used to develop the emission risks. In addition, due to the conservatism in the assumptions made by Biwer and Butler to reconcile results with those presented by EPA (EPA, 1993), latent fatality risks estimated with the above risk factor may be considered to be near an upper bound (Biwer and Butler, 1999). Use of this risk factor for Class VIIIB trucks will give estimated fatalities comparable to those from accident fatalities in some cases. In addition, what exactly constitutes a fatality as a direct consequence of increased PM_{10} levels from vehicle emissions is an open question, but long-term fatalities have been associated with increased levels of PM_{10} (Biwer and Butler, 1999).

D.4 Summary of Transportation Impacts

Table D-11 presents the estimated annual radiological and nonradiological impacts from truck shipment of radioactive material, including collective population risk from incident-free transport, latent cancer fatalities from the vehicle emissions, and fatalities from traffic accidents. Table D-12 presents the estimated radiological impacts from potential accidents during these shipments, including the contributions of each exposure pathway to the collective population dose. The accident results are presented in terms of risk, which involves weighting the impact of the various accident scenarios by the frequency that the accident scenario occurs.

The impact results in Table D-11 include a range of values for each type of shipment. This range represents the lowest to highest impact for the various proposed shipping routes. For example, for the feed materials, the values represent one year of shipments from any of the four feed supply locations to the proposed EREF. If some feed materials were provided from one location and the remaining amounts from another, the estimated impacts would fall somewhere between the low and high values (impacts could be evaluated by multiplying the fraction of material from a given location by the impacts from that location plus the fraction of material from a second location multiplied by the impacts from the second location).

To evaluate the total impacts from the transportation of radioactive materials, a scenario must be defined and the impacts from the various materials/routes can be summed. For example, the proposed EREF would receive feed material from Metropolis, Illinois, the product material would be shipped to Wilmington, North Carolina, LLRW would be shipped to Clive, Utah, and depleted UF_6 would be shipped to Paducah, Kentucky. The impacts from these materials/routes would then be summed to determine the total impacts for this scenario. Table 4-11 of this EIS summarizes the potential transportation impacts, presented as a range of collective risk for each type of shipment and the range of impacts summed over all shipping scenarios.

Table D-11 Annual Collective Population Risks from Truck Transportation

Material	Total Mileage (km)	Cargo-Related Radiological Impacts: Dose Risk (person-rem): Routine Crew	Public Off-Link	Public On-Link	Public Stop	Total Public	Maximum Individual	Accident	Latent Cancer Fatalities: Crew	Latent Cancer Fatalities: Public	Vehicle-Related Impacts: Latent Emission Fatalities	Vehicle-Related Impacts: Physical Accident Fatalities
Feed, Port Hope, ON	5,302,406	1.6×10^{1}	5.7×10^{0}	1.8×10^{2}	1.2×10^{2}	3.1×10^{2}	1.9×10^{-4}	1.1×10^{1}	9.6×10^{-3}	1.9×10^{-1}	5.7×10^{-1}	7.5×10^{-2}
Feed, Metropolis, IL	4,033,480	1.2×10^{1}	3.8×10^{0}	6.4×10^{1}	9.4×10^{1}	1.6×10^{2}	1.9×10^{-4}	1.1×10^{1}	7.2×10^{-3}	9.6×10^{-2}	3.5×10^{-1}	5.7×10^{-2}
Feed, Baltimore, MD	5,399,096	1.7×10^{1}	6.6×10^{0}	1.3×10^{2}	1.3×10^{2}	2.7×10^{2}	1.9×10^{-4}	8.0×10^{0}	1.0×10^{-2}	1.6×10^{-1}	6.1×10^{-1}	7.7×10^{-2}
Feed, Portsmouth, VA	5,782,010	1.8×10^{1}	6.8×10^{0}	1.3×10^{2}	1.4×10^{2}	2.8×10^{2}	1.9×10^{-4}	1.1×10^{1}	1.1×10^{-2}	1.7×10^{-1}	5.6×10^{-1}	8.2×10^{-2}
Product, Columbia, SC	1,958,736	4.6×10^{0}	2.4×10^{0}	4.5×10^{1}	4.6×10^{1}	5.2×10^{1}	6.9×10^{-5}	8.5×10^{0}	2.8×10^{-3}	3.1×10^{-2}	2.0×10^{-1}	2.8×10^{-2}
Product, Richland, WA	510,634	1.1×10^{0}	4.2×10^{-1}	9.4×10^{0}	1.2×10^{1}	2.2×10^{1}	6.9×10^{-5}	1.4×10^{0}	6.6×10^{-4}	1.3×10^{-2}	3.9×10^{-2}	7.3×10^{-3}
Product, Wilmington, NC	2,134,589	5.1×10^{0}	3.0×10^{0}	5.2×10^{1}	5.0×10^{1}	1.1×10^{2}	6.9×10^{-5}	9.6×10^{0}	3.1×10^{-3}	6.6×10^{-2}	2.4×10^{-1}	3.0×10^{-2}
Product, Baltimore, MD	1,956,414	4.6×10^{0}	2.4×10^{0}	4.8×10^{1}	4.5×10^{1}	9.5×10^{1}	6.9×10^{-5}	9.8×10^{0}	2.8×10^{-3}	5.7×10^{-2}	2.2×10^{-1}	2.8×10^{-2}
Product, Portsmouth, VA	2,095,166	4.8×10^{0}	2.5×10^{0}	8.9×10^{1}	4.9×10^{1}	1.4×10^{2}	6.9×10^{-5}	6.5×10^{0}	2.9×10^{-3}	8.4×10^{-2}	2.0×10^{-1}	3.0×10^{-2}
Depleted UF_6/tails, Paducah, KY	3,498,830	1.0×10^{1}	3.3×10^{0}	7.0×10^{1}	8.2×10^{1}	1.6×10^{2}	1.6×10^{-4}	7.4×10^{0}	6.0×10^{-3}	9.6×10^{-2}	3.1×10^{-1}	5.0×10^{-2}
Empty feed, Port Hope, ON	2,651,203	2.3×10^{1}	8.6×10^{0}	2.7×10^{2}	1.7×10^{2}	4.5×10^{2}	2.9×10^{-4}	2.7×10^{-5}	1.4×10^{-2}	2.7×10^{-1}	2.8×10^{-1}	3.8×10^{-2}
Depleted UF_6/tails, Portsmouth, OH	4,131,704	1.3×10^{1}	4.1×10^{0}	8.1×10^{1}	9.6×10^{1}	1.8×10^{2}	1.6×10^{-4}	5.3×10^{0}	7.8×10^{-3}	1.1×10^{-1}	3.5×10^{-1}	5.9×10^{-2}

Table D-11 Annual Collective Population Risks from Truck Transportation (Cont.)

Material	Total Mileage (km)	Cargo-Related Radiological Impacts: Dose Risk (person-rem)							Latent Cancer Fatalities		Vehicle-Related Impacts	
		Routine Crew	Public Off-Link	Public On-Link	Public Stop	Total Public	Maximum Individual	Accident	Crew	Public	Latent Emission Fatalities	Physical Accident Fatalities
Empty feed, Metropolis, IL	2,016,740	1.8×10^{1}	5.7×10^{0}	1.2×10^{2}	1.4×10^{2}	2.7×10^{2}	2.9×10^{-4}	2.8×10^{-5}	1.1×10^{-2}	1.6×10^{-1}	1.8×10^{-1}	2.9×10^{-2}
Empty feed, Baltimore, MD	2,699,548	2.6×10^{1}	9.8×10^{0}	2.0×10^{2}	1.9×10^{2}	4.0×10^{2}	2.9×10^{-4}	4.1×10^{-5}	1.6×10^{-2}	2.4×10^{-1}	3.0×10^{-1}	3.8×10^{-2}
Empty feed, Portsmouth, VA	2,891,005	2.7×10^{1}	1.0×10^{1}	1.9×10^{2}	2.0×10^{2}	4.0×10^{2}	2.9×10^{-4}	2.8×10^{-5}	1.6×10^{-2}	2.4×10^{-1}	2.8×10^{-1}	4.1×10^{-2}
Empty product, Columbia, SC	1,958,736	2.3×10^{1}	1.2×10^{1}	2.3×10^{2}	2.3×10^{2}	4.7×10^{2}	3.5×10^{-4}	1.7×10^{-5}	1.4×10^{-2}	2.8×10^{-1}	2.0×10^{-1}	2.8×10^{-2}
Empty product, Richland, WA	510,634	5.5×10^{0}	2.1×10^{0}	4.7×10^{1}	5.9×10^{1}	1.1×10^{2}	3.5×10^{-4}	2.8×10^{-6}	3.3×10^{-3}	6.6×10^{-2}	3.9×10^{-2}	7.3×10^{-3}
Empty product, Wilmington, NC	2,134,589	2.5×10^{1}	1.5×10^{1}	2.6×10^{2}	2.5×10^{2}	5.3×10^{2}	3.5×10^{-4}	2.0×10^{-5}	1.5×10^{-2}	3.2×10^{-1}	2.4×10^{-1}	3.0×10^{-2}
Empty depleted UF_6/tails, Port Hope, ON	2,275,120	2.0×10^{1}	7.3×10^{0}	2.3×10^{2}	1.5×10^{2}	3.9×10^{2}	2.5×10^{-4}	2.3×10^{-5}	1.2×10^{-2}	2.3×10^{-1}	2.4×10^{-1}	3.2×10^{-2}
Empty depleted UF_6/tails, Metropolis, IL	1,730,658	1.5×10^{1}	4.9×10^{0}	1.0×10^{2}	1.2×10^{2}	2.2×10^{2}	2.5×10^{-4}	2.3×10^{-5}	9.0×10^{-3}	1.3×10^{-1}	1.5×10^{-1}	2.5×10^{-2}
Empty depleted UF_6/tails, Baltimore, MD	2,316,607	2.2×10^{1}	8.5×10^{0}	1.7×10^{2}	1.6×10^{2}	3.4×10^{2}	2.5×10^{-4}	4.2×10^{-5}	1.3×10^{-2}	2.0×10^{-1}	2.6×10^{-1}	3.3×10^{-2}
Empty depleted UF_6/tails, Portsmouth, VA	2,480,904	2.3×10^{1}	8.8×10^{0}	1.6×10^{2}	1.7×10^{2}	3.4×10^{2}	2.5×10^{-4}	2.3×10^{-5}	1.4×10^{-2}	2.0×10^{-1}	2.4×10^{-1}	3.5×10^{-2}
Empty depleted UF_6/tails, Paducah, KY	1,749,415	1.6×10^{1}	5.0×10^{0}	8.4×10^{1}	1.2×10^{2}	2.1×10^{2}	2.5×10^{-4}	2.3×10^{-5}	9.6×10^{-3}	1.3×10^{-1}	1.5×10^{-1}	2.5×10^{-2}

Table D-11 Annual Collective Population Risks from Truck Transportation (Cont.)

Material	Total Mileage (km)	Cargo-Related Radiological Impacts: Dose Risk (person-rem): Routine Crew	Public Off-Link	Public On-Link	Public Stop	Total Public	Maximum Individual	Accident	Latent Cancer Fatalities: Crew	Latent Cancer Fatalities: Public	Vehicle-Related Impacts: Latent Emission Fatalities	Vehicle-Related Impacts: Physical Accident Fatalities
Empty depleted UF_6/tails, Portsmouth, OH	2,065,852	1.9×10^{1}	6.2×10^{0}	1.2×10^{2}	1.4×10^{2}	2.7×10^{2}	2.5×10^{-4}	1.7×10^{-5}	1.1×10^{-2}	1.6×10^{-1}	1.7×10^{-1}	2.9×10^{-2}
Solid waste, Clive, UT	8086	5.0×10^{-2}	1.0×10^{-2}	2.4×10^{-1}	1.9×10^{-1}	4.4×10^{-1}	2.1×10^{-6}	5.2×10^{-4}	3.0×10^{-5}	2.6×10^{-4}	1.2×10^{-3}	1.1×10^{-4}
Solid waste, Hanford, WA	16,362	9.0×10^{-2}	1.3×10^{-2}	2.9×10^{-1}	3.8×10^{-1}	6.8×10^{-1}	2.1×10^{-6}	4.2×10^{-4}	5.4×10^{-5}	4.1×10^{-4}	1.2×10^{-3}	2.3×10^{-4}
Solid waste, Oak Ridge, TN	53,573	3.1×10^{-1}	5.6×10^{-2}	9.5×10^{-1}	1.3×10^{0}	2.3×10^{0}	2.1×10^{-6}	2.2×10^{-3}	1.9×10^{-4}	1.4×10^{-3}	5.0×10^{-3}	7.6×10^{-4}

Table D-12 Doses and Total Risk of Latent Cancer Fatalities from Accidents during Truck Transportation of Radioactive Materials

Material	Route	Population Dose (person-rem)					Total Population Risk of LCF
		Ground	Inhaled	Resuspended Soil	Cloud Shine	Total Dose	
Feed	Port Hope, ON	1.2×10^{-1}	1.1×10^{1}	1.8×10^{-2}	4.1×10^{-6}	1.1×10^{1}	6.6×10^{-3}
Feed	Metropolis, IL	1.2×10^{-1}	1.1×10^{1}	1.8×10^{-2}	4.2×10^{-6}	1.1×10^{1}	6.6×10^{-3}
Feed	Baltimore, MD	1.7×10^{-1}	7.8×10^{0}	1.4×10^{-2}	6.2×10^{-6}	8.0×10^{0}	4.8×10^{-3}
Feed	Portsmouth, VA	1.2×10^{-1}	1.1×10^{1}	1.8×10^{-2}	4.2×10^{-6}	1.1×10^{1}	6.6×10^{-3}
Product	Columbia, SC	1.4×10^{-1}	8.3×10^{0}	1.3×10^{-2}	2.9×10^{-6}	8.5×10^{0}	5.1×10^{-3}
Product	Richland, WA	2.2×10^{-1}	1.4×10^{0}	2.2×10^{-3}	4.7×10^{-7}	1.4×10^{0}	8.4×10^{-4}
Product	Wilmington, NC	1.6×10^{-1}	9.5×10^{0}	1.5×10^{-2}	3.3×10^{-6}	9.6×10^{0}	5.8×10^{-3}
Product	Baltimore, MD	1.6×10^{-1}	9.6×10^{0}	1.5×10^{-2}	3.3×10^{-6}	9.8×10^{0}	5.8×10^{-3}
Product	Portsmouth, VA	1.1×10^{-1}	6.4×10^{0}	1.0×10^{-2}	2.2×10^{-6}	6.5×10^{0}	3.9×10^{-3}
Depleted UF_6/tails	Paducah, KY	5.7×10^{-2}	7.3×10^{0}	1.2×10^{-2}	2.8×10^{-6}	7.4×10^{0}	4.4×10^{-3}
Depleted UF_6/tails	Portsmouth, OH	4.1×10^{-2}	5.3×10^{0}	8.5×10^{-3}	2.0×10^{-6}	5.3×10^{0}	3.2×10^{-3}
Empty feed	Port Hope, ON	1.4×10^{-6}	2.5×10^{-5}	2.1×10^{-7}	3.7×10^{-9}	2.7×10^{-5}	1.6×10^{-8}
Empty feed	Metropolis, IL	1.4×10^{-6}	2.6×10^{-5}	2.6×10^{-7}	3.8×10^{-9}	2.8×10^{-5}	1.7×10^{-8}
Empty feed	Baltimore, MD	2.1×10^{-6}	3.9×10^{-5}	3.2×10^{-7}	5.7×10^{-9}	4.1×10^{-5}	2.5×10^{-8}
Empty feed	Portsmouth, VA	1.4×10^{-6}	2.6×10^{-5}	2.6×10^{-7}	3.8×10^{-9}	2.8×10^{-5}	1.7×10^{-8}
Empty product	Columbia, SC	6.5×10^{-7}	1.7×10^{-5}	1.4×10^{-7}	1.7×10^{-9}	1.7×10^{-5}	1.0×10^{-8}
Empty product	Richland, WA	1.1×10^{-7}	2.7×10^{-6}	2.3×10^{-8}	2.8×10^{-10}	2.8×10^{-6}	1.7×10^{-9}
Empty product	Wilmington, NC	7.4×10^{-7}	1.9×10^{-5}	1.6×10^{-7}	1.9×10^{-9}	2.0×10^{-5}	1.2×10^{-8}
Empty DUF_6/tails	Port Hope, ON	1.2×10^{-6}	2.1×10^{-5}	1.8×10^{-7}	3.2×10^{-9}	2.3×10^{-5}	1.4×10^{-8}
Empty DUF_6/tails	Metropolis, IL	1.2×10^{-6}	2.2×10^{-5}	1.8×10^{-7}	3.3×10^{-9}	2.3×10^{-5}	1.4×10^{-8}
Empty DUF_6/tails	Baltimore, MD	2.2×10^{-6}	3.9×10^{-5}	3.3×10^{-7}	5.9×10^{-9}	4.2×10^{-5}	2.5×10^{-8}

Table D-12 Doses and Total Risk of Latent Cancer Fatalities from Accidents during Truck Transportation of Radioactive Materials (Cont.)

		Population Dose (person-rem)					
Material	Route	Ground	Inhaled	Resuspended Soil	Cloud Shine	Total Dose	Total Population Risk of LCF
Empty depleted UF_6/tails	Portsmouth, VA	1.2×10^{-6}	2.2×10^{-5}	1.8×10^{-7}	3.3×10^{-9}	2.3×10^{-5}	1.4×10^{-8}
Empty depleted UF_6/tails	Paducah, KY	1.2×10^{-6}	2.2×10^{-5}	1.8×10^{-7}	3.3×10^{-9}	2.3×10^{-5}	1.4×10^{-8}
Empty depleted UF_6/tails	Portsmouth, OH	1.2×10^{-6}	2.2×10^{-5}	1.8×10^{-7}	3.3×10^{-9}	2.3×10^{-5}	1.4×10^{-8}
Solid waste	Clive, UT	7.3×10^{-6}	5.1×10^{-4}	4.2×10^{-6}	1.9×10^{-10}	5.2×10^{-4}	3.1×10^{-7}
Solid waste	Hanford, WA	5.9×10^{-6}	4.1×10^{-4}	3.5×10^{-6}	1.6×10^{-10}	4.2×10^{-4}	2.5×10^{-7}
Solid waste	Oak Ridge, TN	3.1×10^{-5}	2.1×10^{-3}	1.8×10^{-5}	8.1×10^{-10}	2.2×10^{-3}	1.3×10^{-6}

D.5 Uncertainty in Transportation Risk Assessment

There are many sources of uncertainty in assessing the risks of transporting radioactive materials to and from the proposed EREF. Factors that can be quantified include the routing of the material, shipping container characteristics, mode of transport, and source or destination of the material. Each of these sources of uncertainty is discussed below.

D.5.1 Routing of Radioactive Material

There are many varying routes for the shipments of the radioactive materials to and from the proposed EREF. WebTRAGIS simplifies the routing choices by allowing the analyst to select various routing restrictions. These can range from no restrictions to HRCQ restrictions. Choices include the shortest route, fastest route, and prohibit various routes. Based on the NRC's previous analysis of different routing options (NRC, 2005b), the NRC staff used HRCQ routing for the transportation impact assessment this EIS.

D.5.2 Shipping Container Characteristics

The characteristics of the shipping container are important in the assessment of both incident-free and accident impacts. The routine (incident-free) impact is determined by the direct radiation along the side of the shipping container and the length of the container. The accident impacts are determined by the release fraction for each accident severity class. Historically, NUREG-0170 (NRC, 1977) was developed to provide background material for a review by the NRC of regulations dealing with the transportation of radioactive materials. In 2002, DOE presented a review of the historical assessments, transportation models, and a compilation of supporting data parameters, including release fractions, and generally accepted assumptions (DOE, 2002). DOE also evaluated shipments of depleted UF_6 in Type 48Y containers (DOE, 1999b); however, the release fractions were about one quarter of the DOE (2002) values. For this assessment, the NRC staff chose to use the more conservative release fractions for Type A containers (DOE, 2002).

D.5.3 Source or Destination of Radioactive Material

The source or destination of the radioactive material can also affect the transportation impact analysis. For example, as discussed in Section D.4, it is not expected that all of the feed material would be received exclusively from Port Hope, Ontario, Canada, or from Metropolis, Illinois. It is a reasonable assumption that feed could come from multiple sources. Therefore, the impact from transportation of feed material would range between the impacts evaluated for Port Hope and Metropolis. The same rationale applies to other types of shipments.

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APPENDIX E
DOSE METHODOLOGY AND IMPACTS

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DOSE METHODOLOGY AND IMPACTS

E.1 Introduction

This appendix discusses the methodology, data, and results for the analysis of the impacts on workers (construction workers, nonradiological workers, and radiation workers) and members of the general public that could result from routine operations at the AREVA Enrichment Services, LLC (AES) proposed Eagle Rock Enrichment Facility (EREF).

The consideration of radiation impacts on EREF construction workers covers the period of time when the proposed EREF is operational but not yet at full capacity. These workers would be present and could possibly be exposed to radiation during normal operations at the proposed facility. They may be exposed to external gamma radiation from stored depleted uranium cylinders, low-enriched uranium (LEU) product cylinders, natural feed cylinders, and empty cylinders. In addition, these workers would be exposed to radiation associated with the atmospheric release of uranium during normal operations.

The consideration of radiation impacts on EREF radiation workers covers internal exposures that may be associated with uranium enrichment operations, external exposures to depleted uranium and LEU product cylinders, and external exposures associated with process operations. Radiation dosimetry results associated with similar operational facilities will be used to assess worker doses at the proposed EREF.

Radiation impacts on members of the general public may result from the atmospheric release of uranium from normal operations as well as gamma radiation associated with stored depleted uranium cylinders.

E.2 Pathway Assessment Methodology

The CAP88-PC Version 3.0 computer code was used to assess the impacts on nonradiological workers and members of the general public from the atmospheric release of uranium compounds associated with normal operations (Rosnick, 2007). The CAP88-PC code estimates the total effective dose, which is the 50-year committed effective dose from internal emitters plus the effective dose from external exposure.

E.2.1 Members of the General Public

Radiological impacts on members of the general public were estimated for the following:

- collective population living within 80 kilometers (50 miles) of the proposed EREF
- nearest resident
- persons located outside the fenced boundary of the proposed EREF

The consideration of radiological impacts on the collective population and nearest resident covers the following pathways:

- external gamma radiation due to plume submersion
- external gamma radiation due to deposition
- inhalation of uranium compounds due to plume passage
- inhalation of uranium compounds due to resuspension
- ingestion of plant foods grown within 80 kilometers (50 miles) of the proposed EREF
- ingestion of meat products raised within 80 kilometers (50 miles) of the proposed EREF
- ingestion of milk produced within 80 kilometers (50 miles) of the proposed EREF

Since the area including and surrounding the proposed EREF is zoned for commercial use, for assessment purposes, the receptors were modeled as nonradiological workers that spend 2000 hours per year next to the outer boundary of the proposed EREF. The consideration of radiological impacts on persons working next to the outer fence line of the proposed EREF covers the following pathways:

- external radiation due to stored depleted uranium tail, LEU product, natural feed, and empty cylinders
- external gamma radiation due to plume submersion
- external gamma radiation due to deposition
- inhalation of uranium compounds due to plume passage
- inhalation of uranium compounds due to resuspension

E.2.2 Construction Workers

The consideration of radiological impacts on construction workers associated with continued construction operations while the proposed EREF is operational covers the following pathways:

- external radiation due to stored depleted uranium tail, LEU product, natural feed, and empty cylinders
- external gamma radiation due to plume submersion
- external gamma radiation due to deposition
- inhalation of uranium compounds due to plume passage

- inhalation of uranium compounds due to resuspension

These receptors were evaluated separately from persons working near the outer boundary because of their proximity to radiation sources such as the LEU, product, depleted uranium tail, natural feed, and empty cylinders.

E.2.3 Nonradiological Workers

The consideration of radiological impacts on nonradiological workers (i.e., general office staff) is also considered. These workers are not actively working in the uranium processing areas but rather are general office staff (administrative/secretarial support, etc.). The potential pathways would include:

- external radiation due to stored depleted uranium tail, LEU product, natural feed, and empty cylinders

- external gamma radiation due to plume submersion

- external gamma radiation due to deposition

- inhalation of uranium compounds due to plume passage

- inhalation of uranium compounds due to resuspension

The impacts associated with these workers are assessed using dosimetry records from similar operating enrichment facilities (AES, 2010).

E.2.4 EREF Radiation Workers

Radiological impacts on the EREF radiation workers were estimated on the basis of dosimetry records of historical operations at similar facilities. The EREF radiation workers would be under a radiation dosimetry program that measures both external and internal radiation doses.

E.2.5 Environmental Transport Methodology

The CAP88-PC Version 3 computer code was used to estimate the radiological impacts associated with the atmospheric transport of uranium compounds during normal operations (Rosnick, 2007). CAP88-PC estimates the total effective dose associated with the external inhalation and ingestion pathways. Version 3 of the computer code has incorporated dose conversion and risk factors from Federal Guidance Report Number 13 (FGR 13) (EPA, 1999), which used dose conversion factors from the International Commission on Radiological Protection Publication 72 (ICRP 72) (ICRP, 1996).

The CAP88-PC computer code incorporates a modified version of the AIRDOS-EPA program to calculate the environmental transport of radionuclides. Relevant sections of the CAP88-PC Version 3 users guide are reproduced in this section as referenced.

At the center of the atmospheric transport model is the Gaussian plume model of Pasquill, as modified by Gifford:

$$\chi = \frac{Q}{2\pi\sigma_y\sigma_z\mu}\exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y}\right)^2\right]\left(\exp\left[-\frac{1}{2}\left(\frac{z-H}{\sigma_z}\right)^2\right]+\exp\left[-\frac{1}{2}\left(\frac{z+H}{\sigma_z}\right)^2\right]\right), \qquad (1)$$

where

- χ = concentration in air (chi) at *x* meters downwind, *y* meters crosswind, and *z* meters above ground (Ci/m^3)
- Q = release rate from stack (Ci/s)
- μ = wind speed (m/s)
- σ_y = horizontal dispersion coefficient (m)
- σ_z = vertical dispersion coefficient (m)
- H = effective stack height (m)
- y = crosswind distance (m)
- z = vertical distance (m)

The effective release height used in equation 1 considers buoyant plume rise due to compounds being released above ambient temperatures. For the proposed EREF, any released uranium compounds would be at ambient temperatures; therefore, the effective stack height is simply the height of the release point.

Annual average meteorological data sets usually include frequencies for several wind-speed categories for each wind direction and the Pasquill atmospheric stability category. CAP88-PC uses reciprocal-averaged wind speeds in the atmospheric dispersion equations, which permit a single calculation for each wind speed category. Equation 1 is applied to ground-level concentrations in air at the plume centerline by setting *y* and *z* to zero, which results in

$$\chi = \frac{Q}{2\pi\sigma_y\sigma_z\mu}\exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right]. \qquad (2)$$

The average ground-level concentration in air over a sector of 22.5 degrees can be approximated by

$$\chi_{avg} = \frac{\int_0^\infty \exp\left[-\left(\frac{0.5}{\sigma_y{}^2}\right)y^2\right]dy}{x\tan(11.25^o)} * \frac{Q}{2\pi\sigma_y\sigma_z\mu}\exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right], \qquad (3)$$

which can be reduced further to

$$\chi_{avg} = \frac{Q}{0.15871\pi\, x\sigma_z \mu} \exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2 \right]. \tag{4}$$

The CAP88-PC code considers both dry and wet deposition as well as radioactive decay. Plume depletion is accounted for by substituting a reduced release rate *Q'* for the original release rate for each downwind distance *x* (Slade, 1968). The ratio of the reduced release rate to the original is the depletion fraction. The overall depletion fraction used in CAP88-PC is the product of the depletion fractions for precipitation, dry deposition, and radioactive decay.

Ground surface soil concentrations are calculated on an annual basis. Ingrowth and decay of progeny radionuclides are calculated by using Bateman's equations for the entire decay chain. Radionuclide concentrations in meat, milk, and vegetables are calculated by using elemental transfer factors from Report 123 of the National Council on Radiation Protection and Measurements (NCRP, 1996). The concentration in soil for each isotope is multiplied by the appropriate elemental transfer factor to generate a concentration in each ingestion pathway medium for that isotope in that sector.

E.3 Radiological Impact Assessment Input

The data and results of the radiological impacts are provided below for the following groups:

- collective population
- nearest resident
- member of the public adjacent to the outer boundary of the proposed EREF
- construction workers associated with the continued construction operations while the proposed EREF is operational
- construction worker at uranium hexafluoride (UF_6) cylinder pad
- EREF workers

E.3.1 Radionuclide Releases

The release of uranium compounds during normal operations was modeled by using the activity data provided in Table E-1. The radiological impacts were modeled by using releases from a 1.5-million-separative work unit (SWU) plant described in NUREG-1484 (NRC, 1994) linearly scaled up to a 6.6-million-SWU facility. For the 6.6-million-SWU facility, it was assumed that 19.5 megabecquerels (530 microcuries) of uranium was released. For conservatism, this same quantity of uranium was assumed to be released during the combined construction and operational phase in order to estimate the maximum potential dose that construction workers could incur.

Release points for airborne emissions were assumed to take place at an elevation of 40 m (132 ft). However, the CAP88-PC computer code does not account for building wake effects.

Table E-1 Source Term Used for the Radiological Impact Assessment for Normal Operations[a]

Radionuclide	Wt%	Activity MBq (μCi)
Uranium-234	5.5×10^{-3}	9.5 (260)
Uranium-235	0.71	0.5 (10)
Uranium-238	99.3	9.5 (260)
Total		19.5 (530)

[a] Members of the general public, 6.6-million-SWU facility. Annual uranium released: 760 grams, 19.5 MBq (530 μCi).
Source: Derived from AES, 2010.

Therefore, doses were assessed based on a combination of ground-level releases and 40-m stack releases. For conservatism, the maximum dose calculated for the same individuals or collective population from either a 40-m release or a ground-level release was used for the dose assessment.

E.3.2 Population Distributions

The general population distribution for the radiological impact assessment was made by projecting the population of the 12 counties in Idaho (Bannock, Bingham, Blaine, Bonneville, Butte, Caribou, Clark, Fremont, Jefferson, Lemhi, Madison, and Power) that fall within the 80-kilometer (50-mile) radius of the proposed EREF. Population estimates were made by using the SECPOP 2000 computer code to year 2050 (NRC, 2003). A total of 267,256 persons was considered for estimating the collective population dose. Table E-2 provides the population distribution data used for the assessment.

The worker population distributions were derived on the basis of those workers who are involved in the continued build-out of the adjoining Separation Building Modules (SBMs), the UF_6 handling areas, and the storage areas for the full tails, full feed, and empty cylinders. In total, approximately 400 construction-related persons were evaluated for the radiological dose assessment. Table E-3 provides a breakdown of the individuals by labor craft and location.

E.3.3 Exposure Time Fractions and Receptor Locations

The CAP88-PC computer code assumes that an individual spends an entire year at the locations provided. This assumption is overly conservative with regard to evaluating either the construction worker collective population dose or the dose received by a hypothetical worker at the site boundary because, on average, a worker is assumed to spend 2000 hours per year at a job site. In order to account for this limitation, the collective construction worker doses and the doses received by a hypothetical worker at the site boundary were scaled down by a factor of 4.38 (24 multiplied by 365.25/2000).

Table E-2 Extrapolated Data on Population within 80-kilometer (50-mile) Radius of Proposed EREF in 2050 (distance from proposed EREF in kilometers [top line] and miles [bottom line])

Direction	0–1.6 (0–1)	1.6–3.2 (1–2)	3.2–4.8 (2–3)	4.8–6.4 (3–4)	6.4–8.0 (4–5)	8.0–16 (5–10)	16–32 (10–20)	32–48 (20–30)	48–64 (30–40)	64–80 (40–50)
S	0	0	0	0	0	0	169	20,589	3835	61,264
SSW	0	0	0	0	0	0	49	757	1172	3477
SW	0	0	0	0	0	0	49	55	5	38
WSW	0	0	0	0	0	0	0	33	9	6
W	0	0	0	0	0	0	0	0	10	2142
WNW	0	0	0	0	0	0	0	56	220	562
NW	0	0	0	0	0	0	0	0	0	84
NNW	0	0	0	0	0	0	53	299	58	18
N	0	0	0	0	0	0	921	223	146	70
NNE	0	0	0	0	0	0	290	559	157	831
NE	0	0	0	0	0	3	193	8	1365	4882
ENE	0	0	0	0	0	3	1561	9655	29,946	4229
E	0	0	0	0	0	17	1004	13,654	3436	37
ESE	0	0	0	0	0	14	12,744	68,188	421	0
SE	0	0	0	0	0	0	741	10,303	21	2
SSE	0	0	0	0	0	75	142	6214	78	114

Table E-3 Worker Population Distribution during Build-Out/Operational Phase

Labor Craft	Plant Area	Craft Hours per Year	Persons
Civil/structural	UF_6 Handling	109,174	54
	SBM	269,296	134
	Cylinder Pad	24,729	12
Mechanical	UF_6 Handling	65,504	32
	SBM	161,577	80
	Cylinder Pad	14,837	7
Electrical	UF_6 Handling	43,669	22
	SBM	107,718	53
	Cylinder Pad	9891	5
Totals	UF_6 Handling	218,348	108
	SBM	538,592	267
	Cylinder Pad	49,459	24.5

Source: AES, 2009.

The hypothetical site boundary receptor was chosen so that a person would receive the dose; therefore, this individual can be considered a maximally exposed individual. Since Bonneville County zoning laws prohibit the land area adjacent to the proposed EREF to be zoned other than for industrial use, the receptor was modeled as a worker that spends 2000 hours per year at the proposed site boundary. On the basis of the release point and meteorological conditions present at the proposed site, the receptor was assumed to be located 1.1 kilometers (0.7 mile) north of the proposed site.

Table E-4 provides a listing of the receptor locations and the time fractions used to estimate the radiological impacts on the nearest resident and the hypothetical worker at the proposed site boundary.

E.3.4 Agricultural Productivity

The ingestion of vegetables, meat, and milk was considered in the radiological impact assessment. The U.S. Environmental Protection Agency (EPA) rural food source scenario option within CAP88-PC was selected for the assessment. On the basis of regional food production, estimates were derived for the beef cattle density, milk cattle density, and land fraction cultivated by vegetables. Table E-5 provides a list of the agricultural parameters used in CAP88-PC for the radiological impact assessment.

E.3.5 Radionuclide-Specific Input

The radiological impacts were estimated by using the CAP88-PC Version 3.0 computer code. This computer code uses the newer FGR-13/ICRP-72-based dose conversion factors. Uranium

Table E-4 Receptor Locations for Radiological Impact Assessment

Receptor	Direction from Source to Proposed Site Boundary	Distance from Source to Proposed Site Boundary in km (mi)	Time Spent at Location (h)
Nearest resident	North	8.0 (5.0)	8761
Member of the public at proposed site boundary:			
Cylinder pad	North	0.76 (0.47)	2000
Atmospheric release	North	1.1 (0.7)	NA[a]

[a] NA = Not applicable.

Table E-5 Agricultural Input Parameters Used in the Radiological Impact Assessment

	Vegetable	Meat	Milk	Scenario
Fraction from assessed area	0.7	0.4	0.442	Collective population dose
Fraction home produced	0.3	0.6	0.558	Nearest resident
Cattle density (no./km^2)		11	1.78	Collective population/nearest resident
Cultivated land fraction	0.036			Collective population/nearest resident

Source: Derived from AES, 2010.

compounds released from the proposed EREF were assumed to be in the form of uranyl fluoride (UO_2F_2), which would be more soluble than other forms of uranium, such as uranium oxide. To properly capture this chemical phenomenon, "medium" lung clearance classes were assigned to each uranium isotope.

Radionuclide transfer factors are used to model the uptake of radionuclides by plants and animals. The transfer factors are element-dependent rather than radionuclide-dependent. The default values for uranium found in the CAP88-PC Version 3.0 computer code were used for the radiological impact assessment. A list of the element- and radionuclide-specific factors used for all radiological impact modeling is provided in Table E-6.

E.4 Results of the Radiological Impact Analyses

This section provides the results of the radiological impact analyses. Radiological impacts were estimated for the following:

- collective population
- nearest resident
- member of the public adjacent to the outer boundary of the proposed EREF

Table E-6 Radionuclide-Specific Input Used in the Radiological Impact Assessment

	Radionuclide			Element
Parameter Name	Uranium-234	Uranium-235	Uranium-238	Uranium
Lung clearance class	M	M	M	
Inhalation dose conversion factor (mrem/pCi)	1.29×10^{-2}	1.14×10^{-2}	1.06×10^{-2}	
Ingestion dose conversion factor (mrem/pCi)	1.83×10^{-4}	1.73×10^{-4}	1.65×10^{-4}	
Immersion dose conversion factor (mrem m^3/µCi-yr)	7.14×10^{5}	7.55×10^{8}	2.92×10^{5}	
Ground surface dose conversion factor (mrem m^2/µCi-yr)	6.82×10^{2}	1.63×10^{5}	4.94×10^{2}	
Deposition velocity (m/s)	1.8×10^{-3}	1.8×10^{-3}	1.8×10^{-3}	
Particle size (µm)	1	1	1	
Milk transfer factor				4×10^{-4}
Meat transfer factor				8×10^{-4}
Forage uptake factor (pCi/kg of dry forage/dry soil)				0.1
Edible update factor (pCi/kg of wet soil/dry soil)				0.02

Source: Rosnick, 2007; EPA, 1999.

- construction workers associated with the continued construction operations while the proposed EREF is operational

- construction worker at uranium hexafluoride (UF_6) cylinder pad

- EREF workers

E.4.1 Collective Population

Radiological impacts on members of the general population were estimated to be 1.74×10^{-3} person-rem/yr (1.74×10^{-5} person-Sv/yr). The breakdown by radionuclide follows below:

- 9.3×10^{-4} person-rem/yr (54 percent) uranium-234

- 3.8×10^{-5} person-rem/yr (2 percent) uranium-235

- 7.7×10^{-4} person-rem/yr (44 percent) uranium-238

The inhalation pathway was the most dominant, accounting for approximately 88 percent of the total dose. The ingestion pathway contributed to approximately 11 percent of the total dose.

E.4.2 Individual Public Doses

Radiological impacts were evaluated for the nearest resident and a member of the public next to the proposed EREF site boundary. As shown in Table E-4, the nearest resident is located 8 kilometers (5 miles) to the north of the proposed EREF and is assumed to spend the entire year at that one location. The dose to this individual was estimated to be 2.12×10^{-4} millirem per year. The dominant pathway for this dose is inhalation, which makes up almost 94 percent of the total dose.

Radiological impacts on the hypothetical member of the public next to the proposed site boundary would be composed of both an external dose due to the stored UF_6 cylinders and an inhalation dose due to the release of uranium under normal operations. The total annual dose to this individual was estimated at 1.4 millirem per year; the external dose associated with the stored cylinders would account for more than 99.86 percent of the total. Since the vast majority of the dose is from external radiation associated with the UF_6 cylinders, it is more appropriate to compare this dose to the dose associated with the regulations found in Title 10 of the U.S. *Code of Federal Regulations* (10 CFR 20.1301). In comparison, this dose to the member of the public at the site boundary is more than 70 times lower than the 100-mrem/yr dose limit for members of the public as codified in 10 CFR 20.1301.

E.4.3 Worker Doses

Radiological impacts on construction workers were evaluated for the period when the proposed EREF would be operational but construction would continue on the SBM and the Cylinder Storage Pad. For this assessment, it was assumed that the cylinder pad would be constructed in 20-percent increments. For conservatism, radiological impacts were evaluated for the time when the last of the segments would be constructed. This scenario would yield the largest external dose to the workers because of the quantity of cylinders on the pad. The impacts would be dominated by the external dose associated with stored UF_6 cylinders on the pad. The MCNP Version 5 computer code was used to estimate doses when the last 20 percent of the pad would be under construction (X5 Monte Carlo Team, 2003).

The total annual collective worker dose to construction workers associated with continued construction of the remainder of the proposed EREF while a portion of the proposed facility is under construction was estimated to be 37.6 person-rem. More than 99 percent of the total dose is associated with external exposures from the depleted uranium, LEU product, natural feed, and empty cylinders. Likewise, approximately 64 percent of the collective worker dose is associated with the workers constructing the storage pad. Table E-7 provides the collective doses for both members of the general public living within 80 kilometers (50 miles) of the proposed EREF and the construction workers associated with the build-out of the existing facility.

The radiological impact on a construction worker completing the last section of the UF_6 storage pad was estimated at 196 millirem per year, with essentially the entire dose attributable to the depleted uranium, LEU product, natural feed, and empty cylinders on the storage pad. This

Table E-7 Collective Doses for Members of the General Public and Construction Workers during Proposed EREF Build-Out

Receptor	Collective Dose (person-rem/yr)	% Attributable to Cylinders on Pad
General public	1.74×10^{-3}	~0
Construction workers:		
SBM and UF_6 handling area	13.6	99.99
Storage pad	24.0	99.99
Total	37.6	99.99

Table E-8 Summary of Individual Doses for Workers and Members of the Public

Receptor	Dose (mrem/yr)	Major Pathway
Nearest receptor	2.12×10^{-4}	Inhalation
Hypothetical member of the public at the proposed site boundary	1.4	External
Construction pad worker	196[a]	External

[a] This dose exceeds the dose limit in 10 CFR 20.1301 by a factor of 1.96. The construction pad workers should therefore be part of a radiation dosimetry program and reclassified as radiation workers.

dose is almost two times the annual dose limit to members of the general public; therefore, these workers should be part of a radiation dosimetry program and classified as radiation workers. Table E-8 provides a summary of the individual doses evaluated in the radiological impact assessment.

Annual whole-body dose equivalents accrued by workers at an operating uranium enrichment plant are typically low; they ranged from 0.22 to 0.44 millisievert in URENCO (2003, 2004, 2005, 2006, 2007). In general, annual doses to workers are expected to range from 0.50 millisievert per year (5 millirem per year) for general office staff to 3 millisieverts per year (300 millirem per year) for cylinder handlers. The proposed EREF has proposed an administrative limit of 0.01 sievert per year (1 rem per year) to any radiation worker. This limit is 20 percent of the regulatory limit provided in 10 CFR 20.1201. Table E-9 provides estimates of annual doses to representative workers within the proposed EREF. Table E-10 provides estimated dose rates at several areas at the proposed EREF.

Table E-9 Estimated Annual Exposures for Various Occupations at the Proposed EREF

Position	Annual Dose Equivalent (mrem)
General office staff (nonradiological workers)	<5.0
Typical operations and maintenance technician	100
Typical cylinder handler	300

Source: AES, 2010.

Table E-10 Estimated Dose Rates at Various Locations within the Proposed EREF

Position	Dose Rate (mrem/h)
Plant general area	0.01
Separation building – Cascade Halls	0.05
Separation building	0.1
Empty used UF_6 shipping cylinder	
On contact	10
At 1 meter (3.3 feet)	1
Full UF_6 shipping cylinder	
On contact	5
At 1 meter (3.3 feet)	0.2

Source: AES, 2010.

E.5 References

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APPENDIX F
SOCIOECONOMIC ANALYSIS METHODS

APPENDIX F
SOCIOECONOMIC ANALYSIS METHODS

This appendix describes the methods used to estimate the socioeconomic impacts of preconstruction and construction activities and facility operations of the proposed Eagle Rock Enrichment Facility (EREF). Impacts are evaluated for a two-county region of influence (ROI) consisting of Bingham and Bonneville Counties, Idaho. The ROI is the area in which the majority of the proposed EREF permanent employees would live and spend their wages and which is expected to be the primary source of labor for each phase of the proposed EREF (AES, 2010).

The socioeconomic analysis was divided into four main steps: (1) expenditure and employment data during construction and operations were used to estimate direct and indirect economic impacts; (2) the impact on direct State and local tax revenues were estimated; (3) the number of in-migrating workers required to fill onsite job positions during each project phase, and associated family members, was estimated based on information gathered from local economic development agencies; and (4) the resulting housing and local community service employment impacts were estimated.

F.1 Employment, Income, and Tax Impacts

Employment and income impacts include both direct and indirect employment and income associated with the various phases of the proposed EREF development. Direct employment and income are created by onsite activities at the facility itself, while indirect employment and income are created in the ROI as workers directly employed by the proposed EREF spend their salaries and as jobs are created with the purchase of materials, equipment, services, and other non-payroll expenditures. Direct employment and income created during each stage of the proposed project were estimated on the basis of anticipated labor inputs and salaries for the various engineering and construction activities associated with each phase of the proposed project. The indirect impacts of the proposed EREF on regional employment and income were estimated using regional economic multipliers. Multipliers capture the indirect (offsite) effects of onsite activities associated with construction and operation.

The multipliers used in this analysis were taken from the RIMS-II Input-Output Model developed by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA, 2010). The multipliers take into account the flow of commodities to industries from producers and institutional consumers in the various sectors of the economy of the ROI. Input–output accounts also show consumption activities by workers, owners of capital, and imports from outside the region. The RIMS II model contains 528 sectors representing the industries of agriculture, mining, construction, manufacturing, wholesale and retail trade, utilities, finance, insurance and real estate, and consumer and business services. For each sector, the model also includes information on employee compensation; proprietary and property income; personal consumption expenditures; Federal, State, and local expenditures; inventory and capital formation; and imports and exports.

The RIMS-II multipliers measure the total (direct plus indirect) impact of direct facility employment on ROI output, income, and employment. Multipliers associated with each major expenditure category (for example, separator equipment, process building and offices, utilities, spare parts, and construction payroll) taken from the RIMS-II model are multiplied by the relevant direct employment number, with the resulting total impacts in each category aggregated to produce the overall impact of each phase of the proposed facility.

State income tax revenue impacts were estimated by applying State income tax rates to projected EREF project-related construction and operations earnings. State and local sales tax revenues were estimated by applying appropriate State and local sales tax rates (see Section 3.12.4) to after-tax income generated by construction and operations employees that was spent within the ROI.

F.2 Impacts on Population

A number of workers, families, and children would migrate into the ROI, either temporarily or permanently, with construction and operation of the proposed EREF. The capacity of regional labor markets to provide sufficient numbers of workers in the appropriate occupations required for facility construction and operation is closely related to the occupational profile of the ROI and its occupational unemployment rates. Although Bingham and Bonneville Counties are expected to be the primary sources of labor for the proposed EREF, some in-migration of workers, families, and children into the ROI, either temporarily or permanently, is expected during each phase of the proposed EREF. The capacity of regional labor markets to produce sufficient numbers of workers in the appropriate occupations required for facility construction and operation is closely related to the occupational profile of the ROI and occupational unemployment rates. The number of in-migrating workers used in the analysis was assumed to be small, with the majority of craft skills being available in the ROI. Sixty-five percent of in-migrating workers were assumed to be accompanied by their families, which would consist of an additional adult and one school-age child (AES, 2010), based on the national average household size (U.S. Census Bureau, 2009).

F.3 Impacts on Local Housing Markets

The in-migration of workers during preconstruction, construction, and operation would have the potential to substantially affect the housing market in the ROI. The analysis evaluated the potential impacts resulting from the in-migration of both direct and indirect workers into the ROI by estimating the increase in demand for rental housing, the type of housing most likely to be occupied by construction workers, in the peak year of construction, and the increase in demand for owner-occupied housing, the housing type most likely to be chosen by operations workers, in the first year of operation. The relative impact on existing housing in the ROI was estimated by calculating the impact of the proposed EREF-related housing demand on the forecasted number of vacant rental housing units in the peak year of construction and the number of vacant owner-occupied units in the first year of operations using data from the U.S. Census Bureau (U.S. Census Bureau, 2009).

F.4 Impacts on Community Services

Impacts of proposed EREF in-migration on community service employment were estimated for the two ROI counties in which most of the new workers would reside. The projected numbers of in-migrating workers and families were used to calculate the numbers of new sworn police officers, firefighters, and general government employees required to maintain the existing levels of service for each community service. Calculations were based on the existing number of employees per 1000 population for each community service. The analysis of the impacts on educational employment estimated the number of teachers required for each school district to maintain existing teacher–student ratios across all student age groups. Information on existing employment and levels of service was collected from the individual jurisdictions providing each service.

F.5 References

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APPENDIX G
ENVIRONMENTAL JUSTICE ANALYSIS DATA

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ENVIRONMENTAL JUSTICE ANALYSIS DATA

This appendix provides the data used in the assessment of the potential for disproportionately high and adverse human health or environmental effects on minority and/or low-income populations resulting from the preconstruction, construction, operation, and decommissioning of the proposed Eagle Rock Enrichment Facility (EREF).

Tables G-1 through G-4 present detailed Census data for the environmental justice analysis at the State, county, and Census block group levels for 2000 (U.S. Census Bureau, 2010). Minority and low-income populations are defined in Sections 3.13.1 and 3.13.2 of this Environmental Impact Statement (EIS). ArcView® geographic information system software was used to determine minority and low-income characteristics by block group. Minority and low-income data are shown for all block groups that lay partially or completely within the area 6.4 kilometers (4 miles) from the proposed EREF.

Table G-1 State and County Minority Population Totals, 2000

Location	Total Population	Minority Population	Percent Minority
Idaho	1,293,953	116,649	9.0
Bingham County	41,735	7332	17.6
Bonneville County	82,522	5948	7.2
Jefferson County	19,155	1749	9.1

Source: U.S. Census Bureau, 2010.

Table G-2 Census Block Group Minority Population Totals, 2000

Location	County	Total Population	Minority Population	Percent Minority
Census Tract 9503, Census Block Group 1	Bingham	1438	234	16.3
Census Tract 9715, Census Block Group 1	Bonneville	790	170	21.5
Census Tract 9715, Census Block Group 2	Bonneville	987	74	7.5
Census Tract 9601, Census Block Group 1	Jefferson	957	202	21.1

Source: U.S. Census Bureau, 2010.

Table G-3 State and County Low-Income Population Totals, 1999

Location	Total Population[a]	Low-Income Population	Percent Minority
Idaho	1,263,205	148,732	11.8
Bingham County	41,342	5137	12.4
Bonneville County	81,532	8260	10.1
Jefferson County	19,155	1984	10.4

[a] Total population for which poverty status has been determined.
Source: U.S. Census Bureau, 2010.

Table G-4 Census Block Group Low-Income Population Totals, 1999

Location	County	Total Population[a]	Low-Income Population	Percent Low-Income
Census Tract 9503, Census Block Group 1	Bingham	1384	162	11.7
Census Tract 9715, Census Block Group 1	Bonneville	692	109	15.8
Census Tract 9715, Census Block Group 2	Bonneville	1053	69	6.6
Census Tract 9601, Census Block Group 1	Jefferson	957	223	23.3

[a] Total population for which poverty status has been determined.
Source: U.S. Census Bureau, 2010.

G.1 References

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APPENDIX H
BENEFIT-COST ANALYSIS OF PROPRIETARY DATA

The text in this appendix is being withheld under 10 CFR 2.390.

APPENDIX I
PUBLIC PARTICIPATION AND NRC RESPONSE TO COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPENDIX I
PUBLIC PARTICIPATION AND
NRC RESPONSE TO COMMENTS
ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

I.1 Introduction

This appendix summarizes the public participation process conducted by the U.S. Nuclear Regulatory Commission (NRC) staff for the environmental review and preparation of the Environmental Impact Statement (EIS) in support of the NRC's decision on issuing a license to AREVA Enrichment Services LLC (AES) to construct, operate, and decommission a proposed uranium enrichment facility. This facility is the proposed Eagle Rock Enrichment Facility (EREF) near Idaho Falls in Bonneville County, Idaho. In particular, this appendix also presents all of the comments received by the NRC on the Draft EIS and the staff's response to those comments. The NRC staff has considered and addressed the approximately 1150 individual comments that were received from approximately 220 government officials and agencies, nongovernmental organizations, and members of the general public.

I.2 Public Participation

Public participation is an essential part of the environmental review process under the *National Environmental Policy Act of 1969*, as amended (NEPA). This section discusses the process for public participation during the NRC staff's development of the EIS for the proposed EREF. As indicated in the discussions below, the NRC conducted an open, public EIS development process consistent with NEPA and the NRC's regulations under Title 10 of the U.S. *Code of Federal Regulations* (10 CFR) Part 51.

I.2.1 Initial Notification and Notice of Formal Proceeding

Upon receipt of AES's license application for the proposed EREF and completion of an initial acceptance review, the NRC published a notice in the *Federal Register* on July 30, 2009 (74 FR 38052) of receipt and availability of the application and notice of hearing. The NRC's environmental review began following acceptance and docketing of the application, which included a Safety Analysis Report and an Environmental Report. The NRC conducted its reviews pursuant to the requirements of 10 CFR 70.65 and 10 CFR 51.60, respectively.

I.2.2 Public Scoping

The NRC is required under 10 CFR 51.20(b)(10) to prepare an EIS, and under 10 CFR 51.26 to issue a Notice of Intent (NOI) to prepare the EIS and conduct a scoping process for the EIS. The NRC's public scoping process for the EIS for the proposed EREF began on May 4, 2009, with the publication in the *Federal Register* of the NOI (74 FR 20508). This NOI established a 45-day scoping period, ending on June 19, 2009, during which the public could submit written comments on the appropriate scope of issues to be considered in the EIS. The NOI also provided a brief description of the proposed EREF project and information on alternatives to be evaluated and environmental impact areas to be analyzed in the EIS; summarized the NEPA process for the proposed project; identified where information on the proposed project could be accessed; announced a public scoping meeting to be held in Idaho Falls, Idaho, during the scoping period, on June 4, 2009; and provided information on how to submit written comments to the NRC.

At the public scoping meeting, the NRC staff provided a description of the NRC's role, responsibilities, and mission; gave a brief overview of its environmental and safety review processes; discussed how the public could effectively participate in the environmental review process; and solicited comments from the public on environmental issues and concerns related to the proposed project. Approximately 40 individuals provided oral comments at the meeting. In addition, seven individuals provided written comments via regular postal mail and another 95 individuals provided comments via email during the scoping period. Scoping comments were provided by government officials and agencies, nongovernmental organizations, and the general public.

The oral and written scoping comments received by the NRC were summarized by the staff in the *Scoping Summary Report*, issued on September 11, 2009. This report, which is included in this EIS in Appendix A, also contains additional information on the scoping process and identifies the issues that would be addressed in the EIS based on the public scoping comments.

I.2.3 Draft EIS Development and Availability for Public Comment

Once the NRC staff completed the scoping process, defined the proposed action and alternatives, and determined the scope of the EIS, the staff prepared the Draft EIS. During development of the Draft EIS, the NRC staff sought input from a number of sources, including Federal, State and local government agencies, Tribal governments, and individuals.

Pursuant to 10 CFR 51.74, on July 21, 2010, the NRC staff published a Notice of Availability (NOA) for the Draft EIS in the *Federal Register* (75 FR 42466), announcing the issuance of the Draft EIS for public comment, in accordance with 10 CFR 51.73, 51.74, and 51.117. The NOA contained a summary of the contents and preliminary findings of the Draft EIS; the NRC staff's preliminary recommendation regarding issuance of the proposed license to AES; information on the public comment meeting to be held in Idaho Falls, Idaho; information on how to submit written comments at the public comment meeting, electronically, or by mail; and information on how to access the Draft EIS and other documents related to the proposed EREF project. Additionally, pursuant to 10 CFR 51.74, the NRC distributed the Draft EIS to approximately 135 individuals including Federal, Tribal, State, and local government officials and other interested parties. Copies of the Draft EIS were also sent by the NRC staff to a public library in Idaho Falls, to maintain in an information repository on the environmental review for the proposed EREF project.

Also in the July 21, 2010, *Federal Register* notice, the NRC staff established a 45-day public comment period on the Draft EIS, consistent with the cited NRC regulations. The official public comment period began with publication in the *Federal Register* on July 23, 2010, of the Notice of Availability of the Draft EIS (75 FR 43160). The public comment period ended on September 13, 2010.

Pursuant to 10 CFR 51.74, the NRC distributed the Draft EIS to approximately 135 individuals, including Federal, Tribal, State, and local government officials and other interested parties. Copies of the Draft EIS were also sent by the NRC staff to the Idaho Falls Public Library. The staff had sent other information on the project to this library over the course of Draft EIS development, including the AES Environmental Report and revisions (AES, 2010a). At the request of the NRC staff, the library maintains an information repository on the proposed EREF project.

I.2.4 Draft EIS Public Comment Meetings

The NRC staff conducted public meetings to receive oral and written comments on the Draft EIS from members of the public. These meetings were held on August 9, 2010, in Boise, Idaho, and on August 12, 2010, in Idaho Falls, Idaho. At these meetings, the NRC staff provided a description of the NRC's role, responsibilities, and mission; gave a brief overview of its licensing and environmental review processes; summarized the content and preliminary findings and recommendations of the Draft EIS; provided information on how the Draft EIS could be accessed or obtained and how to provide comments on the document; and solicited comments from the public on the Draft EIS. Oral comments were provided by 50 individuals during the Boise meeting and by 46 individuals during the Idaho Falls meeting. In addition, written comments were provided to the NRC staff by12 individuals at the Boise meeting and by 19 individuals at the Idaho Falls meeting. Court reporters recorded both meetings and prepared a written transcript for each.

I.2.5 Additional Public Comments Received on the Draft EIS

In addition to the written comments submitted at the two public meetings, the NRC received 7 letters, 43 postcards, and 81 emails containing comments on the Draft EIS during the Draft EIS public comment period.

I.3 Draft EIS Public Comment Compilation, Identification, Organization, Review, and Response

I.3.1 Comment Compilation

The NRC staff made the public comment meeting transcripts part of the public record, contained in the NRC's Agencywide Documents Access and Management System (ADAMS). The meeting transcripts are also available in the NRC's public website for the proposed EREF project, at http://www.nrc.gov/materials/fuel-cycle-fac/arevanc.html#3. Other comment documents were added to ADAMS as they were received by the NRC.

Members of the public can access ADAMS at http://www.nrc.gov/reading-rm/adams.html. From this website, the transcripts and other comment documents can be accessed by entering their ADAMS Accession Numbers (or ML numbers). The ADAMS Accession Numbers for the comment documents in which commenter's comments appear are identified in Table I-1. See Section I.3.2 below for a complete description of the contents of Table I-1.

I.3.2 Commenter and Comment Identification

The NRC staff reviewed the public meeting transcripts, letters, postcards, and emails to identify and extract the individual comments on the Draft EIS from these documents. These comments are presented in Section I.5 of this appendix.

The NRC staff identified commenters from the meeting transcripts and comments submitted in writing and assigned a unique identification number to each commenter, to aid the readers of this appendix in locating comments submitted by individual commenters and the NRC staff's corresponding responses to those comments. Table I-1 below lists all of the commenters on the Draft EIS alphabetically by last name, their associated commenter number, the ADAMS Accession Number(s) of the comment document(s) in which each commenter's comments appear, and the subsection(s) of Section I.5 that contain their comments and the NRC responses to those comments.

The NRC staff also assigned a unique comment number to each individual comment. The public meeting transcripts contain multiple comments, and each written comment document received contains one or more comments. The comment identification numbers consist of two parts. The first part identifies the commenter (i.e., is the commenter identification number discussed above). The second part identifies the specific comment within one of the transcripts or submitted written comment documents, incrementing sequentially through each transcript and document.

I.3.3 NRC Comment Organization, Review, and Response

From the meeting transcripts and other comment documents, the NRC staff has reviewed, considered, and addressed the approximately 1150 individual comments that were received. Comments relating to similar issues and topics have been grouped together, as permitted by NRC regulations in 10 CFR 51.91. This grouping is also consistent with the Council on Environmental Quality's NEPA regulations at 40 CFR 1503.4(b).

Section I.5 presents all of the comments received, including groups of similar comments, along with the NRC staff's corresponding responses to these comments or groups of similar comments. The NRC staff has categorized comments in subsections of Section I.5 according to their relation to chapters and sections of this EIS and other issues. Section I.5 contains 29 subsections, or topics, under which the public comments have been categorized. Within these subsections, the comments are further categorized, or grouped, by subtopics that the comments have in common, and there are one or more such groupings of comments within each Section I.5 subsection.

Each comment or group of similar comments in Section I.5 is introduced with a brief summary by the NRC staff of the subject of the comment or comments. The text of the comment(s) is then presented, preceded by the comment identification number(s) and commenter name(s). This is then followed by the NRC response. For cases in which comments have resulted in a modification to the Draft EIS, those changes are noted in the staff's response and are included in this Final EIS. In cases for which the comments do not call for a detailed response, the NRC staff explains why no further response is necessary.

I.3.4 Major Comment Issues and Topics

The majority of the comments received specifically address the scope of the environmental review, analysis, and issues contained in the Draft EIS, including the NEPA process, purpose and need, alternatives to the proposed action, existing conditions, potential environmental impacts, proposed mitigation, environmental measurements and monitoring, and benefit-cost analysis. However, other comments address topics and issues that were not part of the NEPA review process for the proposed action. Those comments include questions about the NRC's safety evaluation of the proposed EREF, security concerns, general statements of support of, or opposition to, the proposed EREF project, and observations regarding past AES activities (e.g., environmental and safety practices, financial activities) outside the United States.

I.3.5 Comments on Out-of-Scope Issues and Topics

The scope of the EIS analysis is defined in 10 CFR 51.71(c), NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC, 2003), and the *Scoping Summary Report* in Appendix A of this EIS. Several commenters raised issues that are not related to – i.e., not within the scope of – the NRC staff's environmental review of AES's application to construct, operate, and decommission the proposed EREF. These include the comments regarding general opposition to, and support for, the proposed project, without reference to EIS content, presented in Sections I.5.1 and I.5.2, respectively. Most of the other comments on out-of scope issues and topics are identified in Section I.5.5 (Scope of the Analysis). Because these comments do not directly relate to the content of the Draft EIS and are outside the scope of the NEPA review of the proposed EREF, the NRC staff did not prepare detailed responses to these comments.

I.4 Mandatory Hearing

By law, a license to construct, operate, and decommission the proposed EREF cannot be issued until completion of a hearing before the NRC's Atomic Safety and Licensing Board Panel (ASLBP). The ASLBP is an adjudicatory body independent from the NRC staff. Among its responsibilities, the ASLBP appoints judges to preside over NRC licensing cases in which a hearing request has been submitted, or where a hearing is required under the *Atomic Energy Act* of 1954 (AEA). Although the NRC did not receive any hearing request in connection with the EREF application, the AEA requires a hearing with regard to the licensing of the construction and operation of a uranium enrichment facility such as the proposed EREF. On March 26, 2010, the Chief Judge of the ASLBP established a three-judge Board to preside over this mandatory hearing. The purpose of the mandatory hearing is twofold: the Board must determine whether the EREF application meets applicable safety requirements in NRC regulations, and it must also determine whether the requirements of NEPA and the NRC's NEPA-implementing regulations have been satisfied.

On May 19, 2010, the ASLBP provided notice in the *Federal Register* of its adoption of a bifurcated schedule for the mandatory hearing, such that separate safety and environmental evidentiary hearings would be conducted. The safety hearing would be held first after issuance of the staff's Final Safety Evaluation Report (SER). The environmental hearing would be held later, following issuance of the Final EIS. The SER, NUREG-1951 (NRC, 2010b), was issued in September 2010, and the safety hearing was held January 25, 2011. Following completion of the safety and environmental hearings, the ASLBP will issue written findings on whether the requested license should be issued to AES. The Board's findings will be subject to review by the Commission. Evidence submitted during the hearings and January 25th only decisions of the ASLBP and Commission are made publically available, except to the extent that they contain proprietary or sensitive security information. This evidence, along with all adjudicatory issuances and submittals, may be viewed by accessing the Electronic Hearing Docket maintained by the NRC's Office of the Secretary at http://ehd1.nrc.gov/EHD/.

Table I-1 Draft EIS Commenter Identification and Comment Response Locations

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Aarti, Reham	Member of the Public	001	ML102310563	I.5.1, I.5.4
Allgood, Lane	Partnership for Science and Technology	002	ML102310563	I.5.3
Anderson, Philip A	Idaho Academy of Science	003	ML102530073	I.5.2
Anonymous	Member of the Public	004	ML102390243	I.5.21
Anonymous	Member of the Public	005	ML102280389	I.5.2
Anonymous	Member of the Public	006	ML102280389	I.5.2, I.5.18
Ayers, Arnold	Member of the Public	007	ML102320123	I.5.2, I.5.13, I.5.16, I.5.18
Bachelder, Carol	Member of the Public	008	ML102310563 ML102320123	I.5.1, I.5.5, I.5.13, I.5.19, I.5.22
Barclay, Steve	Member of the Public	009	ML102650572	I.5.1, I.5.4
Barraclough, Jack	Member of the Public	010	ML102320123	I.5.2, I.5.13
Baxter, Donald E	Member of the Public	011	ML102390284	I.5.3
Berndt, Janice	Member of the Public	012	ML102580064	I.5.18
Blackburn, Kit	Member of the Public	013	ML102650572	I.5.1, I.5.8
Blair, William	Member of the Public	014	ML102580071	I.5.1, I.5.4, I.5.12, I.5.13, I.5.18
Bond, Dina	Member of the Public	199	ML102630195	I.5.1, I.5.6
Brailsford, Beatrice	Snake River Alliance	015	ML102320123 ML102580089	I.5.1, I.5.4, I.5.5, I.5.6, I.5.8, I.5.13, I.5.14, I.5.18, I.5.21, I.5.22, I.5.23, I.5.25

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Briggs, E. Manley	Member of the Public	016	ML102310563 ML102280275	I.5.12, I.5.17
Briggs, Sally	Member of the Public	017	ML102310563 ML102280511	I.5.1, I.5.13
Brown, Deb	Member of the Public	018	ML102650572	I.5.1, I.5.5
Buehler, George	Member of the Public	019	ML102580063	I.5.1, I.5.13, I.5.18
Busby, Tracey	Member of the Public	020	ML102390250	I.5.13
Campbell, Sean	Member of the Public	200	ML102630195	I.5.1, I.5.6
Campos, Giovanna	Member of the Public	201	ML102630195	I.5.1, I.5.6
Cannarozzo, Linda	Member of the Public	021	ML102650572	I.5.1, I.5.4
Carroll, Judy	Member of the Public	022	ML102530077	I.5.1, I.5.18
Casper, Rebecca	Member of the Public	023	ML102320123	I.5.2, I.5.13
Chalfant, Jana	Idaho Economic Development Association	024	ML102280389	I.5.2, I.5.3
Chew, Sue	Idaho State Representative, Boise District 17	025	ML102310563 ML102580070	I.5.1, I.5.4, I.5.5, I.5.13, I.5.16, I.5.28
Chiles, Robb	Greater Idaho Falls Chamber of Commerce	026	ML102310563 ML102320123	I.5.3, I.5.19
Cohn, Sara	Idaho Conservation League	027	ML102310563 ML102530075	I.5.3, I.5.5, I.5.9, I.5.11, I.5.13, I.5.14, I.5.16, I.5.17, I.5.18, I.5.21, I.5.25, I.5.27
Coney, David	Member of the Public	028	ML102310563	I.5.1, I.5.16

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Conner, Richard	Member of the Public	029	ML102650572	I.5.1, I.5.6
Cooke, Kerry	Member of the Public	030	ML102310563 ML102280511	I.5.4, I.5.5, I.5.13, I.5.18
Cooper, James	Member of the Public	031	ML102530074	I.5.1, I.5.4
Cottrell, Cindy	Member of the Public	032	ML102370760	I.5.1, I.5.4, I.5.5, I.5.13, I.5.17, I.5.18, I.5.19
Crapo, Mike	U.S. Senator – Idaho	033	ML102320123	I.5.2, I.5.3, I.5.4
Crockett, Greg[a]	Partnership for Science and Technology	034	ML102320123 ML102280389	I.5.2, I.5.3, I.5.4, I.5.19
Crowley, Stephen	Member of the Public	035	ML102310563 ML102580072	I.5.1, I.5.5
Cutler, Christina	The Shoshone-Bannock Tribes	036	ML102580061	I.5.8, I.5.9, I.5.13, I.5.14, I.5.17, I.5.18, I.5.21
Daly, Kathy	Member of the Public	037	ML102580056	I.5.1
Davidson, Brian	Member of the Public	038	ML102390248	I.5.2, I.5.19
Davis, Kreg	Electrical Wholesale Supply	039	ML102310563 ML103410527 ML103410530	I.5.2, I.5.19, I.5.28
Day, Collin	Member of the Public	040	ML102310563	I.5.4, I.5.5, I.5.13, I.5.28
de Weerd, Tammy	Mayor, City of Meridian, Idaho	041	ML102310563	I.5.2, I.5.19
Deal, John	Hyperion Power	042	ML102280389	I.5.2, I.5.3

[a] The comment document provided and signed by Greg Crockett was also signed by an additional 114 individuals in support of the statement in the document.

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Deschamps, Rocky	Member of the Public	043	ML102320123	I.5.2, I.5.19
Donnelly, Dennis	Member of the Public	044	ML102320123	I.5.5, I.5.6
Drake, Joan W.	Member of the Public	045	ML102530072	I.5.18, I.5.25
Dudley, Mr. and Mrs. David	Members of the Public	046	ML102580057	I.5.1
Duffin, Alison	Member of the Public	202	ML102630195	I.5.1, I.5.4
Dugge, Danielle	Member of the Public	203	ML102630195	I.5.1, I.5.6
Dunham, Mark	Idaho Associated General Contractors	047	ML102310563	I.5.19
Emerson, Genevieve	Member of the Public	048	ML102580081	I.5.1, I.5.5, I.5.13, I.5.18, I.5.21
Everett, Victoria	Member of the Public	049	ML102310563	I.5.16, I.5.21
Fauci, Joanie	Member of the Public	050	ML102430033	I.5.1, I.5.5, I.5.6, I.5.13, I.5.16, I.5.18, I.5.19, I.5.21, I.5.22
Filkins, Susan	Member of the Public	204	ML102630195	I.5.1, I.5.6
Flowers, Jackie	Member of the Public	051	ML102320123	I.5.2, I.5.3, I.5.4
Fuger, Rod	Member of the Public	052	ML102600333	I.5.2
Fuhriman, Jared	Mayor, City of Idaho Falls, Idaho	053	ML102310563 ML102320123 ML102280389	I.5.2, I.5.3
Fullmer, Paul	Member of the Public	054	ML102280389	I.5.19
Galaviz, Claudia	Member of the Public	055	ML102650572	I.5.1, I.5.5

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Galaviz, Mark	Member of the Public	056	ML102650572	I.5.1, I.5.5
Garman, Steven P.	Sun Valley Air, LLC	057	ML102530079	I.5.1
Gerber, Matt	Member of the Public	058	ML102280389	I.5.2
Giles, Lance	Member of the Public	059	ML102280511	I.5.2, I.5.3
Gianotto, Ericka	Idaho Falls Mayor's Youth Advisory Council	060	ML102320123	I.5.3
Greco, Nancy	Member of the Public	061	ML102580036	I.5.1, I.5.6, I.5.18
Grigg, Trevor	Member of the Public	062	ML102310563	I.5.19
Guerri, Andrea	Member of the Public	205	ML102630195	I.5.1, I.5.4
Haga, Martha	Member of the Public	063	ML102500566 ML102500567	I.5.1, I.5.5, I.5.6, I.5.8
Hally, Tom	City Council Member, City of Idaho Falls	064	ML102390267	I.5.2
Hanson, Pamela	Member of the Public	206	ML102630195	I.5.1, I.5.4
Hardcastle, Ida	City Council Member, City of Idaho Falls	065	ML102280389	I.5.2, I.5.3, I.5.19
Hardesty, Toni	Idaho Department of Environmental Quality	066	ML102580073	I.5.5, I.5.11, I.5.13, I.5.16, I.5.17, I.5.18, I.5.21, I.5.22, I.5.27
Harris, Drew	Member of the Public	207	ML102630195	I.5.1, I.5.6
Hart, Mike	Member of the Public	067	ML102310563 ML102320123	I.5.2, I.5.3, I.5.4, I.5.6, I.5.10, I.5.14, I.5.21, I.5.23, I.5.28

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Harvey, Emily	Member of the Public	208	ML102630195	I.5.1, I.5.6
Hausrath, Anne	Member of the Public	068	ML102310563 ML102600323	I.5.1, I.5.3, I.5.4, I.5.13, I.5.16, I.5.28
Hawke, Scott	Member of the Public	069	ML102390285	I.5.3
Hemingway, Virginia	Member of the Public	070	ML102310563	I.5.1, I.5.16, I.5.18, I.5.21
Hensel, David	Member of the Public	071	ML102320123	I.5.4, I.5.5, I.5.6, I.5.18
Herring, J. Stephen	Member of the Public	072	ML102320123 ML102280389	I.5.2, I.5.4
Hollar, Courtney	Member of the Public	209	ML102630195	I.5.1, I.5.4
Holzmer, Mark	Member of the Public	073	ML102390271	I.5.3, I.5.19
Hoovis, Tyler	Member of the Public	210	ML102630195	I.5.1, I.5.4
Howard, Don	Member of the Public	074	ML102310563	I.5.13, I.5.28
Huddleston, Leslie	On behalf of U.S. Senator Mike Crapo of Idaho	075	ML102320123	I.5.2, I.5.3, I.5.4
Huebner, Martin	Member of the Public	076	ML102320123	I.5.2, I.5.3
Hyatt, Larry	Member of the Public	077	ML102310563 ML102320123 ML102580055	I.5.3, I.5.18, I.5.25
Jaquet, Wendy	Idaho State Representative, District 25	078	ML102530080	I.5.1, I.5.5, I.5.13, I.5.16, I.5.18

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Jensen, Kristen	Eastern Idaho Economic Development Partners	079	ML102280511 ML102280389	I.5.2, I.5.3
Joelson, Olivia	Member of the Public	211	ML102630195	I.5.1, I.5.4
Johnson, Don	Member of the Public	080	ML102320123	I.5.19
Johnson, Lea	Member of the Public	081	ML102650572	I.5.1, I.5.4
Johnson, Naomi	Member of the Public	212	ML102630195	I.5.1, I.5.4
Johnston, Michael P.	Member of the Public	082	ML102390241	I.5.2
Jones, Darvel	Member of the Public	213	ML102630195	I.5.1, I.5.6
Jones, Diane	Member of the Public	083	ML102310563	I.5.1, I.5.3, I.5.4, I.5.5, I.5.14, I.5.18, I.5.22
Jones, Michael R.	Member of the Public	084	ML102580034	I.5.1
Jonkouski, David	Member of the Public	085	ML102600323	I.5.1
Jull, Paula	Member of the Public	086	ML102580049	I.5.4, I.5.5, I.5.14, I.5.18, I.5.25
Kasnicki, Dennis	Member of the Public	087	ML102390270	I.5.5, I.5.13, I.5.19, I.5.21, I.5.27
Kay, Jim	AREVA Enrichment Services LLC	228	ML103410510	I.5.3, I.5.29
Kidwell, Stan	Member of the Public	088	ML102580060	I.5.4, I.5.5, I.5.6, I.5.8, I.5.14, I.5.18, I.5.21, I.5.28
Kiefer, Sharon W.	Idaho Department of Fish and Game	089	ML102580074	I.5.8, I.5.14, I.5.27

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Kjellander, Paul	On behalf of Idaho Governor Butch Otter	090	ML102310563	I.5.2, I.5.4, I.5.19
King, Jacob	Member of the Public	214	ML102630195	I.5.1, I.5.6
Kull, Arthur	Kull Food Technologies LLC	091	ML102390247	I.5.5
Lagergren, Ginna and Ken	Members of the Public	092	ML102510649	I.5.13
Landry, Louis	Member of the Public	093	ML102650572	I.5.1, I.5.8
Lange, Michael	Member of the Public	094	ML102320123	I.5.2, I.5.3, I.5.11
Larsen, Verlyn	Member of the Public	215	ML102630195	I.5.1, I.5.4
Lee, Beau	Member of the Public	216	ML102630195	I.5.1, I.5.6
Leeuwrik, Linda	Member of the Public	095	ML102530078	I.5.4, I.5.5, I.5.6, I.5.8, I.5.14, I.5.18, I.5.25, I.5.28
Makhijani, Arjun	Institute for Energy and Environmental Research	096	ML102320123 ML102280389	I.5.4, I.5.6, I.5.7, I.5.18
Martin, Bryan	Member of the Public	097	ML102310563	I.5.25
Martin, Linda	Grow Idaho Falls	098	ML102310563 ML102390240	I.5.2, I.5.3, I.5.4, I.5.6, I.5.11, I.5.16, I.5.19
Martin, Linda	On behalf of the Eastern Idaho Economic Development Partners	194	ML102310563 ML102320123	I.5.2, I.5.3
Martin, Linda	On behalf of the Eastern Idaho Economic Development Association	196	ML102320123	I.5.2, I.5.3
Mathieu, Brent	Member of the Public	099	ML102650572	I.5.1, I.5.6

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Matson, Wendy	Member of the Public	100	ML102310563 ML102650572	I.5.1, I.5.4, I.5.6, I.5.12, I.5.13, I.5.18, I.5.21
May-Chang, Jody	Member of the Public	101	ML102650572	I.5.1, I.5.5
Maynard, R.D.	Member of the Public	102	ML102310563	I.5.3, I.5.11, I.5.13
McCall, Karen	Member of the Public	103	ML102580087	I.5.1, I.5.4, I.5.5, I.5.6, I.5.13, I.5.17, I.5.18, I.5.19
McCollum, Carolyn	Member of the Public	104	ML102460018	I.5.4, I.5.18
McConaughey, Eve	Member of the Public	105	ML102260323	I.5.1, I.5.3, I.5.5, I.5.13, I.5.16, I.5.18
McConaughey, Ted	Member of the Public	106	ML102310563	I.5.1, I.5.5, I.5.19
McKay, Jean	Member of the Public	107	ML102320123 ML102280389	I.5.1
Mckelvey, Jodie	Member of the Public	217	ML102630195	I.5.1, I.5.4
McMahon, John C.	Member of the Public	108	ML102580051	I.5.6
McVey, Eugene	Member of the Public	109	ML102650572	I.5.1, I.5.8
Medlin, John and Susan	Members of the Public	110	ML102390273	I.5.4, I.5.5, I.5.13, I.5.18
Meikle, Robert	Member of the Public	111	ML102310563	I.5.2, I.5.18
Menlove, Mark	Member of the Public	112	ML102580033	I.5.1, I.5.6
Miller, Ken	Member of the Public	113	ML102320123 ML102580037	I.5.1, I.5.4, I.5.5, I.5.23, I.5.25

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Minick, David	Member of the Public	218	ML102630195	I.5.1, I.5.6
Mitchell, Anne	Member of the Public	114	ML102600333	I.5.2
Miyaoka, Neil	Member of the Public	219	ML102630195	I.5.1, I.5.6
Molenaar, Nicholas	Member of the Public	115	ML102280511	I.5.3, I.5.4
Mondy, Richard	Member of the Public	116	ML102360687	I.5.2
Morgan, Richard	Member of the Public	117	ML102650572	I.5.1, I.5.5
Morris, Caroline	Member of the Public	118	ML102580069	I.5.1, I.5.4, I.5.5, I.5.8
Naftzger, Tim	Member of the Public	220	ML102630195	I.5.1, I.5.6
Neilson, Bob	Member of the Public	119	ML102310563	I.5.2
Nicholson, Frank	Member of the Public	120	ML102280511 ML102580048	I.5.1, I.5.3, I.5.4, I.5.5, I.5.8
Nordstrom, Jennifer	Member of the Public	121	ML102580039	I.5.1, I.5.8
O'Brien, Kathy	Member of the Public	122	ML102580086	I.5.1, I.5.4, I.5.5, I.5.8, I.5.13, I.5.14, I.5.18, I.5.21, I.5.25
Otter, Butch	Governor, State of Idaho	123	ML102310563 ML102320123 ML102600333	I.5.2, I.5.4, I.5.19
Packwood, Lane	Idaho Department of Commerce	124	ML102310563	I.5.3, I.5.19, I.5.25
Paquette, Holly	Member of the Public	125	ML102310563	I.5.1, I.5.18

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Pengilly, Susan	Idaho State Historical Society, State Historic Preservation Office	126	ML102150425	I.5.9
Perrington, Mike	Member of the Public	221	ML102630195	I.5.1, I.5.6
Pierce, Vanessa	Health Environment Alliance of Utah (HEAL Utah)	198	ML102600070	I.5.18
Plowman, Sheila	Member of the Public	127	ML102580059	I.5.1, I.5.4, I.5.8, I.5.21
Poyser, Bob	AREVA Enrichment Services, LLC	128	ML102310563	I.5.2, I.5.4, I.5.13, I.5.18, I.5.19, I.5.28
Preacher , Willie	The Shoshone-Bannock Tribes	129	ML102580061	I.5.9, I.5.16, I.5.21, I.5.22
Price, Park and Sharon	Members of the Public	130	ML102390269	I.5.3, I.5.4, I.5.28
Prisament, Morty	Member of the Public	131	ML102580091	I.5.3, I.5.4, I.5.5, I.5.6, I.5.7
Proksa, Margo and Dennis	Members of the Public	132	ML102320123 ML102280389	I.5.5
Provencher, Richard B.	Member of the Public	133	ML102390264	I.5.2, I.5.3, I.5.4, I.5.8, I.5.13, I.5.16, I.5.17, I.5.18, I.5.19
Quapp, William	Member of the Public	134	ML102320123	I.5.2
Radford, Dave	Bonneville County Commissioner	135	ML102320123	I.5.2, I.5.3, I.5.8, I.5.9, I.5.19
Raines, Hannah	Member of the Public	222	ML102630195	I.5.1, I.5.4
Rainey, Susan	Member of the Public	136	ML102600323	I.5.16, I.5.18
Reeves, Ralph	Member of the Public	137	ML102280389	I.5.2, I.5.19

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Reichgott, Christine	U.S. Environmental Protection Agency, Region 10	138	ML102580090	I.5.3, I.5.9, I.5.10, I.5.11, I.5.13, I.5.14, I.5.19, I.5.25, I.5.27
Revier, John	On behalf of U.S. Congressman Mike Simpson of Idaho	139	ML102310563	I.5.2, I.5.4
Reynolds, Wendy	U.S. Department of the Interior, Bureau of Land Management, Upper Snake Field Office	140	ML102390288	I.5.8, I.5.10, I.5.14, I.5.23, I.5.25
Richens, Mason	Member of the Public	223	ML102630195	I.5.1, I.5.6
Rickards, Peter	Member of the Public	141	ML102580078	I.5.3, I.5.17, I.5.21, I.5.24
Rindlisbacher, Blake	Idaho Transportation Department	142	ML102580050	I.5.3, I.5.16
Risch, James	U.S. Senator – Idaho	143	ML102320123 ML102600333	I.5.2, I.5.3, I.5.4, I.5.13
Rodgers, Sara	Member of the Public	144	ML102580085	I.5.1, I.5.5
Rolsen, A.	Member of the Public	224	ML102630195	I.5.1, I.5.4
Rydalch, Ann	National Foundation for Women Legislators	145	ML102320123 ML102280389	I.5.2, I.5.3, I.5.4, I.5.19
Sayer, Doug	Premier Technology	146	ML102310563	I.5.2, I.5.19
Schueler, Joe	Member of the Public	147	ML102310563 ML102280511 ML102390244	I.5.1, I.5.3, I.5.4, I.5.5, I.5.6, I.5.7, I.5.9, I.5.13, I.5.14, I.5.16, I.5.17, I.5.18, I.5.19, I.5.22, I.5.28

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Schuler, Eric	Member of the Public	148	ML102310563	I.5.1, I.5.4, I.5.5, I.5.7, I.5.18, I.5.21
Secrist, Wendi	Idaho Economic Development Association	149	ML102280389	I.5.2, I.5.3
Seevers, Katie	Member of the Public	150	ML102310563	I.5.1, I.5.4, I.5.12, I.5.13, I.5.18, I.5.19, I.5.25
Sellers, Beth	Member of the Public	151	ML102280389	I.5.2, I.5.3
Serr, Steven	Planning and Zoning Administrator, Bonneville County, Idaho	152	ML102310563 ML102320123	I.5.2, I.5.3, I.5.8, I.5.10, I.5.11, I.5.12, I.5.16, I.5.21
Shipley, Andrea	Member of the Public	153	ML102580047	I.5.1, I.5.4, I.5.5, I.5.8, I.5.9, I.5.10, I.5.13, I.5.14, I.5.16, I.5.18, I.5.23, I.5.25
Shipley, Andrea	On behalf of the Snake River Alliance	197	ML102320123	I.5.1, I.5.4, I.5.5, I.5.8, I.5.9, I.5.13, I.5.14, I.5.16, I.5.18, I.5.23, I.5.25
Shipley, Diana	Member of the Public	154	ML102580077	I.5.1, I.5.19, I.5.22
Shivly, Jerry	Member of the Public	155	ML102320123	I.5.2, I.5.19
Simison, Robert	On behalf of Mayor Tammy de Weerd, City of Meridian, Idaho	156	ML102310563	I.5.2, I.5.19
Simpson, Erik	Idaho State Representative, District 32	157	ML102310563 ML102320123	I.5.2, I.5.3, I.5.4, I.5.16, I.5.17, I.5.18, I.5.19, I.5.21, I.5.22
Simpson, Mike	U.S. Congressman, Idaho	158	ML102310563	I.5.2, I.5.4

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Skinner, Robert	Member of the Public	159	ML102320123	I.5.3
Smith, Jeff	Local 449, IBEW	160	ML102320123	I.5.2
Smith, Marisa	Member of the Public	161	ML102460017	I.5.1, I.5.4, I.5.6
Smith, Michael	Member of the Public	162	ML102390261	I.5.2
Smith-Putnam, Cindy	Grow Idaho Falls	163	ML102320123	I.5.2, I.5.3, I.5.4, I.5.19
Solomon, Timothy	Regional Development Alliance	164	ML102310563	I.5.19
Staker, Lee	Bonneville County Commissioner	165	ML102310563	I.5.19
Stears, Allen	Member of the Public	166	ML102390245	I.5.2
Stevenson, Andrew	Idaho Falls Mayor's Youth Advisory Council	167	ML102320123	I.5.2
Stewart, Lon	Member of the Public	168	ML102580062	I.5.1, I.5.4, I.5.5, I.5.6, I.5.13, I.5.17, I.5.18, I.5.19
Stewart, Margaret	Member of the Public	169	ML102320123	I.5.1, I.5.4, I.5.5, I.5.12, I.5.16, I.5.18, I.5.21
Stimpson, Lisa	Member of the Public	225	ML102630195	I.5.1, I.5.4
Strobel, David	Member of the Public	170	ML102390266	I.5.2
Tanner, John	Member of the Public	171	ML102320123	I.5.2, I.5.4, I.5.12, I.5.17, I.5.18
Taylor, Amy	On behalf of U.S. Senator Risch of Idaho	172	ML102320123	I.5.2, I.5.3, I.5.4, I.5.13
Taylor, David	Member of the Public	173	ML102390262	I.5.2, I.5.4

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Thomas, Christopher	Health Environment Alliance of Utah (HEAL Utah)	174	ML102600070	I.5.18
Thomas, Ellen	Member of the Public	175	ML102580058	I.5.1, I.5.4, I.5.5, I.5.6, I.5.8, I.5.14, I.5.18, I.5.25
Thompson, Jeff	Idaho House of Representatives	176	ML102320123 ML102280389	I.5.2, I.5.3, I.5.4, I.5.19
Thompson, Jeff	On behalf of Idaho Governor Butch Otter	195	ML102320123 ML102600333	I.5.2, I.5.4, I.5.19
Thomson, T.J.	City Council Member, City of Boise, Idaho	177	ML102580170	I.5.3, I.5.28
Toinga, Jessica	Member of the Public	226	ML102630195	I.5.1, I.5.6
Trane, Randy	Member of the Public	178	ML102390252	I.5.2, I.5.3, I.5.19
Turek, Jolie	Eastern Idaho Economic Development Partners	179	ML102280511 ML102280389	I.5.2, I.5.3
Turner, Kaye	Member of the Public	180	ML102580084	I.5.1, I.5.4, I.5.5, I.5.17, I.5.18, I.5.19
Turner, Roger	Member of the Public	181	ML102320123 ML102580075 ML102580080	I.5.1, I.5.3, I.5.4, I.5.5, I.5.6, I.5.7, I.5.13, I.5.16, I.5.17, I.5.18, I.5.19, I.5.21, I.5.25, I.5.28
Ursenbach, Brianna	Member of the Public	182	ML102310563	I.5.4, I.5.19, I.5.28
Vincent, James D.	Member of the Public	183	ML102320123 ML102280389	I.5.1, I.5.4, I.5.5, I.5.13, I.5.14, I.5.18, I.5.19

Table I-1 Draft EIS Commenter Identification and Comment Response Locations (Cont.)

Commenter Name	Affiliation	Commenter Number	Comment Document(s) ADAMS Accession Number(s)	Subsection(s) Containing Comments and Responses
Vincent, Kitty	Member of the Public	184	ML102390263 ML102390272	I.5.1, I.5.4, I.5.5, I.5.6, I.5.8, I.5.9, I.5.10, I.5.12, I.5.13, I.5.14, I.5.18, I.5.19, I.5.21, I.5.23, I.5.25
Virgin, Wade	Idaho Department of Labor	185	ML102320123	I.5.19
Voss, Joseph	Member of the Public	227	ML102630195	I.5.1, I.5.6
Walker, Lauren	Walker Land and Cattle Company	186	ML102320123	I.5.2
Weber, John	Member of the Public	187	ML102310563	I.5.1, I.5.4, I.5.18, I.5.19, I.5.22
Weber-Wells, Lana	Member of the Public	188	ML102430049	I.5.1, I.5.5
Weil, Josh	Member of the Public	189	ML102310563	I.5.19
Whaley, Dave	Idaho State AFL-CIO	190	ML102440327	I.5.19
Woodruff, Liz	Member of the Public	191	ML102320123 ML102580035	I.5.1, I.5.4, I.5.5, I.5.6, I.5.8, I.5.9, I.5.10, I.5.12, I.5.13, I.5.14, I.5.16, I.5.18, I.5.19, I.5.21, I.5.23, I.5.25
Woodruff, Liz	On behalf of the Snake River Alliance	193	ML102310563 ML102310570	I.5.1, I.5.4, I.5.5, I.5.6, I.5.8, I.5.9, I.5.10, I.5.14, I.5.17, I.5.18, I.5.21, I.5.25, I.5.28
Young, Lisa	Member of the Public	192	ML102310563	I.5.1, I.5.4, I.5.5, I.5.6, I.5.13, I.5.14, I.5.16, I.5.17, I.5.18, I.5.21, I.5.25

I.5 Public Comments on the Draft EIS and NRC Responses

Following are all of the comments received by the NRC on the Draft EIS and the NRC staff's responses to those comments. As discussed in Section I.3.3, the comments are arranged by topic in the 29 subsections below, and multiple comments that address a similar issue/topic have been grouped together for a common response. In cases where one or more commenters had identical comments, those comments are shown only once preceded by the commenter numbers and names of all the commenters who provided those identical comments. Also, please note that some comments contain more than one issue/topic as presented below because the comment text with respect to each issue cannot be readily separated from the other issues. Such comments are necessarily included under more than one topic so that all of the issues can be addressed in the NRC responses.

Note that comments taken from written comment documents (e.g., letters, emails) are reproduced below "as is"; i.e., those comments are reproduced exactly as they were provided, and the NRC staff has not attempted to correct spelling or grammatical errors in these comments. Also, due to possible transcription errors by the court reporters during the public comment meetings, the NRC regrets if the text of any oral comment does not exactly match what was said at a public meeting.

I.5.1 General Opposition to the Project

The comments addressed in this subsection are those that are limited to expressing opposition in some manner to the proposed EREF project. However, comments that contain general opposition statements and also include topics that are relevant to issues addressed within the scope of the EIS are not included in this subsection, but are instead included and addressed elsewhere in Section I.5, in the subsections relevant to the specific topics discussed.

Comment: The following comment expresses concern that AES has already signed contracts to sell the product of the proposed EREF when the proposed plant does not yet have an NRC license.

[015-04, Beatrice Brailsford] AREVA has said U.S. companies have already signed contracts for half its projected production. Those contracts raise another question, though.

I know the NRC has already heard concerns that it has a bias towards licensing. What about selling the product of a plant that doesn't even have a license yet? I'd say we've gone well beyond a learner's permit here.

Response: *AES has submitted a license application to the NRC for the construction, operation, and decommissioning of the proposed EREF, to produce enriched uranium for commercial nuclear reactors. As part of its business plan, AES may wish to ascertain that there is a consumer for its product. AES appears to have done so by contracting future services to be provided by the proposed EREF. These actions were taken by AES at the risk of not receiving a license from the NRC, and such risks are borne solely by AES. These actions have no bearing on the NRC's decision to grant or deny AES's license application.*

Comment: The following comment expresses concern about what resources provided by Idaho taxpayers will be used for the proposed EREF project.

[105-03, Eve McConaughey] I am concerned about what resources e.g. land/water/energy/raw materials will be used (provided by Idaho taxpayers).

Response: *AES could contract with Idaho State or local government agencies, or apply for resources from those agencies, to the extent permitted under Idaho law.*

Comment: The following comments deal with the current operating and construction trends for nuclear power plants in the U.S. and worldwide.

[015-02, Beatrice Brailsford] Eight years later, there are no more nuclear reactors operating in the world, but as of June, URENCO, a German company, is enriching uranium in New Mexico.

[015-12, Beatrice Brailsford] Furthermore, eight years after Mr. Magwood's letter*, there are no more nuclear reactors operating in the US or in the world, but as of June, Urenco, a German company, is enriching uranium in New Mexico, which the draft NRC only sporadically acknowledges.

* Note from NRC: This refers to a letter identified in comment 015-09 and archived in ADAMS under Accession Number ML022350130.

[180-09, Kay Turner] Is it true there are less reactors operating now than there were eight years ago?

Response: *Within the last 10 years, 32 new nuclear power plants have become operational in the world, 31 have shutdown, and construction began on 50 additional nuclear plants (IAEA, 2010a, 2010b). One of the new plants under construction is in the United States. In addition, as of December 2010, the NRC is actively reviewing 12 applications for a total of 20 nuclear reactor units. The number of operating nuclear power plants in the world has risen from 416 in 1990 to 435 in 2000 and 441 in 2010. The net electrical power generated by these facilities rose from 318,000 megawatts electric [MW(e)] in 1990 to 350,000 MW(e) in 2000 and 375,000 MW(e) in 2010 (IAEA, 2010a, 2010b).*

URENCO USA, the uranium enrichment facility in New Mexico (formerly known as the National Enrichment Facility [NEF]) that began initial operations in June 2010, is still under construction and will continue to increase production as its remaining cascade halls are completed. This facility is operated by Louisiana Energy Services LLC (LES), a U.S. Delaware limited liability company.

Comment: The following comments express general opposition to the proposed EREF project and request that the NRC deny the license application.

[014-04, William Blair] I urge decision makers to disapprove this and any other radioactive processing.

[008-08, Carol Bachelder] I am in favor of the no action alternative.

[017-02, Sally Briggs] I am Sally Briggs, an air breathing, water and milk drinking native of Idaho…raised during a time when nuclear fallout drills consisted of sheltering under our desks at school. Sometime later, grown with my own children, I received a postcard addressed to "Dear neighbor" asking "Where were you between 1944 and 1972?" Informing me that I may have been exposed to radioactive material released into the air, water, and soil by the Hanford Nuclear Facility. Much later I learned in "secret" experiments. I have since become aware that in its 45 year history 1million curies of iodine 131 have been released! SUCH HUBRIS! Do we think the scientists employed by Areva are smarter or have a greater moral sense than those at Hanford? LESS HUBRIS?

[019-03, George Buehler] I see this scheme as ill-considered, unnecessary, exploitive and wrong. I am categorically opposed to the Areva Uranium Enrichment Plant.

[046-01, Mr. and Mrs. David Dudley] Just say NO to AREVA'S URANIUM FACTORY~ NUREG 1945!

[050-01, Joanie Fauci] I would like it to be known that I support the No Action Alternative and wish for the NRC to adopt that alternative.

[057-01, Steven Garman] We do not need, do not want or will not tolerate an enrichment facility in Idaho. Please reconsider.

[068-05, Anne Hausrath] We believe the proposed facility is a bad idea. It is not necessary to meet Idaho's needs. It would pose a potential threat to the safety of our children, grandchildren, and future generations, and we strongly recommend you to adopt the "no action alternative."

[084-01, Michael Jones] The environmental impacts of nuclear waste will be an unwanted legacy. If you think the national debt will take forever to payoff, then you have no comprehension of the servitude that nuclear waste will have on our country and future countless generation. The enrichment facility is unnecessary for national defense, current domestic use. Before you increase the waste load get a solution established that is sound and long term.

[085-01, David Jonkouski] The horrors of Ballistic Uranium is not …[ILLEGIBLE TEXT]… to electric generation by the atom. It is not necessary. The inventor of alternating current Tesla said rightly "we are in a sea of energy." Wars are caused by artificial scarcity. If an intelligent person who can do the math of electromagnetic theory of Maxwell and Heaviside can see pos and neg vectors in quaternion calculus. This is FREE …[ILLEGIBLE TEXT]…energy beyond the trinomial of current easy to engineer math of Einstein, who knew that the universe was curved, but in a quaternion (4 part) math it is easy to see small spaces are curved also. This is the obvious proof of ambient energy. Free Science!

[103-01, Karen McCall] I am writing to express my opposition to Areva's gas centrifuge uranium enrichment plant proposed to be built in Eastern Idaho. There are many reasons why this plant is unnecessary:.. I am strongly opposed to Areva's proposal and want my comments to go on record.

[120-06, Frank Nicholson] This enrichment factory: …should not be licensed.

[127-03, Sheila Plowman] I oppose the building of the uranium enrichment plant…. Please Do Not approve the building of this dangerous plant.

[168-01, Lon Steward] Areva should not be allowed to build a uranium enrichment plant in Eastern Idaho…. From a business perspective, a financial perspective, world peace, energy independence, environmental, global warming, and common sense perspectives, the Areva enrichment plant in Eastern Idaho does not make sense and therefore the Nuclear Regulatory Commission should not license the plant.

[175-01, Ellen Thomas] I oppose the proposed new Areva uranium factory in Idaho, or anywhere else.

[181-09, Roger Turner] The State of Idaho should say no to this project and the NRC should revise the final EIS to a no action alternative.

[184-03, Kitty Vincent] Human Folly: While we spend billions of dollars searching for water in outer space on various planets, we are hard at work on Earth poisoning our own water supplies, not to mention the air as well. Not only does this enrichment plant appear to unnecessary, it seems to represent human folly at its best.

[193-01, Liz Woodruff, on behalf of the Snake River Alliance] And it's the proposition of the Snake River Alliance that the NRC should not license the AREVA facility. First, uranium enrichment should not occur in Idaho for use in power reactors, and secondly, the draft EIS is inadequate.

Response: *The NRC staff acknowledges these comments and appreciates the public participation. However, these comments are outside the scope of the EIS analysis because they do not directly relate to the content of the Draft EIS.*

Comment: The following comments note that there is no need to rush through the process of licensing the proposed EREF and to make sure that all risks have been addressed. Some of these comments also express opposition to the proposed EREF project.

[008-05, Carol Bachelder] I appreciate the fact that AREVA put in an application in 2008, and that was two years ago, and the Environmental Impact Statement was released two weeks ago, and here we're having a hearing on it. It does seem like it's on the fast track, and we'd like to put it on the slow track. I would like to derail it completely.

[017-01, Sally Briggs] I urge you, as regulators, to apply a healthy dose of skepticism to these plans. Do we really need domestic production? Have all the risks been addressed? Please demonstrate courage in protecting our children, grandchildren, and all those who follow.

[025-01, Hon. Sue Chew] So, you know, I'm looking at the issues that we're looking at in terms of your EIS, and I do want to make sure that we aren't fast-tracking anything, that there aren't any corners being cut, and that things aren't moving along too fast, because, really, just like in the practice of medicine, when you make a mistake like this, you can't undo it. This is about life.

[070-05, Virginia Hemingway] For these, and many other reasons, I adamantly am opposed to this plant being built and to the Idaho taxpayers' money paying for an off-ramp to nowhere, except sagebrush. These few facts prove that once again, Idaho's leaders, and the NRC, have shown they do not consider the long-term consequences of decisions made in haste, without appropriate research. As a fourth generation Idahoan, I do not need, nor do I want, this kind of danger in my state.

[148-01, Eric Schuler] Taken as a whole, the EIS suggests that this facility will have a relatively low impact on the environment. Of course several aspects of this, of the—have been overlooked in making this conclusion. For instance, as others have already noted, it does not consider the impact of the exempted preconstruction activities, the high risk of wildfires in the area, or the lack of an appropriate disposal pathway for depleted uranium. Accordingly, the true impact of this facility is certainly larger than the DEIS suggests.

[147-14, Joey Schueler] 10. Why is this plant being pushed through so quickly? The EIS is still in the assessment phase, yet many steps have already been taken that affect Idaho's budget. If this decision so critical, it should be carefully considered and brought to the Idaho public before money is expended on its behalf.

[191-03, Liz Woodruff] I don't think there's any reason to expedite any aspect of this process.

Response: *Consistent with the requirements of NEPA and the NRC's NEPA implementing regulations under 10 CFR Part 51, the NRC staff evaluated and compared the environmental impacts of the proposed action and its alternatives. The Draft EIS described the proposed action (Chapters 1 and 2), the purpose and need for the proposed action (Chapter 1), alternatives to the proposed action (Chapter 2), the potentially affected environment (Chapter 3), the environmental impacts of the proposed action and proposed mitigation (Chapters 4 and 5), the cumulative impacts of the proposed action (Chapter 4), and the benefits and costs of the proposed action (Chapter 7). The analysis contained in the Draft EIS fully considered the environmental impacts of the proposed action and alternatives. The NRC will not make a final decision on whether to grant a license for the proposed EREF until after the NRC's ASLBP conducts public hearings on the safety and environmental reviews. (The hearing process is discussed in Section I.4 of this appendix).*

Comment: The following comments request that the NRC take AREVA's reputation, foreign ownership, past and present business practices, and past and anticipated environmental and safety record into account when considering whether to license the proposed EREF. Some of these comments also express general opposition to the proposed EREF project.

[031-01, James Cooper] I am OPPOSED to the Areva project. As an Idaho taxpayer and voter I feel this state does NOT NEED a foreign company to build any facility on our soil - much less one which is subject to accidents and one whose profits go to another country.

[032-04, Cindy Cottrell] I'm against a foreign country making the profit from this plant and leaving the contamination in our Country. Not just the by-product of waste will we have to store, but Areva has a history of contamination in their own Country's waterways.

[037-01, Katherine Daly] The Areva uranium enrichment proposal is very disturbing to both of us. Please don't sell us down the road. Areva does not meet with the approval of many Idahoans who would like to preserve the natural integrity of our incredible state. PLEASE...just say no to Areva.

[048-03, Genevieve Emerson] I am concerned that Areva has no true vested interest in the overall health and well being of the land or the people of Idaho, other than economic gain, and this poses a direct threat to present and future generations of all life in this area.

[061-03, Nancy Greco] It amazes me that, in a state which argues against federal involvement in state affairs, even when that involvement benefits Idaho citizens, the same state would welcome and encourage a harmful company which is almost entirely funded by the French government. Please be very cautious in giving Areva the necessary pathway to this destructive plant.

[107-01, Jean McKay] But I ask you, the Nuclear Regulatory Commission, to include in your study of the potential environmental impacts the record of AREVA in France, and elsewhere. And to delay any exemption or approval until after such a study has been completed and revealed to the public.

You've already heard about situations that have occurred in France. The Nuclear Safety Authority of France, the ASN, cited a series of frauds and human negligence fraud, and ordered the closure of an AREVA subsidiary. Possible legal action was also being considered because of repeated leaks during 2007, 2008 in the site's waste water evacuation system.

In California, or in South Carolina, sorry, a mixed oxide fuel assembly was removed from the plant of Duke Energy/AREVA at Catawba facility because of potentially hazardous physical changes. In addition, AREVA's plans in the United States to build an evolutionary power reactor, an EPR, at various sites, including Idaho, have created controversy. In France, as of August 2008, the construction of an evolutionary power reactor by AREVA has been delayed because of technical and quality control problems. So, I urge you, the NRC, to include, to broaden your study, evaluate these reported problems.

[107-02, Jean McKay] I ask the Nuclear Regulatory Commission to include in the report of potential environmental impacts the record of Areva in France and elsewhere, and to delay any exemption or approval until after such a study has been completed and revealed to the public.

#1 In July 18, 2008, a Paris newspaper revealed: The Ecology Minister of France announced a 2nd leak in a subsidiary of Areva due to a broken pipe. The 1st leak occurred on July 7, 2008, and residents of the area were told not to drink the water, or to swim in, to irrigate crops with the waters of nearby rivers.

The Nuclear Safety Authority (ASN) of France cited a series of "frauds and human negligence" and ordered the closure of the Areva subsidiary. Possible legal action was being considered because of "repeated leaks" during 2007 in the site's waste water evacuation system.

#2 In South Carolina, reported August 2008, an experimental mixed-oxide fuel assembly was removed from the plant of Duke Energy/Areva Catawaba facility because of "potentially hazardous physical changes."

In addition, Areva's plans in the U.S. to build EPR (Evolutionary Power Reactors) at various sites including Idaho - have created controversy. In France, as of August 2008, the construction of these Evolutionary Power Reactors by Areva have been delayed by technical and quality-control problems.

Again, I urge the NRC to include a study and evaluation of these reported problems in its EIS, and to report them to the public before any exemption or approval is considered.

[118-05, Caroline Morris] Additionally, Areva's palm-greasing tactics to persuade officials to welcome the EREF, as the Mayor of Idaho City testified at the August Boise hearing, are pure bribery. Likely many other Idaho officials and citizens received other valuable favors from Areva, not publicly announced. Please refer to my letter to the editor published in the Idaho Stateman. (I am traveling and cannot access its late August or early September printing date.)

[120-04, Frank Nicholson] This enrichment factory:…

• Poses a risk to Idaho's natural resources and people. If something were to happen and when the plant is shutdown a foreign company does NOT have the incentive to do what is right. They can leave and we have no recourse. BP is a great example. Also, importing and exporting the nuclear fuel will not only put ourselves at risk but many others along the path.

[122-02, Kathy O'Brien] Areva also has a bad track record in France.

[147-09, Joey Schueler] 5. Areva's financial stability and history of ethics is unclear. Varied opinions range from sound to on the verge of bankrupt and no clear agreements have been made ensuring that they will do right by Idaho if this project fails (reference the BP oil spill for a comparative potential scenario).

[154-01, Diana Shipley] Before backing a project such as AREVA proposes we need to consider more than the jobs it would create. Before backing a project such as AREVA proposes we need to consider more that the wining and dining that is taking place. In this tough economy it would be easy to welcome AREVA when they are being so generous with catered trips and lots of flourish.

The truth of the matter is this:

AREVA dumps at least one million gallons of radioactive waste into the English Channel a year, contaminating water all the way up to the Arctic Circle. How are their environmental policies going to take shape in Idaho? Will they be thoughtful that they are located near the aquifer which provides drinking water to many Idahoans? I can't imagine they will give it a second thought.

They have contaminated towns all around an open pit mine in Niger. Are they worried about the people of those towns? How are they helping to recover the area back to an environmentally safe one?

Their track record seems to be less than stellar when it comes to environmental issues. They withheld information from the regulatory commission in France to secure a loan in their own backyard.

[169-01, Margaret Stewart] And aside from AREVA's greed, grim, and very, very devastating global environmental and human rights record around the world, particularly in Africa, I vehemently oppose the NRC licensing of this facility on grounds that the facility has not been proven necessary, a huge amount of dangerous radioactive waste that would be created has no disposal place, the nuclear reactors that the EIS says will need AREVA's product more than likely will never be built.

[168-04, Lon Stewart] Areva is processing and handling some of the most dangerous material on earth. Unfortunately they do not have an exemplary environmental or safety record that would be expected of a company handling such types of materials. Areva dumps radioactive waste into the English Channel and there have been a couple of accidents at their plants in the last few years while they were touting to be a safe company. Accidents will happen. Even if you think you have enough redundancy built into the system, mechanical things will fail and people will do stupid things no matter how much training and experience they have. The BP Gulf oil spill is a case in point. This does not sound good to me.

[181-07, Roger Turner] It would be opposed because the AREVA company has a poor environmental record, especially with respect to the radioactive waste handling. It would be opposed by Idahoans because the AREVA company is in poor financial shape, a condition that often results in shortcuts in worker safety, worker benefits, and environmental protection.… It would be opposed because the company is dependent on taxpayers for front-end costs, because of its own poor financial status.

[180-04, Kaye Turner] Is it true Areva pumps one million gallons of nuclear waste into the English Channel every year? Is it true Areva pumps ANY nuclear waste into the English Channel?

[184-02, Kitty Vincent] What matters is Areva's history of leaks and pollution overseas as well as the fact that this plant would sit atop this magnificent aquifer.

[183-03, James Vincent] I live downwind and downstream of the proposed AREVA plant, and I have concerns about my safety. As a reference, in July 2008, AREVA had two accidents in France. One was a burst pipe at a plant at the Romans-sur-Isere, southeastern France, an AREVA subsidiary. The pipe had been broken for several years. Jean-Pierre Gros of AREVA's Head of Combustion said between 120 and 750 grams of enriched uranium had leaked.

Another accident happened also July of 2008 at the Tricastin site near the historic southeast city of Avignon; 7,925 gallons of a liquid containing traces of unenriched uranium leaked from a factory run by AREVA subsidiary, SOCTRI. I can't pronounce it, S-O-C-T-R-I, spilling from a reservoir that overflowed. The leak flowed into the ground and into the two rivers, Gaffiere and Lauzon.

French authorities banned the consumption of well water and watering of crops, as well as swimming, fishing, and water sports. There's preliminary evidence of higher incidents of pancreatic cancer in women in the Tricastin area. France's Nuclear Safety Authority classified the Tricastin accident as one on a scale of zero to seven. However, there were 86 level one incidents in France in 2007, and 114 in 2006.

[183-10, James Vincent] I have a photograph from page 17 of public Areva document "Nunavut Mining Symposium Iqaluit April 2009 by Peter Wollenberg ARC" about one of their operations in Canada. Even though this is a color photograph, I printed this with a black and white printer. I would like to submit this to the commission. I believe the conclusions are obvious, if this is supposed to be a secure Areva facility for radioactive core storage. My 5 year old grandson could scale this six foot cyclone fence.

[187-02, John Weber] How can AREVA's statement, in section 9.2, about protecting people and the environment from radiation be taken seriously, knowing AREVA's dismal track record in Africa, and other parts of the world, for protecting people and the environment?

Response: *These comments raise issues that are outside the scope of the EIS. As discussed in Section 1.4.5 of this EIS, the reputation of the applicant is an issue that is not within the scope of the EIS. The proposed EREF would be fully subject to the NRC regulations for uranium enrichment facilities, and to other applicable Federal, State, and local laws and regulations. The NRC evaluates the submitted license application based on its own merits and performs an independent verification of the proposal put forth in the applicant's application. Further, pursuant to 10 CFR Part 70 and 10 CFR Part 2, respectively, the NRC will implement oversight (inspection) and enforcement programs during construction, operation, and decommissioning of the proposed EREF to assure safe functions and compliance with NRC requirements.*

Comment: The following comments raise the issue of AREVA's financial stability and/or the availability of funds to ensure that the proposed EREF site is cleaned up properly.

[008-04, Carol Bachelder] And they say, oh, well, AREVA will be, you know, totally responsible for the expenses. But this is based on projected earnings, like so many businesses do. You know, you plan to pay your loans out of how much money you make. There aren't any guarantees for this, are there? The economic times, and being what they are. I just don't see that even the promise of jobs is enough to sell me on the feasibility of this plant.

[028-02, David Coney] Because the risk is so high, I'm going to ask AREVA to front the money, prove it to us that you're sincere. Invest in Idaho. Back your play with money. If I go down to the bank, they're going to say, where's your money, buddy? I would ask AREVA to do it, and if I can do it with five bucks to get a loan, they can do it with 5 billion, or 5 trillion, if they're sincere about what they're bringing to the table. Now I would also ask them to prove to us that they can be the best steward, and invest in Idaho, before they ask anything of us.

[050-12, Joanie Fauci] The NRC and the license agreement, if it occurs, should have specific requirements for Areva, its owners, its stockholders, and the government under which it falls, with regards to financial responsibility. This should cover all expenses, above and beyond. It should cover all legal possibilities should the Areva corporation dissolve or go bankrupt before all waste is removed from the Idaho site.

[070-01, Virginia Hemingway] On to Areva, because I have such a limited amount of time, that company had 6.2 billion euros in net debt at the end of 2009, and as recently as June 4 of 2010, it has been downgraded by Standard & Poor's to a debt rating of BBB plus, due to its weakened profitability.

[078-01, Hon. Wendy Jaquet] As a member of the legislature at the time that the tax exemptions were being considered (and I voted "no") I had concerns about the financial viability of the company.

[083-05, Diane Jones] How can we expect the company to -- whose financial future is uncertain, to be able to guarantee that they will bear the cost of treating all that waste and disposing of all that waste, when the process for disposing of the waste is not even known? This seems highly reckless to me, and not a very sound economical calculation.

[106-02, Ted McConaughey] So, once again, I don't want to come down, either for or against the facility under consideration here, but I would like to say that the EIS itself ought to address the possibility of failure at all stages, and have backup plans for funding whatever kind of cleanup and disposal might be necessary, and that should be part of the environmental costs. I mean, this is a very big environmental issue, if one of these facilities fail, as many of our nuclear facilities have.

[147-09, Joey Schueler] 5. Areva's financial stability and history of ethics is unclear. Varied opinions range from sound to on the verge of bankrupt and no clear agreements have been made ensuring that they will do right by Idaho if this project fails (reference the BP oil spill for a comparative potential scenario).

[154-02, Diana Shipley] They are asking for loan guarantees from the United States government and I wonder who will be left to clean up the waste and pay the bills if they bail out? The answer is fairly obvious. We will be left holding the very unpleasant bag of troubles and if you haven't heard, AREVA is experiencing financial difficulties. We do not need to be the ones to bail them out even though they are promising jobs, and wining and dining Idahoans in an attempt to blind those Idahoans to the simple fact that they will not be doing us any favors in the long run by contaminating our desert and leaving our communities with one toxic bill to pay.

[180-03, Kaye Turner] Is it true this French company is being heavily subsidized by the French government and is otherwise in serious financial trouble? Is it true if the French and the U.S. governments stopped propping up Areva financially it would go under?

Response: *NRC regulations in 10 CFR Part 70 require license applicants to be financially qualified to safely construct, operate, and decommission their proposed facilities. These regulations apply to AES's application for the proposed EREF. However, the financial verification process is outside the scope of this EIS and is conducted by the NRC in conjunction with the safety review.*

Comment: The following comments express the concern that construction and operation of the proposed EREF may be too risky and dangerous. Some of these comments also express general opposition to the proposed EREF project.

[001-01, Reham Aarti] I think the risks are absolutely ridiculous, considering what the benefits are going to be. I know people are worried about jobs, and they want more jobs in Idaho, and everything. But I'm sorry, it's not worth it, it's not worth, you know, our children being in danger. I mean, accidents happen all the time. Fires happen all the time. It's not worth it, in the least bit, and I know you guys do your job and everything's supposed to be really safe, but that doesn't mitigate, you know, human error and everything else.

[009-01, Steve Barclay; 013-01, Kit Blackburn; 018-01, Deb Brown; 021-01, Linda Cannarozzo; 029-01, Richard Conner; 035-01, Stephen Crowley; 055-01, Claudia Galaviz; 056-01, Mark Galaviz; 063-01, Martha Haga; 081-01, Lea Johnson; 093-01, Louis Landry; 099-01, Brent Mathieu; 100-06, Wendy Matson; 101-01, Jody May-Chang; 109-01, Eugene McVey; 117-01, Richard Morgan; 121-01, Jennifer Nordstrom; 161-01, Marisa Smith; 188-01, Lana Weber-Wells; 199-01, Dina Bond; 200-01, Sean Campbell; 201-01, Giovanna Campos; 202-01, Alison Duffin; 203-01, Danielle Dugge; 204-01, Susan Filkins; 205-01, Andrea Guerri; 206-01, Pamela Hanson; 207-01, Drew Harris; 208-01, Emily Harvey; 209-01, Courtney Hollar; 210-01, Tyler Hoovis; 211-01, Olivia Joelson; 212-01, Naomi Johnson; 213-01, Darvel Jones; 214-01, Jacob King; 215-01, Verlyn Larsen; 216-01, Beau Lee; 217-01, Jodie Mckelvey; 218-01, David Minick; 219-01, Neil Miyaoka; 220-01, Tim Naftzger; 221-01, Mike Perrington; 222-01, Hannah Raines; 223-01, Mason Richens; 224-01, A. Rolsen; 225-01, Lisa Stimpson; 226-01, Jessica Toinga; 227-01, Joseph Voss]
This enrichment factory:

• Is unnecessary
• Poses a risk to Idaho's natural resources and people
• Should not be licensed

[022-01, Judy Carroll] I am strongly opposed to Areva's plan to build a plant here because I do not believe that the radioactive waste will be handled appropriately and taken out of Idaho. Areva is taking advantage of Idaho in the fact that the unemployed and poor need jobs. What they don't say is that Areva will also be bringing sickness and death to Idaho. We may seem like a simple people but we do know in this state how important clean water and land are to our way of life. Idahoans are the ones who are able to enjoy beautiful wilderness, rivers and wildlife. If Areva needs uranium enriched, let them enrich it in France!

[106-01, Ted McConaughey] And I think that the point of all this is that things aren't going very well. Our best-laid plans are "gang aft agley," I guess is the word, and because our record on completing our project, our nuclear projects, is rather poor, and we don't have a very good way of demonstrating that we actually can carry out these projects for the entire lifetime of the project, including the nuclear fuel, the waste reprocessing, or waste disposal, I think that to suggest that a 30 year lifetime of the plant is very optimistic, and that the nuclear fuel cycle itself is - we make all kinds of optimistic projections here, which are very hard to ensure.

[112-01, Mark Menlove] I am writing to express my strong concern with the draft Environmental Impact Statement for the Eagle Rock Enrichment Facility proposed in eastern Idaho (NUREG-1945 draft).

In my view the enrichment factory poses a risk to the people and natural resources of Idaho, is unnecessary, and should not be licensed.

[113-09, Ken Miller] So there is no reason for Idaho, of all places, to be sacrificed for a fuel production factory for a generation resource that Idaho and our region do not need.

[118-01, Caroline Morris] The EREF is unnecessary, presents risks to Idaho's natural resources and people, and should not be licensed. I oppose the EREF's licensing…. Please consider my concerns and adjust the draft EIS, or deny the license.

[120-04, Frank Nicholson] This enrichment factory:…

• Poses a risk to Idaho's natural resources and people. If something were to happen and when the plant is shutdown a foreign company does NOT have the incentive to do what is right. They can leave and we have no recourse. BP is a great example. Also, importing and exporting the nuclear fuel will not only put ourselves at risk but many others along the path.

[125-02, Holly Paquette] And so the main thing that I want to tell you is that most of the people who have come in here today, and have supported AREVA, and said that Idaho needs AREVA, have been talking about money, and that seems to be the underlying basis for why they're supporting AREVA. And having introduced myself and my background, I want to tell you -- sorry, I'm a little emotional about this -- no amount of money is worth risking the environment or the safety of the people of Idaho, and that includes the next generation of Idahoans.

[144-01, Sara Rodgers] This letter is in opposition to the licensing of the Eagle Rock Enrichment Facility and to suggest that the draft EIS for the EREF is inadequate. Current lives and many future lives are at risk and at stake in the licensing for one corporation. I urge you to not license the Eagle Rock Enrichment Facility nor adopt the draft EIS.

[150-09, Katie Seevers] The potentially devastating health, environmental, and economic effects to Idaho, that the licensing of the AREVA facility presents make me say that the rejection of the licensing of this facility is in the best interest of our state and its citizens.

[153-01, Andrea Shipley; 197-01, Andrea Shipley, on behalf of the Snake River Alliance] AREVA's proposed uranium enrichment factory will store radioactive waste above the sole source aquifer for nearly 300,000 people, impact sensitive species, support transport of radioactive materials into and out of Idaho, impact the Hell's Half Acre national monument, support destruction of the John Leopard Homestead, which has been recommended for the National Register of Historical Places, enjoy billions in state and federal largesse, and utilize farmland that is potentially protected by the federal government. The Alliance is here to say it's not worth the risk

[184-06, Kitty Vincent] The idea that this will boost the economy of Idaho is short sighted.

Affected could be the lives of the future citizens in Idaho and the West.

I strongly suggest that the Areva enrichment plant be denied a license. Idaho Falls needs to develop other avenues to enhance its economy, in ways that do not threaten the people who live there for hundreds of years to come as well as a major water source of the western United States.

[184-07, Kitty Vincent] Areva's proposed Eagle Rock Enrichment Facility (EREF) will store radioactive waste above the sole source aquifer for nearly 300,000 people; impact sensitive species; require the transport of radioactive materials; impair the Hell's Half Acre National

Monument; support destruction of the John Leopard homestead, which has been recommended for the National Register of Historic Places; devour billions of dollars in state and federal largess; and obliterate farmland that is potentially protected by the federal government. The Alliance is here to say it is not worth the risk.

[192-01, Lisa Young] As a member of the scientific community, and as a member and leader of many organizations on campus and in the community, I can say that this proposal is irrational, unnecessary, and a threat to the health, safety, environment, and tax dollars of all Idahoans.

[192-07, Lisa Young] Therefore, as a member of the scientific community, and as a member and leader of many organizations on campus and in the community, I can say that this proposal is irrational, unnecessary, and a threat to the health, safety, environment, and tax dollars of all Idahoans. I urge you to select the "no action" alternative when evaluating AREVA's license application.

Response: *The proposed EREF would be licensed only if the Commission finds that public health and safety and the environment would be adequately protected. In reviewing all of the comments received on the Draft EIS, the NRC staff has determined that no information has been provided in these comments that would change the findings and conclusions regarding environmental impacts in the Draft EIS. Safety issues are not within the scope of the EIS and are addressed in the NRC's SER (NRC, 2010b).*

I.5.2 General Support for the Project

The comments addressed in this subsection are those that are limited to expressing support in some manner for the proposed EREF project. However, comments that contain general support statements and also include topics that are relevant to issues addressed within the scope of the EIS are not included in this subsection, but are instead included and addressed elsewhere in Section I.5, in the subsections relevant to the specific topics discussed.

Comment: The following comment supports the construction of transmission lines.

[171-02, John Tanner] As far as transmission lines are concerned, if we couldn't build transmission lines because of environmental impacts, we certainly couldn't have wind farms, because they need transmission lines in spades.

Response: *The NRC appreciates this comment and the public participation.*

Comment: The following comments express general support for the proposed EREF project.

[005-01, Anonymous] I support the EIS.

[006-01, Anonymous] I am supportive of the AREVA project but would like to have heard more from the NRC on how waste from the process will be stored and ultimately disposed of.

[007-004, Arnold Ayers] And for those things, we ought to be considering, and building this facility as fast as we can build it.

[024-01, Jana Chalfant; 149-01, Wendi Secrist; 196-01, Linda Martin, on behalf of the Idaho Economic Development Association] The Idaho Economic Development Association is grateful for the opportunity to show our support for the AREVA Project. IEDA represents over seventy-five economic development professionals throughout the State. We have supported the AREVA project from its beginning during the site selection phase with the Department of Commerce, in several areas across the state.

We supported the legislation which positioned Idaho to ultimately become the site chosen for the project. This was healthy economic legislation which provided for earned benefits for performance, not only for the AREVA project, but *any* company that would present similar investments in Idaho.

[052-01, Rod Fuger] Idaho wants and needs this project.

[059-02, Lance Giles] Official comment - Support licensing of facility.

[058-01, Matt Gerber] We need this for the country. Areva is good for us all.

[065-03, Hon. Ida Hardcastle] I appreciate being able to voice the support of myself and the many residents, who I believe are the most pro-nuclear community in the country, that AREVA be issued a license to begin construction and move forward with this very important facility to this area as well as the entire nation.

[079-01, Kristen Jensen; 179-01, Jolie Turek; 194-01, Linda Martin, on behalf of the Eastern Idaho Economic Development Partners] On behalf of the Eastern Idaho Economic Development Partners (EIEDP) we wish to express support for the AREVA project. The EIEDP represents a 13-county area surrounding the Eagle Rock Enrichment plant location, which is in the effective immediate impact area for the project. We have issued previous letters of support for the project.

[090-01, Paul Kjellander, on behalf of Hon. Butch Otter; 123-01, Hon. Jeff Thompson, on behalf of Hon. Butch Otter] As such, the governor wants to state his support for the proposed AREVA facility, Eagle Rock, which will be built and operated outside of Idaho Falls.

In conclusion, the Governor would strongly encourage the Nuclear Regulatory Commission to move forward expeditiously in the review and granting of a license to AREVA so that this important facility can begin construction next year.

[137-05, Ralph Reeves] I urge that this uranium low enrichment plant be approved

[143-04, Hon. James Risch; 172-04, Amy Taylor, on behalf of Hon. James Risch] In closing, I support AREVA's application for the Eagle Rock Enrichment Facility, and recognize the enormous positive impact they will have for our country, state, and local citizens.

[145-05, Ann Rydalch] I encourage you to follow the preliminary recommendation that AREVA be issued a license to construct and operate the Eagle Rock Enrichment Facility here in Bonneville County, Idaho Falls, Idaho, formerly called Eagle Rock, Idaho

[158-01, Hon. Mike Simpson; 139-01, John Revier, on behalf of Hon. Mike Simpson] I'm writing today to express my strong support for AREVA's license application to construct and operate the Eagle Rock facility. I'm sorry I cannot join you at the public hearings in Idaho Falls and Boise, but I'd like to welcome the NRC to Idaho, and express my appreciation for the NRC's work on this important matter.

[160-01, Jeff Smith] We fully support the need and the purpose of this EIS. I represent some 600 members and their families. We not only feel this is good for Local 449, but Idaho, but for America and its future.

[167-02, Andrew Stevenson] Because of the effort made by both the NRC and AREVA, we would like to, as a Council, voice our approval of the Environmental Impact Statement in its current form, and urge the NRC to continue on to the next step in the process of getting this project a reality.

[166-01, Allen Stears] I am writing in regards to the Areva EIS. It is my opinion that enough safety procedures will be in place to protect the environment. Therefore I am in favor of granting of a permit.

[170-01, David Strobel] I support Areva building an Enrichment Plant west of Idaho Falls, ID. The benefit will far outweigh the risk.

[176-05, Hon. Jeff Thompson] I am pleased to give my support to AREVA, and agree with the NRC recommendation to issue a license to AREVA to construct and operate the Eagle Rock Enrichment Facility.

Response: *The NRC staff acknowledges these comments and appreciates the public participation. However, these comments are not within the scope of the EIS analysis because they do not relate to the content of the Draft EIS.*

Comment: The following comments express concern regarding possible misinformation that has been put forth by various parties about the proposed EREF project and about the nuclear power industry in general.

[076-02, Martin Huebner] If it's true, as we previously stated in Boise, that the Snake River Alliance now is a research organization, that implies that maybe the Snake River Alliance has dumped the precautionary principle, and now embraced the facts-based scientific principle. If that is not the case, I sincerely hope that Snake River Alliance objectively looks at the facts, and comes to the conclusion that most of us here already have, that safe, reliable, economical, carbon-free nuclear power must be, and will be a vital part of America's future.

[082-02, Michael Johnston] There are a couple of groups here in the area, Snake River Alliance and (?) Keep Yellowstone Nuclear Free, that try to misrepresent and distort the truth. I have seen where they represent a small but very vocal group and generally turn out larger groups of anti-nuclear people. I along with a lot of others here are normally very low key, quiet, supportive of the INL and nuclear power, and sorry to say do not go to these meetings. This morning I had breakfast with about 18 of these people and do not believe any of them will be at the meeting to show their support. I think they assume you will know the true facts regarding environmental and safety factors to discount what these antinuclear groups represent and/or distort. How can one believe with a INL workforce here there is not great support for the nuclear industry.

[157-11, Hon. Erik Simpson] Risk. At the Boise hearing, those opposed asked the NRC panel if they could guarantee there would be no mishaps at the Eagle Rock Enrichment Facility. I came to the conclusion that even if the NRC could ensure the public there would be no problems at the facility, those who are opposed to this project would still be opposed. After all, it's nuclear.

[173-01, David Taylor] …I am strongly in favor of the construction and maintenance of the Areva complex and hope the rest of the DOE INL site can be used for productive nuclear research and generating capacity.…

We cannot supplant the energy from fossil fuels to the electric grid without vast improvements to the grid itself and to generating capacity. Nuclear is the only viable alternative and the only one that is "eco friendly" to the environment. Fear mongers and professional detractors "Snake River Alliance" use disgraceful tactics and words in attempting to keep their little source of revenue alive.

We possess the technology (Gen IV reactors) and now need the common sense to use these resources to help sustain a vibrant economy and standard of living that we have all come to expect. The next generation will not have these opportunities if we squander and make feeble attempts to make nuclear energy production a reality now.

I support Areva and the ideas that surround using nuclear technology as a great national effort. It must be for national security and for economic security. We must have a federal government that will establish certain protocols and reactor templates that if complied with will move to a fast track for licensing and construction. From there the government must run interference against all the special interest that come to bear only for the reason of capital extraction. Thanks for allowing us to be part of this potentially wonderful venture that will not only bless the lives of those who live and work here but for the whole nation.

Response: *In the EIS, the NRC staff provides an objective analysis of the potential environmental impacts in all resource areas, based on NEPA and the NRC regulations for implementing NEPA in 10 CFR Part 51. The NRC staff has followed these requirements and has independently evaluated the information used for, and presented in, the EIS.*

Comment: The following comments support the development of the proposed EREF and point out that Idaho is the proper location for such a facility and that the proposed facility can be operated safely, based on the technical capability and experience of the workforce in the project area and on local environmental and legal/regulatory factors. Some of these comments also express general support for the project.

[003-01, Philip Anderson] This is to express *support* for the proposed Eagle Rock Enrichment Facility near Idaho Falls, Idaho.

In addition, I want to draw your attention to the population demographics of eastern Idaho which show that one of the highest concentrations of scientists and engineers in the nation already live in this relatively lightly populated region. Therefore, public support of the project and its technology would be among the most positive in the nation.

Specifically, because a substantial fraction of this population has the educational and professional advantage of *understanding* nuclear technologies, organized opposition to the project should be less than in other regions. One would expect the superstitious fears of and opposition to "everything nuclear" to be less than in other regions, and any that might be expressed in eastern Idaho can be answered or explained locally.

[038-03, Brian Davidson] Eastern Idaho's long history with nuclear research and its current safety-minded workforce are a strong reason to support Areva's plant in our area. We have proved time and again that not only can we operate such technology safely, but we also have the commitment to ensure generated wastes are dealt with safely.

[043-01, Rocky Deschamps] I am going to speak just a little bit, and I won't take much time. I'm going to talk a little bit about, I spent six years on the Bingham County Planning and Zoning Commission, the last two years as chairman of that Commission, and there's one area here on the Environmental Impact Statement that I'd just like to maybe touch just a little bit of base on, and it talks about, it's anticipated the number of workers moving into the area during each phase of the proposed project they call them migration workers, that might have some impact on the schools, health care, law enforcement, availability, cost of public utilities, such as electric, water, sanitary, road, number of migrating workers expected during the construction and operations might impact the housing.

My time on the Bingham County Planning and Zoning, we encourage businesses because our schools are crying out, we need more students. We're actually declining in our number of youth in our schools. Our roads are very adequate. Our schools are adequate. We have an infrastructure here in southeast Idaho because we are so used to having INL, we have the colleges here that can train the workers. We have the high schools that are there that are ready to accept anything new that we might have in this area in the schools. We have multiple, multiple infrastructure in place because of the INL, and the experience we have with the INL out there.

Also, I've been involved with the supply side. We have contractors in this area that are so familiar with the requirements to build a facility like this, that it's just -- you don't find that in a lot of areas. We also have suppliers that are used to supplying the specifications, the ASTM specifications that are required on a nuclear facility to do that, so we are very able to take on a facility like this, and take care of it, and do what we need to do.

[065-02, Hon. Ida Hardcastle] I spend a large amount of time in the city among the residents and it is exciting to feel the enthusiasm most have for this project coming to Idaho Falls. Of course the main interest is the economic impact it will have on the area, in other words - jobs. Also the community supports the fact that there will be a very small environmental impact from this facility. We thank the NRC again for their efforts in this particular concern. We have a top notch workforce here which was recognized by AREVA in the beginning. The community as a whole supports energy being produced by nuclear power. We simply have to address our independence on foreign oil.

[094-03, Michael Lange] One of the things that they don't cover in NEPA is the biggest single issue of safety, of building any plant in this country, whether you like coal, or nuclear, whatever, and that's the quality of the people that build the plant. It's the skill level of the people that build the plant. It's the safety training of the people that build the plant. And I can say that in Idaho, the times I've worked here, and the people I worked with, you have very highly-trained people, very safe people, very professional people that work hard. And I can tell you from working in those facilities under those rules, and the NRC Commissioners would be the first to tell you, if you've ever worked in a hot mockup on a nuclear plant, you've got 3 R next to you about a few feet away, you better be doing it right.

[111-02, Robert Meikle] And Idaho Falls is one of the places that has 40 years of experience doing this sort of thing. And I've been there for 40 years. My first construction company put the seven big tanks in at CPP, at the Idaho Nuclear Engineering Laboratory, and I was still in business 40 years later, and we took those same tanks out.

[133-02, Richard Provencher] Relative to the potential environmental impacts, this is a perfect fit nuclear facility to locate in Idaho. … Overall, this appears to be a facility that affords much benefit to the country and Idaho Falls that far outweighs the low risk and low potential for environmental impact and I am fully supportive of NRC granting a license to construct and operate.

[135-04, Hon. Dave Radford] Being a political subdivision of the State of Idaho, Bonneville County adopted a comprehensive plan that included located nuclear growth west of -- on the western side of -- Bonneville County, so we think that will help expedite the process. We, as the commission, agree with the Environmental Impact Statement's conclusion.

Historically, I serve on the Heritage Commission. I think history is important, that homestead, I think, could be mitigated out there. Historically, Bonneville County, my predecessors at the County Commission, took very limited resources in terms of property tax dollars and invested them in improved roads to get out to the site 60 years ago. So, historically, we've been a nuclear-friendly county, and I believe that it will continue. And we applaud your work, we respect your work, and we hope for a great outcome for an expedited license for AREVA.

[151-03, Beth Sellers] The fact that Areva Enrichment *Services* selected Idaho Falls as the location to construct and operate this enrichment facility speaks to the comfort level this community has with all things nuclear. There are over 6 decades of nuclear energy R&D&D experience at the INL. Locating a commercial capability next door makes logical sense, as the synergy that will co-exist in the professional arena will be a natural outcome and provide benefit to all involved.

[152-01, Steven Serr] I am also responsible for code compliance conformance for building code, fire code, mechanical code, flood plain rules and regulations. And I have had an opportunity to work with NRC staff. They've been in my office asking questions as to what we figure impacts are, how we plan on addressing issues, if we have concerns on implementation of this project. We've worked extensively with AREVA, and their staff, to make sure everything that they are doing would be in compliance with NRC guidelines, with local rules and regulations, and they've made every attempt to make adjustments to their plan, to make sure that we have a safe facility.

[152-03, Steven Serr] As far as compliance with zoning rules and regulations, that area was designed specifically for this type of facility. It's not designed to have other uses out there that could be impacted by those uses.

[152-07, Steven Serr] One of the issues we were concerned, we talked specifically about, was the storage facilities on site, to make sure that those are contained. We feel that the plan that they have implemented for on-site retention containment, lined ponds, monitoring would adequately protect the community. As far as code enforcement officers, that one of my major charges, is any facility we have come in, that we do see that they are fully code compliant and protect the public health, safety, and welfare of the community.

[152-09, Steven Serr] I wanted to address the issue as to the suitability of this property for development of that site. Again, as the Commissioner mentioned earlier, this area has been zoned and designated for this type of use. It's been planned that it could accommodate this type of operation since 1960. So, it's been a long-designated piece of property, tract of land out there for this type of use.

I approach this as an enforcement site for any facility that's built in the county. Our concern in the county is making sure that things are built to code, built complaint, built safe, protect public health, safety, and welfare. My office, we are responsible for enforcement of the building code, the fire code, mechanical code, flood plain rules and regulations, and we have addressed most of these issues with AREVA. We've made modifications for some of their design issues on what they contemplate doing to try to mitigate, and make sure that the operation that they're proposing out there will be a safe compliant operation.

Response: *The NRC staff acknowledges these comments and appreciates the public participation. However, these comments are outside the scope of the EIS analysis because they do not relate to the content of the Draft EIS.*

Comment: The following comments express support for the proposed EREF and state that the operations at the EREF are expected to be safe and environmentally responsible because operations would be based on a proven technology. Some of these comments cite the safety of the nuclear industry as a whole.

[039-02, Kreg Davis] First. The project is environmentally responsible. It is tested. It is proven technology. I think most people agree that we need safe, clean, secure, and abundant base power, baseload power. This baseload power argument has not been discussed as much as I think it should be tonight.

My business is very grateful for the business we get from wind and solar, and would continue to hope those sectors expand, and at a rapid rate.

However, neither one of those provide baseload power. Nuclear can. In my opinion, AREVA's project complements these important energy goals. I also believe that serious thinkers on this issue agree -- nuclear power is the only technology able to deliver on all of these dimensions. I acknowledge that there are reasonable people who have safety concerns, but most of those I have spoken with, that oppose nuclear power, believe nuclear safety is possible. However, there are those that let anxieties rule. Their doubts lead to fight against any implementation of nuclear power. I personally believe that we are better to focus on growing a safe, clean, secure, and abundant nuclear industry.

[039-05, Kreg Davis] First, this project is environmentally responsible. It is tested. It is proven technology. I think most people agree that we need safe, clean, secure, and abundant base-load power. In my opinion, Areva's project complements these important energy goals. I also believe that serious thinkers on this issue agree nuclear power is the only technology able to deliver on all of these dimensions. I acknowledge that there are reasonable people who have safety concerns, but most of those I have spoken with that oppose nuclear power believe nuclear safety is possible. However, there are those that let anxieties rule. Their doubts lead to fight against any implementation of nuclear power. I personally believe that we are all better to focus on growing a safe, clean, secure and abundant nuclear industry.

[043-02, Rocky Deschamps] The last thing that I was -- I'll just touch base on, and I'll touch it very briefly, and that is, is that it's too bad that in this day and age that we treat nuclear power the way we do. And I've gone through the Environmental Impact Statement, I didn't see anything that touched on this. And the only figures that I have with it, on my note here, in 2006, I don't have it. In 2006, there was 46 miners killed in coal mining accidents. If that would happen in the nuclear industry, it would be shut down so fast, but coal is just left kind of as it is. So, I think that we need to look at that a little bit and say geez, where -- I think that 2006 is probably a pretty good year. If we looked at 2009, or 2008, it would even be worse, so I think we need to take in a little bit of perspective, and look at that.

[098-04, Linda Martin] As far as technical impacts, the centrifuge technology is proven and safe as based on other facilities across the world, and while there conceivably is a significant gap in the supply-demand equation for enriched uranium to provide our current and future green energy needs, we can address that with the EREF.

[098-11, Linda Martin] The company's use of centrifuge technology is a proven, safe method of enriching uranium. This technology is more energy efficient, more environmentally friendly and less expensive to operate than the other accepted uranium enrichment process called gaseous diffusion.

[116-01, Richard Mondy] I am in full support of the proposed Eagle Rock enrichment facility.

I submit that nuclear power is as safe, if not safer, than petroleum based power. Opponents to the facility neglect to admit the hazards of alternative sources, hazards such as the recent Gulf oil spill.

It is easy for those with other agendas to be opposed when they can take a narrow view and just ‘cry wolf’ without having to offer and substantiate a realistic alternative.

[123-02, Hon. Butch Otter; 090-02, Paul Kjellander, on behalf of Hon. Butch Otter; 195-02, Hon. Jeff Thompson, on behalf of Hon. Butch Otter] AREVA is proposing to build a state-of the-art, technologically-proven, modern facility to enrich uranium needed to operate the existing U.S. fleet of 104 power reactors. AREVA’s plant will incorporate many unique features which have been developed over three decades of experience with centrifuge enrichment technology. AREVA’s vast experience and use of the technology will result in minimizing and, where possible, eliminating any impacts on the surrounding environment and regional communities, but there will remain, however, many significant beneficial impacts.…

Safety, integrity, professionalism, and sustainability are demonstrated attributes that AREVA embraces in all of its projects and operations, and the Governor believes they’ll bring no less to Idaho Falls. AREVA has been easy to work with, and they are as excited about coming to Idaho as we are to have them locate their facility here.

As we look across the country today, there are not many, if any, states or regions that can claim proposed major energy construction projects or facilities like the Eagle Rock Enrichment Facility. While large projects are usually accompanied by some environmental impacts, Governor Otter believes the end result of this facility will be very positive for Idaho and the country. Eagle Rock will provide much needed domestic production of enriched uranium for our existing U.S. nuclear power fleet, which will help enable U.S. utilities to move away from importing nearly 90 percent of this important fuel product.

[137-02, Ralph Reeves] 2. The nuclear industry has a great safety record. Then there is oil drilling, coal mining, etc.

[143-03, Hon. James Risch; 172-03, Amy Taylor, on behalf of Hon. James Risch] I also note the centrifuge technology is proven, reliable, and efficient. The process will use 50 times less electricity than a gaseous diffusion plant, and the amount of water used by the plant is less than the current irrigation appropriation.

[128-02, Bob Poyser] In addition, the Eagle Rock enrichment facility will provide safe and secure domestic enrichment services that American utilities need to generate carbon-free energy.

[163-04, Cindy Smith-Putnam] Over the past five years, approximately a million and a half Americans have died from smoking, automobile accidents, and alcohol-related incidents. Obesity has claimed another million and a half lives over the same time period. And according to the Institute of Medicine’s landmark report titled, “To Err is Human,” my own industry, health care, is estimated to be responsible for the annual death of nearly 100,000 people through medical errors. By contrast, according to the Director of the Carlsbad Environmental Monitoring and Research Center, in that same period of time, the past five years, the nuclear industry has produced zero deaths, and a relative danger index of 0.0.

Response: *The NRC staff acknowledges these comments and appreciates the public participation. However, these comments are outside the scope of the EIS analysis because they do not relate to the content of the Draft EIS.*

Comment: The following comments express support for the role of the proposed EREF as part of the nuclear fuel cycle and/or support for nuclear power in general.

[010-01, Jack Barraclough] So, when a project like this comes in my study of nuclear needs, it's just so obvious that this is what we need. You can look at all these things, and talk about the aquifer, but this is trivial compared to the needs of this country.

… and we don't need negativism, naysayers, we need positive support of this excellent project that would help the world, and help the country, and I strongly support this.

[033-01, Hon. Mike Crapo; 075-01, Leslie Huddleston, on behalf of Hon. Mike Crapo] Now, more than ever, it is critical to develop secure, economically feasible, and clean supplies of domestic energy. EREF will supply America's existing operation fleet of nuclear power reactors, and further augment the anticipated growth of new commercial nuclear power generation here in the U.S.

[034-01, Greg Crockett] While I understand this is not a debate on nuclear energy policy, the context in which decisions of this nature are made must be considered and cannot be ignored. Daily headlines demonstrate the devastating environmental consequences of our heavy dependence on petroleum fuels. Fires in Russia, floods in China and Pakistan, and oppressive heat currently being experienced within the continental United States remind us continuously of the ever-increasing consequences of climate change.

It is time for the U.S. to change directions in the interest of our energy future and our national interest. It is time for the United States to reassume a leadership role worldwide in nuclear energy. Our national security interests require that we have enrichment and fuel development capabilities within our borders. I support the Draft Environmental Impact Statement, which likewise recognizes those demands.

Demand for nuclear fuel is, and will dramatically increase in the future, and I think that's demonstrated by the number of pending NRC license applications. To suggest that the Eagle Rock Enrichment Facility's production is not or will not be necessary is pure folly. To meet our current demand for enriched uranium, much of it is imported, and we need robust domestic suppliers who can provide this service in an environmentally compatible manner.

We trust AREVA. We trust that the proposed Eagle Rock facility will provide this valuable service to our nation. I support the Draft Environmental Impact Statement, and recommend that it be accepted, and that the license process proceed.

[038-02, Brian Davidson] As we look to secure our nation's energy future, nuclear power has got to be a part of it. Having Areva's uranium enrichment capacity in Idaho and the United States will help nuclear power become an even more viable energy alternative.

[039-04 and 039-07, Kreg Davis] In the long run, this project will augment our base-load electrical needs. Nuclear energy is a significant part of the answer to our energy needs. I worked for Philips Semiconductors during the years when the semiconductor industry started moving jobs from the United States overseas. Countries with empty fields, cheap and abundant power, clean and plentiful water, an education program fully developed complete with a steady stream of graduates, and low taxes. These countries provided all this and an invitation to come.

If America and Idaho are going to compete in this world, we too need to provide clean water, quality education, and reasonable taxes. But we also need to provide energy — abundant power — predictable base-load energy. I personally believe that nuclear energy should be a significant part of that base. Areva's project helps us to achieve success. This project is good for our planet and it is good for our economy. Thank you for giving me this time.

[041-01, Hon. Tammy de Weerd; 156-01, Robert Simison, on behalf of Hon. Tammy de Weerd] I am speaking tonight on behalf of Mayor Tammy de Weerd of the City of Meridian, which is the third largest city in Idaho, located here in the Treasure Valley, in support of the purpose and need for the proposed Eagle Rock facility, as outlined in the EIS.

We believe that the proposed facility will help support our nation's nuclear power industry and emphasize the importance of having a reliable source of enriched uranium for national energy security, as is described in the EIS.…

I think this could be a good partnership for the area. With that, I will go ahead and conclude my comments, and say, as a nation, we need a generation of safe nuclear energy power plants and we encourage you to move the EIS for the Eagle Rock facility forward, and know that it will directly and indirectly benefit thousands of Idahoans.

[042-01, John Deal] We believe the Eagle Rock Facility is an important and necessary addition to the fuel cycle in America and will depend on the Eagle Rock facility for fuel enrichment.

[051-02, Jackie Flowers] Something else this community is concerned about and cares about is energy. As this country grapples with visions for a sustainable energy future, and energy independence, we have to take action and stop the rhetoric. Nuclear energy provides 20 percent of the nation's electricity. We've already heard that tonight. Importantly, we've also heard it provides more than 69 percent of emission-free electricity that keep the lights on in this country. Let me stress, base load emission-free energy. With less than 15 percent of the nuclear fuel supply necessary for the existing nuclear energy fleet coming from a single source inside this country's border, we have an energy security problem that I believe rallies that of our dependence on foreign oil. And this is an important step towards building that independence.

Nuclear energy is ready now to be a central part of a balanced common-sense approach to clean energy diversity. I agree with the NRC staff's statement that this facility will contribute to the attainment of national energy security policy objectives by providing an additional reliable and economical domestic source of fuel for these important nuclear energy facilities.

[064-01, Hon. Tom Hally] I support the facility as it is part of a long term solution to our energy needs. A nation we have failed to come up with a comprehensive energy policy. We all seem to agree that we need to down size coal. In my opinion nuclear Is part of the solution and I feel is green. We need to move forward. Idaho Falls supports the facility and as a member of the Idaho Falls city council I support the facility.

[065-02, Hon. Ida Hardcastle] The community as a whole supports energy being produced by nuclear power. We simply have to address our independence on foreign oil.

[067-03, Mike Hart] With respect to the need, I, looking at global warming, I know there are obviously impacts of nuclear energy, but the reality is, seven generations from now I think they won't be worrying as much about depleted uranium as they will be about depleted glaciers, depleted ice caps, and nuclear energy has a significant benefit. It's not without its warts, it's not without its impacts, but there is "no free lunch" when it comes to energy.

You can conserve, but we do use energy. It is used globally, whether this is a French company, whether it's used locally, or nationally, the reality is its carbon-free, and that carbon-free resource is something that is very precious, and until we have alternative technologies that can produce significant usable quantities of electricity, nuclear is a very positive step in between now and a carbon-free future.

[067-06, Mike Hart] Also, they took exception with the cause and need for action. I think there's most definitely a need for this, because there's a need for carbon-free energy. Throughout the world, I think we've seen that global warming is a significant problem that we need to be paying attention to, and there's also a demand for growth in nuclear energy. There's a couple of facts I want to point out why we need nuclear energy, why we need this particular enrichment plant.

Carbon dioxide reflects, or absorbs, infrared energy that does not go back out to space. It makes the planet warmer. That's simply a fact. Carbon dioxide is a greenhouse gas. Levels of carbon dioxide have gone from 288 parts per million in 1850 to 369 parts per million in the year 2000. It doesn't matter where it comes from. That is a greenhouse gas that is increasing in concentration. But I'll give you a hint as to where it's coming from: fossil energy. In 1990s, we annually contribute 6.3 gigatons of carbon dioxide into the atmosphere through fossil combustion. That's annual, 6.3 gigatons. The concern about 300,000 metric tons, 300,000 tons of total waste versus 6.3 gigatons in a single year, I view the problem with carbon as much more significant than the problem with depleted uranium.

So, what is a gigaton? Why is that a concern? Well, 2.3 gigatons is one part per million of carbon dioxide in the atmosphere. So, every year we are steadily increasing carbon dioxide. So, yes, global warming is occurring. Yes, it's our fault. Yes, carbon puts more of that in the atmosphere, and I think nuclear energy is a stopgap that will – is worth pursuing. So, yes, there is a need.

Energy demands are increasing worldwide. Currently, the population of the planet is about 4.5 billion. By 2050, that will double, and people are not less energy consumptive. Populations like China and India used to be in the Third World. They have bought the second world, and they've placed a firm down payment on the first one. So, energy consumption will go up as the population goes up, so even if nuclear energy just holds its own at 15 percent, there will be a need for more nuclear plants, and that means there will be a need for more enriched uranium.

[072-01, Stephen Herring] Good evening, my name is Steve Herring. I am a nuclear engineer and have lived here in Idaho since earning my doctorate 31 years ago. During that time I have seen the NRC carefully exercise its duty in protecting the public health through their diligent review of proposed facilities. I would like to speak in favor of the AREVA license application for the Eagle Rock Enrichment Facility.

This facility will be an important part of the nuclear fuel cycle and a key step in providing for future electricity. In building this facility, AREVA will replace 60-year old technology for uranium enrichment with new gas centrifuge technology that is more proliferation resistance, cleaner and a factor of twenty to fifty times more efficient.

The 104 reactors in the US provide about 20% of total US electricity and 69% of the emission-free electricity. However, today, the US has only one operating gas centrifuge plant and the last gaseous diffusion plants are being decommissioned. The one gas centrifuge plant which began operation in New Mexico in June 2010, will be capable of producing 3 *MSWU/yr,* about 25% of the US need for enrichment. So the US is dependent on imported enrichment for 75% of its commercial fuel needs.

We have seen the construction of many wind turbines in the hills east of Idaho Falls and through the west in the last five years. I applaud the contribution that these turbines can make, though I have yet to see any comparable contribution in Jackson or Sun Valley. But it is important to remember that turbines in the best wind sites have capacity factors of only 30-35%. The nuclear reactors fueled by means of the Eagle Rock Enrichment Facility will provide power with a capacity factor above 90%, that is, they provide more than 90% of their maximum capacity when averaged 24-7, year around. The US needs reliable, sustainable energy for decades to come, and not just when the wind is blowing.

Thank you for the opportunity to comment.

[082-01, Michael Johnston] I would like to submit my support for the proposed AREVA Enrichment Service's proposed gas centrifuge uranium enrichment plant to be built in Eagle Rock, Idaho, report number, "NUREG- 1945 draft."

We need nuclear power and the facilities to support them. I feel this facility will be a safe asset to the overall program. I started working at the Idaho National Laboratory (INL) in 1976 and retired in 2000, I always felt safe there. One of my biggest complaints was the general US population was never provided with enough truthful educational information to know how safe Nuclear Power was and what a good source of safe power it was. I know just a little about the planning, review process, and construction overview that goes into building nuclear facilities after working at the INL and am supportive of this project.

[098-13, Linda Martin] Conceivably there is a significant gap in the supply/demand equation for enriched uranium to provide for our current and future green energy needs. The uncertainty of the future supply of energy could evolve into a national security issue. The Eagle Rock Enrichment Facility would be a principal supplier for this valuable and needed material.

[111-01, Robert Meikle] The issue of risk is the risk of what we don't do if we don't adopt nuclear. What are our options if we don't adopt nuclear? And so if we don't do nuclear, ten years from now we'll still be doing coal. And what are the risks of coal, if we're doing coal ten years--as opposed to doing nuclear?

And so I think you have to weigh the risks. You have to weigh them, carefully, and you have to look at all of the science, and you have to look at all of the economics. But I don't think economics should be the driver here.

Boone Pickens made one other really great point, and I've lived in Wyoming the last few years. I understand Wyoming's economy, with coal and natural gas. But we need to go to natural gas, and if we don't go to natural gas, we're going to be in trouble.

It's going to take all of these things. But Mr. Davis brought out what I think is the most important point that's been made in this entire hearing, and that is we have to have a baseload. We have to have a baseload that's reliable.

I was in the ski business in 1976-77, and in that year, we did not see one storm come through from September clear through till January, and in that year wind wasn't going to do it, solar wasn't going to do it for Idaho, nor was hydro. And so we've got -- we've got to look at the "big picture" with our energy policy, and I think you're doing the right thing, although I totally agree, there are risks. But the risks, when you look at the risks and weigh them against the rewards, and our other alternatives, then we've got to move in this direction.

[114-01, Anne Mitchell] Thank you for granting Areva a license to help create a clean, efficient energy source so direly needed in this country. They, of course, are a proven entity with a sterling history for safety, economy in their enrichment facilities. Our country needs this forward thinking element of clean energy and nuclear energy (so long over-looked by this country) is direly needed. I strongly appreciate the NRC's approval of Areva's license and embrace this not only for Idaho Falls, but also for my country which I love.

[119-01, Bob Neilson] One of the things that's very important in this country to be looking at in these days and ages is carbon management, and because of carbon management and the issues associated with it, I'm a strong supporter of renewable energy, including biomass, geothermal, hydropower, solar and wind.

However, for the same reason, I'm also a supporter of nuclear energy. And because I'm a supporter of nuclear energy, if you're going to have nuclear energy you have to have enrichment plants. There's no way around that.

Now we've all talked about environmental impacts. It's an interesting, a little fact, that if you talk about life cycle analysis for a variety of energy sources, and I'm talking about from the time that you're talking about mining, through transportation, through conversion, through manufacturing, through operation, through decommissioning. That if you look at nuclear energy in terms of carbon management, it produces the same, or less, carbon dioxide on a life cycle basis than wind energy does.

Now that doesn't say that nuclear is better or worse, or wind is better or worse. What it does say, though, is that no matter what kind of energy generation technology you're talking about, there are impacts, impacts to all of them, and those impacts need to be carefully considered, so that we, as the citizens of Idaho, can make the decisions that are important to our livelihoods and the state.

Now nuclear energy produces about 20 percent of the electrical energy in this country today. I would maintain that because nuclear is one of the few sources that's baseload compared to renewable energy for which most renewable energy is not baseload, we need to have nuclear energy, and if we need to have nuclear energy we need to have enrichment, and I'm afraid that, unfortunately, it's an important source among all the others. There's no "silver bullet." We need a mix. Nuclear is a part of that mix.

[123-04, Hon. Butch Otter; 090-04, Paul Kjellander, on behalf of Hon. Butch Otter; 195-04, Hon. Jeff Thompson, on behalf of Hon. Butch Otter] Third, Eagle Rock will help rebuild the nation's nuclear infrastructure, and enhance energy security for all those who depend on nuclear power for their health and welfare right here from Idaho.

[128-01, Bob Poyser] We welcome this opportunity to provide factual information about our project to Boise and the surrounding communities. Assuming we are granted a license next year, those in Boise, who make the trip to Idaho Falls by way of Highway 20, will see the beginning of an important step towards our nation's energy independence, the development of a significant investment in Idaho, and construction of an American facility which will provide jobs to American workers, and strength to the local economy.

[133-01, Richard Provencher] I fully support the NRC's proposed preferred alternative to build a uranium enrichment plant west of Idaho Falls, Idaho. The facility being pursued by AREVA will provide an additional reliable and economical domestic source of low enriched uranium to be used in commercial nuclear power plants. Having more capability for enrichment in this country helps reduce the risk related to importation of this type of material from foreign sources. The AREVA facilities planned capacity can provide 40% of the current and planned demand for enriched uranium. AREVA's business plan fits well within the country's plan to reduce dependency on foreign oil, improve the climate, and make nuclear energy a larger contributor to the domestic energy supply. This creates a clear mandate for the capability which is critically important to beginning the review of environmental impacts related to its operation.

[134-01, William Quapp] First of all, I commend the staff's preliminary conclusions, and hope that they retain those conclusions on the favorable benefit cost assessment. My only disagreement with the NRC's impact statements may be one of semantics. I believe that the risks or impacts identified shouldn't be attributed to low and moderate, but the word should be trivial. I believe those impacts are trivial compared to the impacts associated with a societal continued importation of foreign oil. I believe, furthermore, that nuclear power can provide the indigenous energy supply while employing Americans in the USA. And, in fact, I believe there is no bigger impact than sending our soldiers to support energy policy in countries of foreign, or the Middle East. So, I support the Draft EIS conclusions for the reasons that have been stated therein, but for many more societal benefits, as I see it, in use of safe and sensible use of nuclear power.

[135-03, Hon. Dave Radford] And, to me, when we develop nuclear in this country, and yet we only arrive at 20 percent of our power, with French getting 80 percent of their power from nuclear, and we have an opportunity to learn some things about getting this energy on the grid, so I’m optimistic that it can eventually translate to more electricity, cheaper power, a better quality of life.

[143-01, Hon. James Risch; 172-01, Amy Taylor, on behalf of Hon. James Risch] As a U.S. Senator from Idaho, I have the privilege of serving as the Ranking Member of the Subcommittee on Energy. From that position, I have seen firsthand the efforts this country is making to formulate a forward-looking energy policy. Supporting nuclear power, and its associated technologies, such as enrichment, is one way to make our country more energy secure.

Years of broken energy policy have led us to become dependent on foreign sources of energy. We’ve also lost our competitive edge in the nuclear field, a field where the United States and Idaho once led. This community knows what it takes to regain that competitive edge, and once again place Idaho and this nation at the pinnacle of the nuclear industry.

There is a growing recognition that nuclear power is the most viable option to meet the clean energy demands of the future. Demand for enriched uranium is increasing in the United States and across the world to fuel clean nuclear power. This proposed facility will allow that need to be met from domestic sources, while providing a much needed economic boost to the entire region.

[146-01, Doug Sayer] You know, what happens to my grandson happens to me. We’re both Idahoans. But more importantly, we’re both Americans. And we have to have that baseload energy. And until we have an alternative, nuclear is the answer. Decisions I made about my grandson’s future are important. I realize that the decisions that we make, and the projects that we undertake are going to be his legacy to deal with….

We encourage you to pursue this license and approve it, so that we can get back to work and build these nuclear projects like our country needs them.

[151-01, Beth Sellers] The purpose of the facility has been made clear in the draft EIS. It is in the best interest of the citizens of the United States that we continue to support and increase the percentage of electricity generated by commercial nuclear power. It is a proven mission-free source of electricity. Furthermore, its increased use will enhance our national energy security. The sooner we become self-sufficient in fulfilling our energy needs, the more secure our nation will remain in these turbulent times.

[152-08, Steven Serr] And my planning hat side. We are encouraging development and expansion. As mentioned, we are promoting alternate energy resource facilities. We have 160 megawatts of wind power under construction at this time. For promoting the nuclear side with this, we’ve been promoting the nuclear research on the INL site, and we’re also currently producing, or hope to be producing a cogeneration facility with a four county region, with a cogeneration facility for waste burning that also generates electricity.

So we are promoting all sources of energy. we feel this is also a safe one, that meets the needs of the community, meets our rules and regulations.

[155-01, Jerry Shivly] First of all, it was going to help our nation, because we need the nuclear energy.

[163-02, Cindy Smith-Putnam] The bigger picture is this project's significance to our regional and national energy future, and it is the national energy future that fundamentally and absolutely requires a significant reset from the status quo.

Currently, under the E in Energy, Grow Idaho Falls has taken an active role in supporting the development and expansion of green renewable sources of energy. We can, we should, we have, and we will continue to support the diversification of the energy portfolio of our region and nation, to include harnessing the power of wind, water, heat, and light, to reduce the harmful effects to the environment of carbon emitting sources, and to promote our national security by becoming less reliant on foreign oil.

Increasing renewables, promoting conservation, decreasing use of fossil fuels, all very important, we can, and we should do all of those things. And, yet, even taken together, none of that is enough, not nearly enough to meet our growing energy demands. Nuclear energy stands alone as the best way to produce the energy we need, while at the same time minimizing harmful environmental and geopolitical consequences. It gives us the opportunity to turn away from the practices of the past toward a more stable and sustainable energy future.

Therefore, just as we need to be independent of unstable and unpredictable sources of oil, we also need to be independent of unstable and unpredictable sources of enriched uranium. Simply put, the Eagle Rock Enrichment Facility beautifully addresses that need.

[173-01, David Taylor] …I am strongly in favor of the construction and maintenance of the Areva complex and hope the rest of the DOE INL site can be used for productive nuclear research and generating capacity.…

We cannot supplant the energy from fossil fuels to the electric grid without vast improvements to the grid itself and to generating capacity. Nuclear is the only viable alternative and the only one that is "eco friendly" to the environment. Fear mongers and professional detractors "Snake River Alliance" use disgraceful tactics and words in attempting to keep their little source of revenue alive.

We possess the technology (Gen IV reactors) and now need the common sense to use these resources to help sustain a vibrant economy and standard of living that we have all come to expect. The next generation will not have these opportunities if we squander and make feeble attempts to make nuclear energy production a reality now.

I support Areva and the ideas that surround using nuclear technology as a great national effort. It must be for national security and for economic security. We must have a federal government that will establish certain protocols and reactor templates that if complied with will move to a fast track for licensing and construction. From there the government must run interference against all the special interest that come to bear only for the reason of capital extraction. Thanks for allowing us to be part of this potentially wonderful venture that will not only bless the lives of those who live and work here but for the whole nation.

[176-02, Hon. Jeff Thompson] As an eastern Idahoan and Representative, I'm excited to hear that we are looking for sustainable energy solutions for our future, such as those provided by AREVA. The demand for electricity is becoming greater, and with this demand we're beginning to see prices soar. Nuclear energy offers a solution to our need for reliable energy sources now and in the future.

[178-02, Randy Trane] This is a project that will serve two purposes. It will allow nuclear power to serve the world and it will help the economy in the Eastern Idaho area with much needed employment. I have several friends who are experts in the nuclear power industry and they are telling me that this project will not have any negative impact on the environment in this area.

[186-01, Lauren Walker] We are supportive of the nuclear industry. Though we are, ourselves, not employed by the industry, we feel that the experience that we've had is absolutely compatible with the things that we do in our industry.

We're supportive of bringing back manufacturing to the United States. We've become a service-oriented country. We need to start manufacturing for ourselves. Our dependence on foreign energy has taught us by sad experience that it's time to bring our independence home. It's a win for Idaho; it's a win for the United States of America.

Response: *The NRC staff acknowledges these comments and appreciates the public participation. However, these comments are outside the scope of the EIS analysis because they do not relate to the content of the Draft EIS.*

Comment: The following comments express confidence in AES's capabilities and/or in the proposed EREF.

[023-01, Rebecca Casper] I am pleased as a community member with AREVA's arrival in our community. They began giving back almost immediately upon their arrival, and corporate citizenship like that is nothing to be taken lightly. To me, it's a sign of responsible management and conscientious management, but that's just an observation.

[033-02, Hon. Mike Crapo; 075-02, Leslie Huddleston, on behalf of Hon. Mike Crapo] I am confident EREF will meet the strong environmental and safety standards enforced by the NRC, and other federal, state, and local entities.

[034-04, Greg Crockett] We trust AREVA.

[053-02, Hon. Jared Fuhriman] You know, it was just a year ago, March, that I had the opportunity, along with two high school teachers and 20 high school students, to travel back to Tricastin, France, and there we were able to go through the George Besse Plant, which the Eagle Rock facility is modeled after. And I've got to tell you, it was very impressive as we were on the site, be able to witness the production of that.

I had a chance to talk to elected officials there, as well as citizens of Tricastin, and they're very proud of the George Besse plant, and they're with AREVA, that they're their neighbor, and also the partnership in energy.

One of the things that I noted when I was back there. All the plants were built right next to cities. And we had the opportunity to talk to many of the citizens, and there was absolutely no residual problems, that they could ever detect. I had the opportunity to meet with many AREVA executives and staff, both in France and the United States, and I have total confidence that the Eagle Rock enrichment facility will be operated safely and efficiently.

[053-03, Hon. Jared Fuhriman] As Mayor of Idaho Falls, and as members of the City Council, we're elected to represent the best interests that our city has to the best of our ability, so when a proposed project like AREVA comes along, it's imperative that we do everything we can to exercise our due diligence in ferreting out the project, itself, and making sure that it's the best fit for our city and our communities.

It is my opinion that we have tried to turn over every stone possible, as we looked into AREVA, and if it would be a benefit to our community. We have met with several mayors in eastern Idaho, and received their endorsement on this project. Myself, along with several other community leaders have personally met with representatives from AREVA numerous times, not only here in Idaho Falls, but at the headquarters in Bethesda, Maryland, in addition to a personal visit to Paris, France to the corporate office just to seek direction and information from them.

One of the best pieces of evidence that I've obtained through my personal research regarding the potential environmental impacts was when I, along with 24 other members of our community, 20 of those being youth in our community, traveled back to Pierrelatte, France, population of 13,000. Pierrelatte is next door to the Tricastin Georges Besse plant, which has been operational for several years. I had the opportunity to personally visit with many of the city and the community leaders, as well as speaking with many of the citizens, themselves, in regards to the Tricastin plant, and if there was any residual issues that they have seen as a result of having lived right next door to that plant.

I was able to see firsthand AREVA's sustainable development philosophy of protecting the environment. Through this visit, I found no evidence of any negative environmental impact on their community. What I saw, instead, was a vibrant and beautiful city and community.

[098-12, Linda Martin] In its application, AREVA has proven itself to be technically capable of addressing and satisfying any NRC criteria or requirements, as well as addressing any waste issues per DOE and NRC guidelines, which may be necessary for the full and successful operation of this plant.

[114-01, Anne Mitchell] Thank you for granting Areva a license to help create a clean, efficient energy source so direly needed in this country. They, of course, are a proven entity with a sterling history for safety, economy in their enrichment facilities. Our country needs this forward thinking element of clean energy and nuclear energy (so long over-looked by this country) is direly needed. I strongly appreciate the NRC's approval of Areva's license and embrace this not only for Idaho Falls, but also for my country which I love.

[123-02, Hon. Butch Otter; 090-02, Paul Kjellander, on behalf of Hon. Butch Otter; 195-02, Hon. Jeff Thompson, on behalf of Hon. Butch Otter] AREVA is proposing to build a state-of the-art, technologically-proven, modern facility to enrich uranium needed to operate the existing

U.S. fleet of 104 power reactors. AREVA's plant will incorporate many unique features which have been developed over three decades of experience with centrifuge enrichment technology. AREVA's vast experience and use of the technology will result in minimizing and, where possible, eliminating any impacts on the surrounding environment and regional communities, but there will remain, however, many significant beneficial impacts….

Safety, integrity, professionalism, and sustainability are demonstrated attributes that AREVA embraces in all of its projects and operations, and the Governor believes they'll bring no less to Idaho Falls. AREVA has been easy to work with, and they are as excited about coming to Idaho as we are to have them locate their facility here.

As we look across the country today, there are not many, if any, states or regions that can claim proposed major energy construction projects or facilities like the Eagle Rock Enrichment Facility. While large projects are usually accompanied by some environmental impacts, Governor Otter believes the end result of this facility will be very positive for Idaho and the country. Eagle Rock will provide much needed domestic production of enriched uranium for our existing U.S. nuclear power fleet, which will help enable U.S. utilities to move away from importing nearly 90 percent of this important fuel product.

[135-01, Hon. Dave Radford] The people I've met at AREVA have been wonderful. They already have 7,000 employees in the United States, so we're real comfortable with their way of doing business here in eastern Idaho.

[145-03, Ann Rydalch] Our country is open to legal immigrants that come here for the American dream. Our country is open to legal foreign companies that want to do business in the United States. AREVA is a very experienced and credible company that wants to do business in the U.S.

[157-12, Hon. Erik Simpson] I have great trust in those who have proposed this facility, and have considered a multitude of emergency situations, and have a plan for mitigation. With that, I am in support of the Draft EIS, and encourage the NRC to grant the license.

[158-03, Hon. Mike Simpson; 139-03, John Revier, on behalf of Hon. Mike Simpson] Areva has a strong record of corporate safety and achievement, and the technology that Eagle Rock will use have been well-proven in the United Kingdom, mainland Europe, and now in the United States. I have the utmost confidence in the quality, safety, and security of their facilities.

[162-01, Michael Smith] It is my opinion that AREVA should in fact be granted the license and permit to build the uranium enrichment facility located near Idaho Falls. I am a local citizen both born and raised in Idaho, I as most Idahoans care a great deal about the environment and the quality of life here in this area. I believe AREVA has gone beyond required measures to ensure the process used in the proposed facility will protect the environment and the citizens of this state.

While there are still clean up measures on going at the INL we as a nation and the organizations working in the nuclear industry have learned a great deal in how to safely manage the relatively small amounts of waste generated. I fully support the NRC for its decision to allow the construction and operation of the new Eagle Rock Enrichment Facility.

I also applaud AREVA for their decision to trust Idaho and its citizens enough to desire joining our neighborhood.

[167-01, Andrew Stevenson] We weren't without our concerns originally on this project. As Erica mentioned, the facility is obviously going to have a significant impact on our community, and we were concerned that some of these impacts could, potentially, be negative, and so we wanted to find out more about that. But in March of 2009, AREVA took us to go see the Georges Besse II facility in France, which is, essentially, the same thing they would be building here, and while we were there, Erica actually raised some of those concerns.

She touched briefly on the myriad recreational activities that are available here, just because of the pristine condition of our countryside, and our desire to see those areas preserved. There was also some concern about pollution, particularly in the water supply due to accidental pollution, but when we raised those questions, AREVA showed us some of the measures that they'd implemented to prevent such spillage and pollution. And we have to say, we were extremely impressed with it, even in cases of flood and earthquake, and crazy natural disasters that are never going to happen. It was extremely unlikely that any waste was going to be spilled into the surrounding area. An even greater reassurance came when we visited with residents of Pierrelatte, a French town in the area around the Tricastin site. They all live relatively normal lives, and there were no real noticeable effects from having that site on their borders. Most of them actually said that they felt that having the site there improved their general lifestyles, so we were very comforted by that. Also notable is the fact that the Tricastin site sits right on a river, and yet in all the time that that facility has been there, there have really never been any major issues with water contamination there, and that also eased our mind.

Response: *The NRC staff acknowledges these comments and appreciates the public participation. However, these comments are outside the scope of the EIS analysis because they do not relate to the content of the Draft EIS.*

I.5.3 NEPA Process

Comment: The following comment requests that the PowerPoint presentations and speaker's notes from the public meetings be made public on the NRC's website.

[115-01, Nicholas Molenaar] Could the Power Point presentations be made public on your Web site? Also speaker's notes please.

Response: *The NRC staff's PowerPoint presentations from the August 9 and August 12, 2010, public meetings in Boise and Idaho Falls, Idaho, respectively, can be found on the NRC's public website for the proposed EREF project, at http://www.nrc.gov/materials/fuel-cycle-fac/arevanc.html#3 (click on "Meeting Slides" links). The PowerPoint presentation given by Liz Woodruff of the Snake River Alliance during the August 9, 2010, public meeting in Boise, Idaho, can also be found on the NRC's website for the proposed EREF project, at http://www.nrc.gov/materials/fuel-cycle-fac/arevanc.html#3 (click on "Meeting Transcript and Other Meeting Information" link, and then on the "Slides from Public Meeting Between the Nuclear Regulatory Commission and the Snake River Alliance" link).*

There are no speakers' notes available from the two public meetings. However, the statements of all of the speakers at these meetings can be found in the meeting transcripts, which are available on the NRC's website at http://www.nrc.gov/materials/fuel-cycle-fac/arevanc.html#3 (click on "Meeting Transcript and Other Meeting Information" link).

Comment: The following comment expresses concern that copies of the Draft EIS and supporting documents were difficult to access and that inadequate numbers of hard copies of these documents were made available to the public.

[131-02, Morty Prisament] Availability and Access to Documents: A related issue involves availability and access to the copies of the EIS and the above-referenced technical supporting documents. Distribution of the EIS and supporting documents has been extremely limited, thereby limiting opportunities for comment. Adequate numbers of hard copy documents should be provided to libraries, local government, and interested organizations in order to facilitate the broadest public review opportunities. This is a project of statewide significance and, therefore, multiple copies of the DEIS and all supporting documents should be, at minimum, made available through the Boise Main Library, given that Boise is the State Capitol. I do acknowledge that NRC did ultimately decide to hold a DEIS hearing in Boise. However, given that this was a late decision by NRC, I was unable to re-schedule and was out of the country at the time.

Response: *Pursuant to the NRC's regulations under 10 CFR 51.74, on July 21, 2010, the NRC staff published a Notice of Availability (NOA) for the Draft EIS in the Federal Register (75 FR 42466), announcing the issuance of the Draft EIS for public comment, in accordance with 10 CFR 51.73, 51.74, and 51.117. Among other information, the NOA contained information on how to access the Draft EIS and other documents related to the proposed EREF project. Documents were made available in hard copy at the NRC's Public Document Room in Rockville, Maryland, and at the Idaho Falls Public Library, 457 West Broadway, Idaho Falls, Idaho 83402. The Idaho Falls Public Library maintains an information repository on the environmental review for the proposed EREF project. Documents were also made available electronically through the NRC's public website, the NRC's Agencywide Documents Access and Management System (ADAMS), and the Federal Rulemaking website. Information on how to access each of these venues was provided in the NOA. Additionally, pursuant to 10 CFR 51.74, the NRC distributed the Draft EIS to approximately 135 individuals including Federal, Tribal, State, and local government officials and other interested parties (including members of the general public). Furthermore, references cited in the Draft EIS were publicly available through the NRC's ADAMS website (http://www.nrc.gov/reading-rm/adams/web-based.html) and/or through other publicly accessible venues such as the Internet, Federal, State and local government agencies and their websites, and public libraries.*

Comment: The following comment maintains that the NEPA process should be restarted due to significant changes in the proposed Federal action.

[131-06, Morty Prisament] Scoping: NEPA provides for a public scoping process in order to facilitate public and agency identification of issues to be analyzed in the DEIS. Public Scoping meetings, also required by NEPA, provides opportunities to comments on the issues to be studied in the DEIS. NEPA also stipulates that if the proposed federal action undergoes significant changes, the scoping process needs to be re-started. Major changes to the proposed action have occurred, not the least of which has been doubling the capacity of the centrifuges. Therefore, the NEPA process should be re-started, beginning with a new Scoping Process, in order to afford adequate opportunities for comment and properly focus the DEIR analysis.

Considering the extent and depth of my concerns, and those of others, the NEPA process does not provide for NRC to simply address comments in a Final EIS. NEPA calls, instead, for re-noticing and re-release of a revised EIS and, where needed, supporting documents. Also called for is a formally revised project (preferred action) description and initiation of a new Scoping Process.

Response: *As noted in Section 1.4.2 of the EIS, the NRC staff's announcement of the Notice of Intent (NOI) to prepare the EIS, which initiated the NEPA process, was published in the* Federal Register *on May 4, 2009 (74 FR 20508). Publication of this NOI was purposely delayed by the NRC because AES notified the NRC of its intent to double the enrichment capacity of the proposed EREF. The NOI was published after the modified license application was received by the NRC from AES on April 23, 2009 (AES, 2009a), for the current proposed capacity of 6.6 million separative work units (SWUs) per year. The NOI established a 45-day scoping period and announced a public scoping meeting that was held in Idaho Falls on June 4, 2009. No significant changes in the scope of the EIS have occurred since that time which would necessitate re-scoping the EIS.*

Comment: The following comment expresses concern that the commenter's scoping comments were not addressed in the Draft EIS.

[141-01, Peter Rickards] The Eagle Rock Draft EIS appears incomplete, not addressing the technical scoping issues I submitted. I do see the actual issues listed as received, on pages 88 & 89 of 234 in the appendix section, but no actual answers were given.

Response: *Responses to individual scoping comments were not prepared. Those comments relevant to the scope of the EIS were considered in the preparation of the EIS as discussed in Section 1.4.2 of the EIS.*

Comment: The following comment questions the analysis of impacts in the Draft EIS.

[181-02, Roger Turner] And what is the science and environmental research behind the endorsement of the AREVA project? Well, science and environmental risks are being downplayed on this proposed project, because of job creation, and economic development.

Response: *The NRC staff believes that it has provided an objective analysis in the EIS for all resource areas, based on the requirements of NEPA and the NRC regulations for implementing NEPA in 10 CFR Part 51. In the case of job creation and economic development, the socioeconomic impacts, beneficial and adverse, were found to be SMALL as presented in Section 4.2.12 of the EIS. The NRC staff does not believe that such a finding downplays the potential adverse impacts found in other resource areas with SMALL-to-MODERATE or MODERATE impacts.*

Comment: The following comment maintains that the Draft EIS fails to follow NEPA guidelines with respect to a number of issues.

[181-22, Roger Turner] In summary the EIS fails to follow NEPA guidelines with respect to evaluation of the need, evaluation of temporary storage risks, evaluation of treatment facilities for depleted uranium. The EIS fails to follow up with a realistic evaluation of the proliferation risks, and to advance alternatives to the dangerous centrifuge system and its risks to violating the NPT treaty. The EIS must evaluate the risks of handling, moving and storing Uranium compounds at Areva, in the context of historical accidents with the casks, spills and releases of the material, the actual toxicity of the uranium and the associated indirect and cumulative risks to the environment, as required by NEPA.

Response: *As stated in Section 1.1 of the EIS, the NRC has specific regulations under 10 CFR Part 51 to implement the requirements of NEPA. The NRC staff has followed the requirements of NEPA and the NRC regulations to independently evaluate all information used in the EIS. The need for the proposed EREF is discussed in Section 1.3 of the EIS. Potential impacts and risks from handling uranium compounds in various forms and the temporary storage of depleted uranium are discussed in Sections 4.2.10 and 4.2.11. Potential impacts from disposal of the depleted uranium are also discussed in Section 4.2.11. Potential impacts and risks from transportation of uranium feed material and waste are addressed in Section 4.2.9. Additional evaluation regarding proliferation risks is not within the scope of the EIS for reasons discussed in Section I.5.6 of this appendix. Alternatives to the gas centrifuge technology are identified and evaluated in Section 2.3.3. Accidental and intentional releases are considered in Sections 4.2.15 and 4.2.18. The toxicity of uranium compounds is discussed in Section 3.11.3 and 4.2.15. Potential cumulative impacts and risks to the environment are covered in Section 4.3.*

Comment: The following comments suggest that the NRC's approach is one of advocacy and pre-determination.

[120-01, Frank Nicholson] Very superficial – Did not address critical issues. As with city councils, your minds have already been made up.

[131-01, Morty Prisament] Independent Analysis: The overall tone of the document is one of advocacy, which makes one question the objectivity of the document's conclusions. The document relies upon a number of technical documents. What were these documents precisely? Were these documents subjected to any type of independent peer review? Lacking such review, the objectivity of these documents would, likewise, be in question. Specifically, these documents relate to engineering studies, system safety and emergency response (including failure analysis and redundancy procedures), human health and ecological health risk assessments and associated probalistic risk assumptions, benefit-cost analysis, socioeconomic impact analysis, and groundwater quality impact-related studies. The discussion of these issues is extremely limited given the scale of the action and associated risks.

Response: *The NRC is a regulatory agency charged with protecting public health and safety and the environment. The NRC's mission does not include advocacy of nuclear technologies. The NRC staff believes that it used the best technical documentation available to support all* *aspects of the environmental review. The documents used are identified and cited as references in the EIS.*

Comment: The following comments express concern regarding the level of detail provided in the Draft EIS, such as information and analyses regarding impacts from construction, operation, and decommissioning of the proposed EREF.

[027-05, Sara Cohn] The ICL has reviewed the draft (EIS) for the Eagle Rock Enrichment facility and is concerned that construction and operation of the facility will pollute Idaho's natural resources and compromise public health. The EIS does not provide the level of detail that would allow ICL to assess environmental and public health impacts associated with the proposed project. Additionally, under Section 102 of the National Environmental Policy Act, federal agencies are directed to prepare detailed statements assessing the environmental impact of and alternatives to major federal actions significantly affecting the environment. Section 102 also requires federal agencies to lend appropriate support to initiatives and programs designed to anticipate and prevent a decline in the quality of the public health and the environment. ICL believes the draft EIS does not accomplish either of these requirements. More detailed analysis must be provided in the final EIS and the not yet released Safety Report to allow the public and interested parties the opportunity to evaluate the project and to ensure that no adverse impacts occur that pollute Idaho's clean water and clean air, or endanger public health.

[105-06, Eve McConaughey] My most serious concerns were around the EIS and why no details were given for impacts of construction, operation, or decommissioning of the proposed EREF.

[120-01, Frank Nicholson] Very superficial – Did not address critical issues. As with city councils, your minds have already been made up.

Response: *Section 4.2 of the EIS presents detailed information and analyses regarding the impacts on human health and the environment from construction, operation, and decommissioning of the proposed EREF project. Chapter 2* describes and compares the proposed action and alternatives to the proposed action. *The NRC staff believes that sufficient attention has been given to the level of detail of the information and analyses to ensure that the NRC's obligations under NEPA and the NRC's NEPA-implementing regulations under 10 CFR Part 51 have been met.*

Comment: The following comments indicate that the NRC needs improvement on its implementation of public outreach.

[059-01, Lance Giles] No ads regarding meeting. Just articles or opinion pieces in local paper. Information about meeting difficult to find. No actual EIS comment form.

[105-01, Eve McConaughey] I was not satisfied that the public received correct or true information or that the public had full opportunity to express their concerns because of the timing of the hearing and lack of information as presented by the officials. Presentation of the

EIS was very inadequate. It was completed only last month (July 2010). There was little opportunity given for questioning prior to testimony.… Also there was too much early time in the hearing allotted to elected and other officials out of the Boise area.

[131-07, Morty Prisament] Also of note that NRC outreach has been "lackluster" at best.

[147-04, Joey Schueler] I am in opposition to the Eagle Rock Uranium enrichment plant being put in Idaho Falls, Idaho! Although I understand the positive incentive arguments for the proposed plant, the arguments against the plant far outweigh the rather short term positive benefits. I think careful consideration should be given to each of the fifteen points I listed below when deciding whether to take this action. I also doubt many Idahoans know about this action and should be brought to a larger table of discussion.

Response: *Public participation is an essential part of the NRC's environmental review process under NEPA. Section I.2 of this appendix discusses the process for public participation during the NRC staff's development of the EIS for the proposed EREF. As indicated in Section I.2, the NRC conducted an open, public EIS development process consistent with NEPA and the NRC's NEPA implementing regulations under 10 CFR Part 51.*

Written comments on the Draft EIS could be submitted in many forms, including postal mail, emails, and uploads to the Federal rulemaking website, as well as written comments provided to the NRC staff at the two public comment meetings. No EIS comment form was needed, although the NRC staff did provide NRC Public Meeting Feedback forms at the public meetings, which could be used, and were used by many of the meeting participants, to provide written comments.

The NRC staff provided accurate information to the public at the two public meetings. This information was commensurate with the time available for the NRC's presentation and the need to present information that could be understood by all meeting attendees. All members of the public and government officials who registered to speak at the meetings were given an equal opportunity to speak. Due to the very large numbers of registered speakers at the two meetings, most of the meeting time was allotted to receiving public comments. Question and answer sessions were also limited by the large number of meeting attendees and speakers, but NRC staff were available prior to and after the meetings to discuss the Draft EIS with, and respond to questions from, members of the public.

Comment: The following comments relate to attendance and speakers/commenters at the NRC public comment meetings for the Draft EIS.

[068-06, Anne Hausrath] I very much appreciate having a public meeting in Boise. This proposed project would have a profound impact on Boise and all of Idaho.

I am concerned that it appears people from Idaho Falls who testified in Boise might be given time in Idaho Falls as well at that public meeting. If that was the case I do not appreciate them being given preference and allowed to testify first in Boise.

One opportunity to testify is great – thank you!

[083-01, Diane Jones] If I might, I'd like, respectfully, to make a comment on procedure. I'd just like to say, if you're going to have a hearing in Idaho Falls and a hearing in Boise, I think it's appropriate for people from Idaho Falls to testify there and not be able to testify twice in both hearings. There's a lot of us from Boise who really appreciate being able to testify but, you know, they have their hearing. There's one here for us.

[098-06, Linda Martin; 098-15, Linda Martin] Stakeholders that reside in the immediate vicinity of the facility are the appropriate people to comment on these reviews. As residents, voters, and taxpayers, we locally represent the immediate concerns for impacts to our community.

[178-01, Randy Trane] Thank you for the opportunity to comment on the proposed Areva project in the Idaho Falls, Idaho area. I hope common sense will prevail with this decision. It seems as though the minority in this country rules the masses. The Snake River Alliance and similar type people and groups have one objective in mind. That is to slow or stop progress at any costs. Of course they are against any drilling of gas, oil or coal and they are against nuclear power. I suppose they feel like solar and wind will take care of the world…. Please do not allow this small minority group to override the wishes of this area and with needed nuclear power worldwide.

Response: *Public meetings held by the NRC, such as the two public comment meetings the NRC staff held on the Draft EIS for the proposed EREF project, are open to all members of the public, and all persons who register to speak at such meetings are given an equal opportunity to speak.*

Comment: The following comments caution the NRC to provide a careful, thorough, and credible analysis in the EIS, and to consider all public comments provided.

[067-04, Mike Hart] I would urge the NRC to review their testimony for the legitimate concerns, but also pay attention to the procedural trip wires, because an EIS is an important legal document. It has to be done well, otherwise the proposal gets caught up in court. So, please do your job, listen, and pay attention to the procedural trip wires.…

I think the NRC has done a good job with the EIS, but I think they also need to make sure it's procedurally tight, so we don't spend a lot of time in court, so that this EIS moves through quickly, but that means they have to do a thorough and excellent job, and I would encourage them to review all opposition comments, adhere to the letter of the law, follow the procedure, and give us an EIS that we can proceed forward with the license.

[077-01, Larry Hyatt] I'd like to speak briefly to the issue of credibility and accuracy of information. I've observed, personally, for over years, basically the life of the Snake River Alliance, and have been a member of that group for many years, that time and time again, when they have taken positions based on concerns, research, and positions of information to implement, and suggestions and requests, that over and over and over again, they have been correct. And that says a heart full of information for me. Therefore, I sincerely request that you evaluate, to the deepest level you possibly can, all of the accurate, sincere information, that our Snake River Alliance has compiled and presents to you.

[098-07, Linda Martin] We appreciate the time and expertise, and patience, at this point, the NRC has devoted to the licensing and permitting process. We hope that your studies and deliberations will continue to rely on scientific fact, and technology for a timely and positive outcome for our community and Idaho.

[145-02, Ann Rydalch] I urge the NRC to continue to listen to scientific facts, and to disregard untruthful or scare tactic statements, statements such as DOE is giving $2 billion loan guarantee, a misleading statement, because no money exchanges hands. DOE is not giving AREVA the 2 billion dollars. However, by it being included in the Loan Guarantee Program, AREVA and other companies in that program will be able to possibly receive lower interest rates. It's like the Good Housekeeping Seal of Approval. Or another scare statement that building this will cause further degradation of the habitat for sage grouse. The truth is, the NRC preliminary conclusion, as described in Chapter Four, which I have read, the environmental impacts of preconstruction and the proposed actions would mostly be small.

[159-02, Robert Skinner] My caution to the NRC is to take all comments and evaluate them based on their technical merit.

[177-02, Hon. T.J. Thomson] Also, please adequately plan, at the front-end, for any environmental impacts and long-term effects to the area and dedicate the time necessary to realistically prepare for any unforeseen consequences, both financial and otherwise.

Response: *As stated in Section 1.1 of the EIS, the NRC has specifically formulated regulations under 10 CFR Part 51 to implement the requirements of NEPA. In preparing this EIS, the NRC staff has followed the requirements to independently evaluate and verify all information used in the EIS. In addition, as demonstrated in Section I.5 of this appendix, the NRC staff has reviewed and considered all comments provided on the Draft EIS in preparing the Final EIS.*

Comment: The following comments express appreciation for, and approval of, the NRC's efforts with regard to the Draft EIS and licensing process for the proposed EREF.

[034-05, Greg Crockett] As citizens of the communities closest to the facility, we feel there are certain potential environmental impacts that needed to be addressed in the EIS. We want to thank NRC and its staff for the amount of work that went into the research and evaluation of this Draft EIS along with the Safety Analysis Report.

Last June at the EIS scoping meeting held in Idaho Falls, we asked you to consider the following potential impacts. (1) land use, (2) transportation, (3) geology and soils, (4) water issues, (5) ecological issues, (6) air quality, (7) historic and cultural issues, (8) socioeconomic, (9) public and occupational health, (10) noise, and (11) waste management.

We understand and support the NRC's primary role in the protection of public health and safety and as neighbors of the Eagle Rock Enrichment Facility we thank you for your dedication and expertise.

[002-01, Lane Allgood] Last June, at the EIS scoping meeting held in Idaho Falls, we asked you to consider the following impacts. Land use, transportation, geology and soils, water issues, air quality, historic and cultural issues, social, economic, public and occupational health, noise, and waste management. All of those potential impacts were addressed in the EIS and we appreciate that.

As citizens of the communities closest to the facility, these potential impacts are very important to us. We want to thank you for the obvious amount of work that went into the research and evaluation of this draft EIS, along with the safety analysis report, and after reviewing this draft, we understand why the licensing process takes so long.

[024-02, Jana Chalfant; 149-02, Wendi Secrist; 196-02, Linda Martin, on behalf of the Idaho Economic Development Partners] We appreciate the NRCs use of scientific expertise to guide the decisions for issuance of the license and permit for the Eagle Rock Enrichment Facility. We feel that the NRC procedures for the licensing process have been very satisfactory, and thank you for your thoroughness.

[026-04, Rob Chiles] Over the last few years, the business community and members of the Chamber of Commerce have shown support for this important economic development project. We are here again tonight to commend you for a job well done. We are confident in your analysis, and agree with your recommendation to grant AREVA the license.

[033-03, Hon. Mike Crapo; 075-03, Leslie Huddleston, on behalf of Hon. Mike Crapo] The staff of the NRC have consulted with Tribal, federal, state, and local entities. They have considered the comments released in the environmental review received during the public scoping process. They have thoroughly reviewed the report revisions, and supplementary information submitted b AES. I have confidence in the NRC to analyze potential impacts of construction, operation, and decommissioning of this proposed facility.

I strongly support the NRC's preliminary recommendation that AREVA Enrichment Services be issued a license to construct and operate the Eagle Rock Enrichment Facility.

[042-03, John Deal] We commend the process completed thus far and appreciate that the NRC's only role is that of protecting public health and safety.

Hyperion Power, as a member of the Idaho community, and future neighbors of the Eagle Rock Enrichment Facility, thank you for your dedication.

[051-01, Jackie Flowers] I want to thank you, the NRC staff, for your due diligence as you evaluated the AREVA license application for the Eagle Rock Enrichment Facility, and your commitment in safeguarding that process.

This facility is proposed to be located in our collective backyard. Your work has resulted in identifying and evaluating potential environmental impacts that our community is concerned about, important topics like water resources, air quality, waste management that could impact our day-to-day lives, and our quality of life. You have also completed important work related to safety analysis report, another topic of community concern. I appreciate the NRC's commitment to its primary role, protecting public health and safety, as you have contemplated the application before you.

As Idahoans look to welcoming new industry in eastern Idaho, we want to know that we are doing so, while maintaining the clean, safe, and healthy environment we currently enjoy. We look to you, the NRC staff, the experts, to conduct a thorough analysis. You have completed this Draft EIS investigating areas of concern as expressed by the community, and we look forward to welcoming AREVA to eastern Idaho.

[065-01, Hon. Ida Hardcastle] My name is Ida Hardcastle, I currently serve as the President of the Idaho Falls City Council, a position I have held for 17 years. My husband and I came to Idaho Falls 45 years ago for him to accept a position with the nuclear industry as an engineer. Obviously we are very much in favor of this project. In addition we appreciate the efforts of the NRC Staff as you have worked through this licensing applications and the detail to safety for the Eagle Rock Enrichment Facility. Obviously the Draft EIS and the Safety Analysis Report have taken a large amount of time and it appears that you have addressed appropriately the potential impacts identified at the June EIS scoping meeting in Idaho Falls. We thank you for your thoroughness.

[053-01, Hon. Jared Fuhriman] I also want to congratulate, and thank the NRC for a very thorough draft EIS, and safety analysis report. It's obvious that a great deal of work has gone into this production. I understand, acutely understand better, the great work and the effort that it takes, and as mayor, I appreciate the detail in your research, and the potential impacts that it has on this project and our communities.

Please be assured that before we decided to support this project, we did a great deal of research ourselves, to ensure that this type of facility was appropriate for our community.

While I'm not a nuclear expert, many Idaho Falls residents are, and we have the luxury to receive counsel from them when we have questions involving nuclear and environmental issues.

I also agree, recognize the expertise of the NRC team that is working on this licensing application, and I thank you for the time that you've given to us as we've traveled back to Washington, D.C. and have met with you. We truly appreciate that. Your courtesy and frankness has helped our community better understand the licensing process.

[053-04, Hon. Jared Fuhriman] I once again want to go on record one more time stating that I'm personally satisfied with the thoroughness and the efforts that NRC has made to this point in time regarding the EIS, and endorse that AREVA should be licensed to construct the Eagle Rock Enrichment Facility.

[079-03, Kristen Jensen; 179-03, Jolie Turek; 194-02, Linda Martin, on behalf of Eastern Idaho Economic Development Partners] We feel that the NRC procedures for the licensing process have been very satisfactory, and thank you for your thoroughness.

[094-04, Michael Lange] So, AREVA, notwithstanding, I don't know AREVA. I've never worked for AREVA, but I trust the NRC. And being -- during my time in government -- being what most people in Montana would consider me a right-wing Republican, was also the president of a labor union, I can tell you that I have confidence in a few government agencies to regulate properly. One of them is the NRC, so we can be thankful that we have an agency that is that concerned about safety, about mockups, about making sure that it's done right the first time. So, that's real kudos for the Commission. I would extend that to you from personal experience.

[098-07, Linda Martin] We appreciate the time and expertise, and patience, at this point, the NRC has devoted to the licensing and permitting process. We hope that your studies and deliberations will continue to rely on scientific fact, and technology for a timely and positive outcome for our community and Idaho.

[094-01, Michael Lange] I have a unique perspective. In 2002, I was elected to the Montana State legislature. I served there for six consecutive years, before going on to lose the United States Senate race in Montana. And the last four of those years, I served as the House Majority Leader, so I'm well aware of the particulars of a NEPA review. I have thoroughly read this EIS, and it is very professionally written. It is very accurately done. It does, in fact, comply with NEPA requirements, and I commend the NRC for that effort.

[133-09, Richard Provencher] From an operational safety standpoint, the Nuclear Regulatory Commission is involved in reviewing the license application and will ultimately ensure that operations are being conducted safely, that proper safety controls are in place, and that possible safety events have been evaluated with response plans in place. As an independent licensing agent, it is comforting to know the NRC will review this facility as a third party to ensure the protection of the public and environment.

[135-04, Hon. Dave Radford] And we applaud your work, we respect your work, and we hope for a great outcome for an expedited license for AREVA.

[138-01, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] We note with appreciation that the DEIS addresses many of the issues we raised during the project scoping period in June 2009, including analysis of cumulative impacts and climate·change effects. Also, we commend NRC staff for working with a variety of stakeholders and considering public comments in the NEPA analysis for the project. The DEIS document includes a good description of resources within the project area, analysis of anticipated environmental impacts from the project, mitigation measures to offset the impacts, and monitoring programs for potential radiological and non-radiological releases from the facility to the environment and measures to be taken to prevent such releases and ensure protection of environmental resources and human health in case an accidental release occurred.

[143-02, Hon. James Risch; 172-02, Amy Taylor, on behalf of Hon. James Risch] I am confident that the Nuclear Regulatory Commission will address the safety and environmental impacts from this proposed facility.

[176-01, Hon. Jeff Thompson] Thank you all for attending tonight, and for listening to everyone's concerns and questions. It is obvious you have taken time to address many of our concerns in the Safety Analysis Report. We appreciate the commitment to protecting the public's health and safety.

Response: *The NRC acknowledges these comments and appreciates the public participation.*

Comment: The following comments express approval of the Draft EIS and state that the Draft EIS addresses the appropriate concerns.

[011-01, Donald Baxter] I am in complete agreement with the comment previously submitted by another supporter of the Eagle Rock Facility. "I support the NRC assessments regarding the potential impacts named in the draft EIS, and agree with the findings that the impacts are small to moderate. We also find them more than acceptable when viewed in relation to the positive benefits this project will bring, which are not small to moderate, but instead massive and transformative. Finally, we agree with your preliminary conclusions that this project deserves to move forward."

[026-01, Rob Chiles] After careful review with a number of scientific environmental and socio economic experts, we strongly feel that the Draft EIS has covered all of our concerns. We are convinced the NRC has done a thorough job in analyzing all the aspects of this project, and agree the results are complete and accurate.

[034-06, Gregg Crockett] Following review of the Draft EIS, we concur that the following potential impacts were evaluated and scored correctly under the Council on Environmental Quality's significance levels:

- Land Use: Small
- Transportation: Small to Moderate
- Geology and Soils: Small
- Water Resources: Small
- Ecological Issues: Small to Moderate
- Air Quality: Small to Large (We do understand that during construction dust from heavy equipment working on the proposed site will generate dust from land grading operations that would result in a large but temporary condition. We live in eastern Idaho with its wind and agricultural activity. We don't believe dust will be a significant problem.)
- Historic and Cultural Issues: Small to Moderate
- Public and Occupational Health: Small
- Noise: Small
- Waste Management: Small

…In closing we agree with the NRC staff recommendation that due to insignificant environment impacts of the EREF, AREVA should be issued a license to construct and operate the facility

[042-02, John Deal] After reviewing the Draft EIS scoping on community impact we concur that the impacts were scored correctly and reflect a conservative and measured approach to the study.

[051-03, Jackie Flowers] I support the NRC staff recommendation that due to small environmental impacts from the Eagle Rock Enrichment Facility, AREVA should be issued a license to construct and operate the facility.

[060-01, Ericka Gianotto] Now with the release of the Environmental Impact Statement for the public comment, our concerns about the impact on the surrounding area and whether this facility would affect the pristine condition of Idaho's countryside, have been allayed.

While we know the facility will affect the surrounding area, we believe these impacts will be small and have been or will be mitigated.

[065-01 and 065-02, Hon. Ida Hardcastle] My name is Ida Hardcastle, I currently serve as the President of the Idaho Falls City Council, a position I have held for 17 years. My husband and I came to Idaho Falls 45 years ago for him to accept a position with the nuclear industry as an engineer. Obviously we are very much in favor of this project. In addition we appreciate the efforts of the NRC Staff as you have worked through this licensing applications and the detail to safety for the Eagle Rock Enrichment Facility. Obviously the Draft EIS and the Safety Analysis Report have taken a large amount of time and it appears that you have addressed appropriately the potential impacts identified at the June EIS scoping meeting in Idaho Falls. We thank you for your thoroughness.

I spend a large amount of time in the city among the residents and it is exciting to feel the enthusiasm most have for this project coming to Idaho Falls. Of course the main interest is the economic impact it will have on the area, in other words - jobs. Also the community supports the fact that there will be a very small environmental impact from this facility. We thank the NRC again for their efforts in this particular concern. We have a top notch workforce here which was recognized by AREVA in the beginning. The community as a whole supports energy being produced by nuclear power. We simply have to address our independence on foreign oil.

[067-05, Mike Hart] One of the concerns was that there's project clearing going on before the impact statement is done. NEPA requires you're not supposed to have an irrevocable commitment of resources. I don't believe the site clearing counts as that, so as a result, I think the project can continue forward without violating that NEPA precept.

[069-01, Scott Hawk] I support the NRC assessments regarding the hazards and potential impacts addressed in the draft EIS I agree with the findings that the impacts are acceptable to manage safely. I look forward to the massive and transformative positive benefits this project will bring to Eastern Idaho. Finally, I agree with your preliminary conclusions that this project deserves to move forward

[073-01, Mark Holzmer] I wholeheartedly support the NRC assessments regarding the potential impacts named in the draft EIS. You concluded that the environmental impacts are small to moderate, and I personally believe that your conclusions easily bound the environmental impacts and may indeed be much lower. These impact findings are more than acceptable, especially considering the positive benefits this project will bring to southeast Idaho.

Finally, I agree with your preliminary conclusions that this project deserves to move forward.

[076-01, Martin Huebner] I want to address my personal and informed opinion on the adequacy of the Draft Environmental Statement for AREVA's proposed Eagle Rock facility. I reviewed the EIS, and I find no errors or omissions in it. It is a well-crafted and complete document, which should be accepted and approved, as is. The impact statement has been criticized unnecessarily and repeatedly by the Snake River Alliance, who I have been dealing with since it was founded years ago.

[079-02, Kristen Jensen; 179-02, Jolie Turek; 194-02, Linda Martin, on behalf of Eastern Idaho Economic Development Partners] We feel confident that the NRC and AREVA have addressed all necessary safety and environmental concerns in the draft EIS. We urge the NRC to stay on scope and utilize scientific expertise to guide their decisions for issuance of the license and permit for the EREF plant.

[228-07, Jim Kay] Our comments on the DEIS are only editorial. As we have indicated previously, we believe the DEIS was well prepared and adequately supports the proposed action to issue a license.

[102-03, R.D. Maynard] I applaud the NRC on your very thorough work on this licensing application and appreciate the detail of research that went into the EIS.

I would suggest that anyone with concerns about environmental issues associated with this project spend some time reading the environmental impacts, mitigation, environmental measures, and monitoring programs, and summary of environmental consequences section of the EIS.

I strongly support this as a citizen of the State of Idaho.

[124-01, Lane Packwood] We've also reviewed the EIS, and from a technical point of view, we find it is adequate, and we encourage you to proceed to the next step, licensing.

[130-01, Park and Sharon Price] We support the NRC assessments regarding the potential impacts named in the draft EIS and agree with the findings that the impacts are small to moderate. The need for an enrichment facility as proposed by AREVA is long overdue. The importance of increasing the production of power by nuclear generation is vital to the United States.

[135-04, Hon. Dave Radford] We, as the commission, agree with the Environmental Impact Statement's conclusion.

[142-01, Blake Rindlisbacher, on behalf of the Idaho Transportation Department] Thank you for your early and close consultation with the Idaho Transportation Department in the development of this environmental impact statement. We believe the statement as expressed in this draft is accurate with regards to our state highway system and the impacts this project will have on it. The mitigation you cite for those impacts are indeed appropriate and we encourage the NRC to make ride sharing and shifts staggered from those of the Idaho National Laboratory a part of the operating license for AREVA Enrichment Services. We will continue to discuss with them the terms and conditions of their access to US-20, but specific operation behavior that may reduce risk is beyond our authority to require.

[145-01, Ann Rydalch] We thank the NRC for the staff's preliminary conclusion that the Eagle Rock Enrichment Facility would have mostly small impacts on the local environment and that AREVA should be issued a license to construct and operate the facility. I encourage you to follow the preliminary recommendation that AREVA be issued a license to construct and operate the Eagle Rock Enrichment Facility here in Bonneville County, Idaho Falls, Idaho, formerly called Eagle Rock, Idaho.

[151-02, Beth Sellers] The draft EIS covered a wide range of impacts. They are the standard impacts that are seen with any major construction activity. The areas of most concern to me include water resources, ecological and cultural resources, waste management, and the transportation impacts to those of us in Idaho Falls. The NRC analysis was comprehensive and the impacts were noted to be small in the majority of the impacts analyzed. For those environmental impacts noted to be in the moderate to large range, the mitigations detailed by the applicant were deemed acceptable.

I support the NRC staff recommendation that due to small environmental impacts from the Eagle Rock Enrichment Facility, Areva should be issued a license to construct and operate the facility.

[152-02, Steven Serr] I've had an opportunity to read your draft EIS. I agree with most of the issues that you've stated in there as far as compliance, with what we feel are important within the jurisdictions for enforcement.

[157-05, Hon. Erik Simpson] In conclusion, I want to state that I strongly support the AREVA project, and feel the draft EIS is very adequate and considers the environmental factors associated with the facility. I believe AREVA will be a positive addition to the State of Idaho, and an integral part of our nation's development of energy independence.

[159-01, Robert Skinner] I have carefully read the Draft EIS, all of it I have not read totally, because it is huge. You're going to put the guys that sell sleeping pills out of business, I'm sure, but I would like to commend the crafters of this document for their hard work and diligence. I find it to be thorough, and lacking in no respect technically. I am here to address the technical aspects of the EIS.…

I believe AREVA should be issued a license to construct and operate the Eagle Rock Enrichment Facility at the earliest opportunity.

[163-03, Smith-Putnam, Cindy] As your EIS shows, and like in all human endeavors, the project is not wholly devoid of impact. The air quality issue is an impact; yet, we are mindful that land and dust issues are a normal part of any major construction, and will be temporary and brief in duration. Risks and impacts are an inherent part of life on this planet. They cannot be avoided, but they can be anticipated, and evaluated, weighed and measured in comparison to their relative reward and benefits.

What is important to maintain, as Rocky said, is a sense of perspective when evaluating those risks and impacts. And that is what the opponents of this license approval fail to do when they engage in hyperbole and misdirection bringing more heat to the subject than light….

We support the Preliminary NRC assessments regarding the potential impacts named in the Draft EIS, and we agree with the findings that the impacts are small to moderate. We also find them more than acceptable when viewed in relation to the positive benefits this project will bring, which are neither small nor moderate, but, instead massive, and transformative.

Finally, we agree with your preliminary conclusions that this project deserves to move forward. We hope you will continue to rely on scientific fact in making these decisions, and not be swayed by emotion or opinion, and we urge you to grant the license for the AREVA project in a timely manner. Thank you for considering our perspective.

Response: *The NRC acknowledges these comments and appreciates the public participation.*

I.5.4 Purpose and Need

Comment: The following comment questions the need for the proposed EREF with regard to U.S. national energy security.

[015-09, Beatrice Brailsford] The basis for and discussion of the second "need" - domestic supplies of enriched uranium for national energy security - is beyond puzzling. Setting aside the fact that the enriched uranium market is an international market, the key word in the current rationale is "domestic." The "national energy security policy objective" Areva's plant is supposed to meet was enunciated in a letter from Assistant Secretary William Magwood at the Department of Energy (DOE) to the Nuclear Regulatory Commission eight years ago. The focus of the letter was not that the US needed a foreign company to build a plant here, but rather that an American company should have a stake in US enrichment capacity. The US Enrichment Corporation has been granted a license - though not a federal loan guarantee - to build a plant, which would seem to more directly meet the policy objective enunciated in the letter. If the NRC is pointing to a "policy objective," that objective must have been articulated more recently and with a "higher profile" than a single letter from an Assistant Secretary provides.

Response: *While the enriched uranium market may be an international one, the addition of domestic uranium enrichment capacity, as would be provided by the proposed EREF, would help fulfill the need for U.S. domestic energy security, as discussed in Section 1.3 of the EIS. As discussed in Section 1.6 of the EIS, AES is a Delaware limited liability corporation that was formed solely to provide uranium enrichment services for commercial nuclear power plants. As discussed in Section 1.3.2 of the EIS, one of the needs for the proposed EREF is increased domestic uranium enrichment for enhanced energy security. The DOE letter (DOE, 2002) referenced in the comment is one reflection of that need, and it also references the concurrence of the U.S. Department of State on the matter.*

Comment: The following comment questions the adequacy of the economic justification for the proposed EREF.

[068-04, Anne Hausrath] My husband and I raised our children in Idaho. We are very much concerned about the current economic climate for their generation, and we believe there's a responsibility of all of us to provide for that. I don't believe that this plant is adequate -- that the economic is adequate justification for that.

Response: *As discussed in Section 1.3 of the EIS, the need for domestic enriched uranium services is one of the reasons why the proposed EREF is needed. The potential beneficial economic impacts are just one of the outcomes that result from the range of analyses over multiple resource areas considered in the EIS.*

Comment: The following comment questions the credibility of statements in the Draft EIS that the proposed EREF will aid the United States in achieving energy independence and/or more national security.

[147-17, Joey Schueler] 13. The notion that this plant will aid the United States in achieving energy independence and/or more national security is a myth. The United States does not control all steps in the Nuclear Power generation process. As a result, every other step that we can produce is dependent upon other nations and what they can contribute. Removing one step in the process would curtail or stop our nuclear energy system.

Response: *The addition of domestic uranium enrichment capacity, as would be provided by the proposed EREF, would help fulfill the need for U.S. domestic energy independence and security, as discussed in Section 1.3 of the EIS. As noted in the comment, other steps are required so as not to curtail or halt nuclear energy in the United States, but those aspects are outside the scope of this EIS because they do not relate to the environmental review of the proposed EREF project.*

Comment: The following comment questions the need for an AES uranium enrichment plant in the U.S. when a similar plant AES is constructing in France could instead be expanded.

[168-07, Lon Stewart] If Areva is currently building a similar plant in France, economy of scale would make more sense to expand that plant rather than building another plant in the western United States.

Response: *As discussed in Section 1.3.1 of the EIS, the proposed action, which is to construct, operate, and decommission a uranium enrichment plant near Idaho Falls in Bonneville County, Idaho, is intended to satisfy the need for an additional reliable and economical domestic source of uranium enrichment services. Expanding AES's plant in France would not satisfy that need.*

Comment: The following comment questions the premise in the Draft EIS regarding the need to lessen the U.S. dependence on enriched uranium from foreign sources.

[193-11, Liz Woodruff, on behalf of the Snake River Alliance] And when our country gets crude oil from overseas and refines it here, does that lessen our dependence? So these are questions we need to ask about the premise set up in the EIS.

Response: *The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of uranium enrichment services. While the proposed action would not entirely remove dependence on foreign sources, it would partially address that dependence.*

Comment: The following comments question the premise in the Draft EIS that a reliable source of enriched uranium is needed.

[191-07, Liz Woodruff] The draft EIS fails to establish that the current approach to supplying enriched uranium is unreliable. There is uranium enrichment in the US, enriched uranium has always been an international market, the raw material comes from foreign sources, and this system has adequately provided fuel for US reactors for decades.

[193-10, Liz Woodruff, on behalf of the Snake River Alliance] And I'd just like to pause here, to check in on this theory of theirs, that there is this need for reliability. Have we ever shut down a reactor because the fuel source was unreliable, in this country? It seems like it's been working pretty well so far.

Response: *The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of uranium enrichment services to help ensure that no U.S. reactors would have to be shut down in time of crisis because of lack of fuel. Past experience may not be predictive of whether such a crisis will occur in the future. The current domestic enrichment services are not sufficient to support U.S. demand if needed. As discussed in Section 1.3.1 of the EIS, the current capacity falls short and is heavily dependent on the aging Paducah Gaseous Diffusion Plant, which is not economical and expected to cease operations in the near future due to the high cost of maintenance.*

Comment: The following comments suggest that demand in the U.S. for enriched uranium will go down as the currently operating reactors are decommissioned.

[181-10, Roger Turner] 1. The purpose and need analyses needs up-dated in EIS. The following conditions, in combination, eliminate the need for this project: (a) recent finds of large amounts of natural gas in the U.S. is reducing interest in nuclear power and rendering nuclear power uneconomical in comparison; (b) the cost of solar and wind power are coming down resulting in a larger role for these power sources and; (c) with the reduction of nuclear power plants in the U.S. domestic uranium enrichment plants will be able to supply the nuclear power industry with ample supplies of U-235, without the need for this proposed, expensive, AREVA plant. The aforementioned points are detailed below:

(A) Recent finds of large amounts of natural gas fields in the U.S. reducing the interest and momentum by power companies in developing nuclear power. New finds of domestic natural gas has resulted in a switch in interest from coal and nuclear to gas for power supplies. A recent MIT study, that is more up-to-date than the study referenced in the draft EIS, reveals a likely economically realistic switch to natural gas for the United States power supplies. This study, by a group of 30 MIT faculty members, researchers and graduate students reflects the more accurate conditions for power plant construction in the United States for the next 40 years. The study shows a baseline global estimate of recoverable gas resources reaching some 16,200 trillion cubic feet (Tcf), enough to last over 160 years at current global consumption rates. (The Future of Natural Gas -- Study finds significant potential to displace coal, reducing greenhouse gas emissions, MIT, June 2010) In addition the study reports the following trend:

"Natural-gas consumption will increase dramatically and will largely displace coal in the power generation sector by 2050 (the time horizon of the study) under a modeling scenario where, through carbon emissions pricing, industrialized nations reduce CO_2 emissions by 50 percent by 2050, and large emerging economies, e.g. China, India and Brazil reduce CO_2 emissions by 50 percent by 2070. This assumes incremental reductions in the current price structures of the alternatives, including renewables, nuclear and carbon capture and sequestration."

According to U.S. Energy Information Administration Annual Energy Outlook 2010, domestic and Canadian gas supply will increase, at least to 2035.

Shale gas provides largest source of growth in U.S. natural gas supply

The increase in U.S. natural gas production from 2008 to 2035 in the AEO-2010 Reference case results primarily from continued growth in production of shale gas, recent discoveries in deep waters offshore, and, to a lesser extent, stranded natural gas brought to market after construction of the Alaska natural gas pipeline is completed in 2023. Shale gas and coalbed methane make up 34 percent of total U.S. production in 2035, doubling their 17-percent share in 2008. Shale gas is the largest contributor to the growth in production, while production from coalbed methane deposits remains relatively stable from 2008 to 2035.

(B) The cost of solar power is lower than nuclear power, resulting in a larger role for these power sources. The New York Times reports the following article:

Solar power costs have been declining, the costs of nuclear power have been rising inexorably over the past eight years, said Mark Cooper, senior fellow for economic analysis at Vermont Law School's Institute for Energy and Environment. Estimates of construction costs — about $3 billion per reactor in 2002 — have been regularly revised upward to an average of about $10 billion per reactor, and the estimates are likely to keep rising, said Mr. Cooper, an analyst specializing in tracking nuclear power costs. (New York Times; Special Report: Energy and Environment, Nuclear Energy Loses Cost Advantage, July 26, 2010)

(C) Switch to other power sources means no need for Areva. Given the above two examples of a switch to other power sources than nuclear, the existing plans for enrichment will be adequate to supply the U.S. nuclear industry. The Les Urenco company has plans to produce up to 6 million SWU; while the USEC produces 10.5 Million SWUs.

Also, in 2008, an amended agreement allows Russia to export increasing amounts LEU available to nuclear power companies to the United States, starting with 442,000 pounds in 2011 and up to 13.7 Million pounds in 2020.

While it is true that some nuclear plants may expand their existing power plant, such as Watts Bar 2 (TVA), there will be nowhere near the number of new units predicted by the NRC's Energy Assessment Administration Report (EIA 2009a) and nowhere near the need for SWUs referenced in the draft EIS for AREVA; and because of many nuclear plants are decommissioning -- there will be less and less need for enriched uranium. Many of the firms that initially consider nuclear construction are bound by State requirements that they be 'prudent investors'. Therefore, many initial applicants to NRC are dropping out completely, or keeping them on hold.

Consequently, the EIS should carefully review current studies and assessments that show a general swing to natural gas, solar and wind. Unfortunately the NRC fails to take a hard look at this purported need. A nuclear power plant hasn't been built in the United States in two decades. The EIS needs to provide economic comparisons of nuclear vs. Solar and Natural Gas. More and more companies are dropping their nuclear power applications to NRC, and therefore the need for this plant is not justified, given the existing and soon to open facilities in the U.S. to provide sources of enriched uranium.

[187-06, John Weber] I recommend the "no action alternative" for the following reasons. With many of the current US reactors nearing the end of the design life expectancy and very few, if any, new reactors likely to be build due to economics, a case has not been made for a need for this plant.

Response: *As discussed in Sections 1.3.1 and 1.3.2 of the EIS, the need for the proposed EREF is based on both the projected increase in the number of U.S. commercial nuclear reactors and the current inadequate capacity for domestic enriched uranium production. Section 1.3.1 has been revised to note that most current U.S. reactors that have come, or are coming, to the end of their original 40-year license are undergoing a license renewal process for an additional 20 years of operation. Therefore, as discussed in Section 1.3.1, a net increase in U.S. reactors is expected, and the proposed EREF would help supply the additional enriched uranium required for their operation, as well as ensure that U.S. capacity for enriched uranium production would remain commensurate with U.S. demand.*

Comment: The following comments suggest that the correlation between future energy demand and the corresponding future demand for low enriched uranium is speculative.

[113-01, Ken Miller] The Draft EIS in Section 1.3.1 suggests that "as future demand for electricity increases, the need for low enriched uranium to fuel nuclear power plants is also expected to increase," and they're citing the Energy Information Administration's Annual Energy Outlook in 2009. In fact, the correlation between future energy demand and the corresponding future demand for low enriched uranium today is speculative, at best.

[113-07, Ken Miller] The Draft EIS in Section 1.3.1 suggests that, "As future demand for electricity increases, the need for Low Enriched Uranium to fuel nuclear power plants is also expected to increase." In fact, any correlation between future electricity demand and a corresponding future demand for Low Enriched Uranium is speculative at best. The Department of Energy does not put the nation's future electricity eggs in the nuclear basket. Far from it: It envisions a much more diverse energy portfolio that is more reliant than ever on energy efficiency and conservation and other truly renewable baseload energy resources.

Response: *The quote in these comments from Section 1.3.1 of the Draft EIS does not include the reference, immediately following the quote in the EIS text, that was given to U.S. Department of Energy's (DOE) Energy Information Administration's (EIA) "Annual Energy Outlook 2009 With Projections to 2030." In that reference, the EIA of the U.S. Department of Energy (DOE) estimates the increasing need for nuclear power (and therefore, enriched uranium) based on an increasing need for electricity, taking into account increases from other sources of electric power and conservation measures.*

Comment: The following comments note that the proposed EREF would use a more economical and environmentally friendly uranium enrichment process.

[098-11, Linda Martin] The company's use of centrifuge technology is a proven, safe method of enriching uranium. This technology is more energy efficient, more environmentally friendly and less expensive to operate than the other accepted uranium enrichment process called gaseous diffusion.

[143-03, Hon. James Risch; 172-03, Amy Taylor, on behalf of Hon. James Risch] …I also note the centrifuge technology is proven, reliable, and efficient. The process will use 50 times less electricity than a gaseous diffusion plant, and the amount of water used by the plant is less than the current irrigation appropriation.

Response: *As stated in Section 1.3.1 of the EIS, the proposed action is intended to satisfy the need for an additional economical domestic source of enriched uranium.*

Comment: The following comments support the national security goal of sufficient domestic enrichment capability.

[034-02, Greg Crockett] It is time for the U.S. to change directions in the interest of our energy future and our national interest. It is time for the United States to reassume a leadership role worldwide in nuclear energy. Our national security interests require that we have enrichment and fuel development capabilities within our borders. I support the Draft Environmental Impact Statement, which likewise recognizes those demands.

[051-02, Jackie Flowers] Something else this community is concerned about and cares about is energy. As this country grapples with visions for a sustainable energy future, and energy independence, we have to take action and stop the rhetoric. Nuclear energy provides 20 percent of the nation's electricity. We've already heard that tonight. Importantly, we've also heard it provides more than 69 percent of emission-free electricity that keep the lights on in this country. Let me stress, base load emission-free energy. With less than 15 percent of the nuclear fuel supply necessary for the existing nuclear energy fleet coming from a single source inside this country's border, we have an energy security problem that I believe rallies that of our dependence on foreign oil. And this is an important step towards building that independence.

Nuclear energy is ready now to be a central part of a balanced common-sense approach to clean energy diversity. I agree with the NRC staff's statement that this facility will contribute to the attainment of national energy security policy objectives by providing an additional reliable and economical domestic source of fuel for these important nuclear energy facilities.

[123-04, Hon. Butch Otter; 090-04, Paul Kjellander, on behalf of Hon. Butch Otter; 195-04, Hon. Jeff Thompson, on behalf of Hon. Butch Otter] Third, Eagle Rock will help rebuild the nation's nuclear infrastructure, and enhance energy security for all those who depend on nuclear power for their health and welfare right here from Idaho

[128-09, Bob Poyser] AREVA is really excited to be a part of Idaho's business community, and we look forward to continuing our work with the state, and the people of Southeastern Idaho. We plan to build and operate a safe environmentally sustainable world class facility that is important to America's energy security, important to our American utility customers, and important to the advancement of Idaho's continued leadership in nuclear programs. Thank you very much.

[133-01, Richard Provencher] I fully support the NRC's proposed preferred alternative to build a uranium enrichment plant west of Idaho Falls, Idaho. The facility being pursued by AREVA will provide an additional reliable and economical domestic source of low enriched uranium to be used in commercial nuclear power plants. Having more capability for enrichment in this country helps reduce the risk related to importation of this type of material from foreign sources. The AREVA facilities planned capacity can provide 40% of the current and planned demand for enriched uranium. AREVA's business plan fits well within the country's plan to reduce dependency on foreign oil, improve the climate, and make nuclear energy a larger contributor to the domestic energy supply. This creates a clear mandate for the capability which is critically important to beginning the review of environmental impacts related to its operation.

[158-02, Hon. Mike Simpson; 139-02, John Revier, on behalf of Hon. Mike Simpson] It is more important than ever, that our nation take the steps needed to end our dependence on foreign sources of energy and become energy independent. Currently, the United States imports nearly 90 percent of the uranium enrichment services it uses. The Eagle Rock facility will provide a stable domestic supply of enriched uranium for existing and planned commercial nuclear reactors, and it will serve an important part of an overall domestic energy strategy.

[163-02, Cindy Smith-Putnam] The bigger picture is this project's significance to our regional and national energy future, and it is the national energy future that fundamentally and absolutely requires a significant reset from the status quo.

Currently, under the E in Energy, Grow Idaho Falls has taken an active role in supporting the development and expansion of green renewable sources of energy. We can, we should, we have, and we will continue to support the diversification of the energy portfolio of our region and nation, to include harnessing the power of wind, water, heat, and light, to reduce the harmful effects to the environment of carbon emitting sources, and to promote our national security by becoming less reliant on foreign oil.

Increasing renewables, promoting conservation, decreasing use of fossil fuels, all very important, we can, and we should do all of those things. And, yet, even taken together, none of that is enough, not nearly enough to meet our growing energy demands. Nuclear energy stands alone as the best way to produce the energy we need, while at the same time minimizing harmful environmental and geopolitical consequences. It gives us the opportunity to turn away from the practices of the past toward a more stable and sustainable energy future.

Therefore, just as we need to be independent of unstable and unpredictable sources of oil, we also need to be independent of unstable and unpredictable sources of enriched uranium. Simply put, the Eagle Rock Enrichment Facility beautifully addresses that need.

[171-03, John Tanner] It is a fact that we import well more than half of the enriched uranium that we presently need, not that some future reactors might need, but that we presently need.

Furthermore, we would like to shut down the one remaining gas diffusion enrichment plant in Paducah, Kentucky, because the gaseous diffusion is so much more inefficient than gas centrifuge technology. In fact, I think they use about 10 times as much electricity for a given amount of separation as a gas centrifuge plant does.

Now, okay, we could import enriched uranium, but then not only the profits go abroad, but the jobs, as well. I don't think that's what we want to do.

[173-01, David Taylor] …I am strongly in favor of the construction and maintenance of the Areva complex and hope the rest of the DOE INL site can be used for productive nuclear research and generating capacity.…

We cannot supplant the energy from fossil fuels to the electric grid without vast improvements to the grid itself and to generating capacity. Nuclear is the only viable alternative and the only one that is "eco friendly" to the environment. Fear mongers and professional detractors "Snake River Alliance" use disgraceful tactics and words in attempting to keep their little source of revenue alive.

We possess the technology (Gen IV reactors) and now need the common sense to use these resources to help sustain a vibrant economy and standard of living that we have all come to expect. The next generation will not have these opportunities if we squander and make feeble attempts to make nuclear energy production a reality now.

I support Areva and the ideas that surround using nuclear technology as a great national effort. It must be for national security and for economic security. We must have a federal government that will establish certain protocols and reactor templates that if complied with will move to a fast track for licensing and construction. From there the government must run interference against all the special interest that come to bear only for the reason of capital extraction. Thanks for allowing us to be part of this potentially wonderful venture that will not only bless the lives of those who live and work here but for the whole nation.

Response: *As stated in Section 1.3.1 of the EIS, the proposed action is intended to satisfy the need for an additional economical domestic source of enriched uranium.*

Comment: The following comments suggest that the proposed EREF is needed to address the potential short-fall in enriched uranium supply with a safe, proven, and efficient uranium enrichment process.

[033-01, Hon. Mike Crapo; 075-01, Leslie Huddleston, on behalf of Hon. Mike Crapo] Now, more than ever, it is critical to develop secure, economically feasible, and clean supplies of domestic energy. EREF will supply America's existing operation fleet of nuclear power reactors, and further augment the anticipated growth of new commercial nuclear power generation here in the U.S.

[034-03, Greg Crockett] Demand for nuclear fuel is, and will dramatically increase in the future, and I think that's demonstrated by the number of pending NRC license applications. To suggest that the Eagle Rock Enrichment Facility's production is not or will not be necessary is pure folly. To meet our current demand for enriched uranium, much of it is imported, and we need robust domestic suppliers who can provide this service in an environmentally compatible manner.

[067-06, Mike Hart] Also, they took exception with the cause and need for action. I think there's most definitely a need for this, because there's a need for carbon-free energy. Throughout the world, I think we've seen that global warming is a significant problem that we need to be paying attention to, and there's also a demand for growth in nuclear energy. There's a couple of facts I want to point out why we need nuclear energy, why we need this particular enrichment plant.

Carbon dioxide reflects, or absorbs, infrared energy that does not go back out to space. It makes the planet warmer. That's simply a fact. Carbon dioxide is a greenhouse gas. Levels of carbon dioxide have gone from 288 parts per million in 1850 to 369 parts per million in the year 2000. It doesn't matter where it comes from. That is a greenhouse gas that is increasing in concentration. But I'll give you a hint as to where it's coming from: fossil energy. In 1990s, we annually contribute 6.3 gigatons of carbon dioxide into the atmosphere through fossil combustion. That's annual, 6.3 gigatons. The concern about 300,000 metric tons, 300,000 tons of total waste versus 6.3 gigatons in a single year, I view the problem with carbon as much more significant than the problem with depleted uranium.

So, what is a gigaton? Why is that a concern? Well, 2.3 gigatons is one part per million of carbon dioxide in the atmosphere. So, every year we are steadily increasing carbon dioxide. So, yes, global warming is occurring. Yes, it's our fault. Yes, carbon puts more of that in the atmosphere, and I think nuclear energy is a stopgap that will – is worth pursuing. So, yes, there is a need.

Energy demands are increasing worldwide. Currently, the population of the planet is about 4.5 billion. By 2050, that will double, and people are not less energy consumptive. Populations like China and India used to be in the Third World. They have bought the second world, and they've placed a firm down payment on the first one. So, energy consumption will go up as the population goes up, so even if nuclear energy just holds its own at 15 percent, there will be a need for more nuclear plants, and that means there will be a need for more enriched uranium.

[072-01, Stephen Herring] I'd like to speak in favor of the AREVA license application for the Eagle Rock Enrichment Facility, and particularly on the need for that facility.

This facility would be an important part of the nuclear fuel cycle, and a key step in providing for future electricity. In building this facility, AREVA will replace 60-year old technology for uranium enrichment, that is, the gaseous diffusion process, with the new gas centrifuge technology, which is more proliferation-resistant, cleaner, and a factor of 20 to 50 times more energy efficient.

The 104 reactors in the United States provide, as you've heard earlier this evening, about 20 percent of the total U.S. electricity, and about 70 percent of the carbon-free electricity. However, today the U.S. has only one operating gas centrifuge plant, and the last gaseous diffusion plant is in the process of being decommissioned. The one gas centrifuge plant in New Mexico began operation in June 2010, and will be capable of producing 3 million separative work units per year, which is about 25 percent of the U.S. need for enrichment. So, the U.S. is importing, from one place or another, the enrichment needed for 75 percent of our nuclear electricity.

We have seen the construction of many wind turbines in the hills east of Idaho Falls in the last five years, and throughout the west. I applaud the contribution that these turbines can make, though I have seen very little contribution from Jackson or Sun Valley, but it is important to remember that these turbines, even at the best wind sites, have capacity factors of only 30 to 35 percent. A nuclear reactor's fuel by means of the Eagle Rock Enrichment Facility will provide power with a capacity factor of above 90 percent; that is, they will produce 90 percent of their maximum power for an average, year-round, 24/7. The U.S. needs reliable, sustainable energy for the decades to come, and not just when the winds blow.

[098-04, Linda Martin] As far as technical impacts, the centrifuge technology is proven and safe as based on other facilities across the world, and while there conceivably is a significant gap in the supply-demand equation for enriched uranium to provide our current and future green energy needs, we can address that with the EREF.

[098-13, Linda Martin] Conceivably there is a significant gap in the supply/demand equation for enriched uranium to provide for our current and future green energy needs. The uncertainty of the future supply of energy could evolve into a national security issue. The Eagle Rock Enrichment Facility would be a principal supplier for this valuable and needed material.

[123-02, Hon. Butch Otter; 090-02, Paul Kjellander, on behalf of Hon. Butch Otter; 195-02, Hon. Jeff Thompson, on behalf of Hon. Butch Otter] AREVA is proposing to build a state-of the-art, technologically-proven, modern facility to enrich uranium needed to operate the existing U.S. fleet of 104 power reactors. AREVA's plant will incorporate many unique features which have been developed over three decades of experience with centrifuge enrichment technology. AREVA's vast experience and use of the technology will result in minimizing and, where possible, eliminating any impacts on the surrounding environment and regional communities, but there will remain, however, many significant beneficial impacts.…

Safety, integrity, professionalism, and sustainability are demonstrated attributes that AREVA embraces in all of its projects and operations, and the Governor believes they'll bring no less to Idaho Falls. AREVA has been easy to work with, and they are as excited about coming to Idaho as we are to have them locate their facility here.

As we look across the country today, there are not many, if any, states or regions that can claim proposed major energy construction projects or facilities like the Eagle Rock Enrichment Facility. While large projects are usually accompanied by some environmental impacts, Governor Otter believes the end result of this facility will be very positive for Idaho and the country. Eagle Rock will provide much needed domestic production of enriched uranium for our existing U.S. nuclear power fleet, which will help enable U.S. utilities to move away from importing nearly 90 percent of this important fuel product.

[128-03, Bob Poyser] This is a project that AREVA's American utility customers have embraced, as demonstrated by their willingness to already contract, in advance, for more than half of the production capacity of this facility.

All of the natural uranium that will arrive at the Eagle Rock facility under these contracts belong to American utilities, and is destined for use in American reactors.

I would quickly like to address just a few of key aspects of the EIS, and the Eagle Rock facility.

Let me start by saying that a clear and definite need, today, in the United States, for enrichment services exists. Today, more than half of the enriched material for America's current nuclear plant plants is imported from Russia. Another one third is imported from other nations, and Eagle Rock and Idaho will help significantly reduce America's dependence on these foreign sources of supply.

Nevertheless, when Eagle Rock comes online, America will need to import enrichment services just to fulfill the need for the current existing fleet of 104 reactors.

[130-01, Park and Sharon Price] We support the NRC assessments regarding the potential impacts named in the draft EIS and agree with the findings that the impacts are small to moderate. The need for an enrichment facility as proposed by AREVA is long overdue. The importance of increasing the production of power by nuclear generation is vital to the United States.

[143-01, Hon. James Risch; 172-01, Amy Taylor, on behalf of Hon. James Risch] As a U.S. Senator from Idaho, I have the privilege of serving as the Ranking Member of the Subcommittee on Energy. From that position, I have seen firsthand the efforts this country is making to formulate a forward-looking energy policy. Supporting nuclear power, and its associated technologies, such as enrichment, is one way to make our country more energy secure.

Years of broken energy policy have led us to become dependent on foreign sources of energy. We've also lost our competitive edge in the nuclear field a field where the United States and Idaho once led. This community knows what it takes to regain that competitive edge, and once again place Idaho and this nation at the pinnacle of the nuclear industry.

There is a growing recognition that nuclear power is the most viable option to meet the clean energy demands of the future. Demand for enriched uranium is increasing in the United States and across the world to fuel clean nuclear power. This proposed facility will allow that need to be met from domestic sources, while providing a much needed economic boost to the entire region.

[145-04, Ann Rydalch] As you know, nuclear power currently supplies about 20 percent of the nation's electricity, and surveys show over 70 percent of the public throughout the nation support nuclear energy. We have one company that is currently the sole U.S. supplier of low-enriched uranium for nuclear fuel in the U.S., although there are some being built that may provide enrichment services in the future. However, that still leaves an extremely high percent of low-enriched uranium that is being imported from foreign suppliers, imposing reliability risks for the nuclear fuel supply to U.S. nuclear power plants.

National energy policy emphasizes the importance of having a reliable domestic source of enriched uranium for national energy security. The production of enriched uranium at the Eagle Rock Enrichment Facility would be equivalent to about 40 percent of the current and projected demand for enrichment services within the U.S. Thus, still a high percent of current and projected demand for enrichment services that's left to fulfill.

[157-10, Hon. Erik Simpson] Need for an enrichment facility. At the Boise hearing that I attended on Monday, those opposed to this project said there is no need for additional uranium enrichment. They quoted a so-called expert from the Vermont School of Law who said, "The nuclear renaissance is dying."

Now, at my count, currently there are 468 nuclear power plants planned around the world, including 26, give or take, in the United States. This does not sound like a dying renaissance to me. It is important the United States to continue to be a world leader in nuclear power development and research. The Eagle Rock Enrichment Facility and the Idaho National Laboratory will help continue this nuclear renaissance.

[176-04, Hon. Jeff Thompson] Additionally, the Eagle Rock plant will enrich uranium for use as fuel for the nuclear reactors, which today accounts for 20 percent of U.S. electricity.

Response: *As stated in Section 1.3.1 of the EIS, the proposed action is intended to satisfy the need for an additional economical domestic source of enriched uranium.*

Comment: The following comments question the location of the proposed EREF in Idaho because nuclear power is not needed in Idaho.

[015-13, Beatrice Brailsford] There is, of course, another aspect to "purpose and need," and that's the local rationale: why is this project proposed for this location. Here, too, the draft EIS comes up short. We are told that nuclear reactors that would theoretically be supplied in part by EREF are needed because of our need for non-coal "baseload" or "firm" generation resources. In fact, nuclear power is not being considered at all as a baseload resource here in Idaho. Our region's Sixth Power Plan, developed by the Northwest Power and Conservation Council and vetted by utilities and energy officials in Idaho and throughout our region, projects that we will meet 85 percent of our new electric load growth over the next 20 years through energy efficiency, with the balance coming primarily from renewable generation, mostly from wind. Our region's Power Plan does not anticipate any new large supply-side generation resources, including nuclear.

[025-04, Hon. Sue Chew] And, you know, we've heard that the energy that would be developed through this particular mechanism doesn't benefit our state. I'd like for us to reflect on that.

[032-01, Cindy Cottrell] I am writing about my deep concerns of the proposal to open Areva uranium enrichment plant in Idaho. This would be a big mistake. Of all the States in the United States this should be the last State ever considered to take on such a plant. First of all, Idaho is one of the few States who doesn't need nuclear power. We have all kinds of options for alternative energy. A State like Rhode Island may need to consider such options but Idaho should never be accepting energy that creates waste when there are other options. We have thermal resources to tap, wind power, dams, and some solar. I'm sure more are options too since we live in a large State with a variety of resources.

[113-08, Ken Miller] We are told that nuclear reactors that would theoretically be supplied in part by EREF are needed because of our need for non-coal "baseload" or "firm" generation resources. In fact, nuclear is not being considered at all as a baseload resource - here in Idaho and at regulated electric utilities, at least. Our region's Sixth Power Plan, developed by the highly regarded Northwest Power and Conservation Council and vetted by utilities and energy officials in Idaho and throughout our region, projects that we will meet 85 percent of our new electric load growth over the next 20 years through energy efficiency, with the balance coming primarily from renewable generation, mostly from wind. Our region's Power Plan does not anticipate any new large supply-side generation resources, including nuclear.

Response: *The location of the proposed EREF was not chosen by AES based on the need for nuclear power in Idaho. The determination of the proposed EREF location is based on the criteria identified in Section 2.3.1 of the EIS, which include factors related to geology, hydrology, weather, required resources, available workforce, and local acceptance. The NRC reviewed AES's site selection criteria and selection process as part of its environmental review.*

Comment: The following comments indicate that the justification for domestically enriched uranium is unsupported.

[015-23, Beatrice Brailsford] In conclusion, since the only justification for the facility is an asserted but unsupported need for domestically produced enriched uranium, which the EREF does not in any case provide, a true "no action" alternative - without any preconstruction activities - should be chosen.

[153-14, Andrea Shipley; 161-03, Marisa Smith; 197-16, Andrea Shipley, on behalf of the Snake River Alliance] In conclusion, since the only justification for the facility is an asserted but unsupported need for domestically produced enriched uranium, which the EREF does not in any case provide, a no action alternative should be chosen.

[100-05, Wendy Matson] So therefore, I feel, very strongly, that since the only justification for the facility is an asserted by unsupported need for domestically-produced enriched uranium, which EREF does not, in any case provide. I vote for a no action alternative.

[110-01, John and Susan Medlin] As the Snake River Alliance presentation pointed out, there is no current need for this facility, no compelling evidence that a nuclear renaissance is coming (or inevitable), no rationale for a French company building a nuclear facility in Idaho that purports to promote US energy security while importing inputs and exporting outputs, no provision for the deteriorating and dangerous waste that will haunt us for decades or maybe forever, no concern for yet another threat to the Snake River aquifer, the lifeblood of Idaho agriculture.

So how can the NRC conclude that building this facility is vital, and that the most problematic outcome to be evaluated is construction dust?

[131-03, Morty Prisament] Need for Action: The DEIS has not established a "need" for this action, as required under NEPA. Need is required to be discussed in specific, quantitative, terms and within the scope of global production and markets. there exists a competitive global market to provide enriched uranium. Russia (CIS) has been one of the leading suppliers of enriched U2. If there is a national security rationale for building such facilities in the U.S., the EIS needs to discuss and document such an assertion. Moreover, the document needs to explore the reasons why the supply of enriched U2 from nuclear weapons decommissioning could not meet projected demand for enriched U2.

[148-02, Eric Schuler] But there's a bigger issue here. Before we can ask whether the impact will be small or devastating, we need to ask why we're making an impact at all. This question is paramount, but the draft EIS failed to provide a convincing answer. The EIS claims that the EREF needs to be build to improve national security. For this to be a legitimate need, however, the U.S.'s supply of enriched uranium would have to be unreliable currently. This is not the case.

The U.S.'s enriched uranium sources are reliable partners and the U.S. even seems to tacitly acknowledge this fact, when it states that some of the enriched uranium will be exported to foreign countries. Even so, it is useful to evaluate the sources more fully, just to understand just how unnecessary this facility is.

Now we've heard earlier that 90 percent of our enriched uranium is imported, and about half of that is from Russia, and we've also heard that uranium enrichment is a necessary technology because we need nuclear power to deal with global warming.

However, strictly speaking, that's not true, as a great example of that is the megatons to megawatts program that we operate with Russia. This is an agreement between Russia and the U.S. where by Russian nuclear warheads are downblended to make fuel grade uranium, and thus, since we have an abundant supply of warheads, is a very bountiful source of this enrichment – or of enriched uranium. Moreover, this program diminishes the threat of proliferation and prevents the environmental degradation associated with continued mining.

In other words, it's beneficial in many ways, and it's been existing for several years and there is no reason to expect that it would not be renewed in the future.

The other enriched uranium sources are also reliable. Although much of the enriched uranium is, indeed, imported, this fact alone does not indicate instability. We live in an age of globalization and there is no international market for enriched uranium. Credit counseling with a comparative advantage in the production of enriched uranium, whether because they have highly-accessible reserves, low-cost labor in Africa, or other factors, will specialize in producing enriched uranium while the U.S. focuses its resources in other areas, like agriculture.

Our reliance on this marked is not a sign of weakness or vulnerability, but a sign of efficiency. Energy independence is an outdated idea, is one that is not based on security or patriotism, but of ignorance.

The current system works, and has worked for several years. The entire project that we are discussing here tonight is predicated on the assertion that it will provide national energy security with respect to enriched uranium.

The fact of the matter is that this security already exists and the EREF facility is not necessary, and if the benefits stated in this proposal do not exist, no amount of environmental impact is tolerable, and this facility cannot be licensed.

[182-01, Brianna Ursenbach] The EIS states the facility is necessary for U.S. energy security; however, this argument is based on the unstated and unproven premise that the U.S. must have domestic sources for all of its nuclear fuel needs.

[184-22, Kitty Vincent] In conclusion, since the only justification for the facility is an asserted but unsupported need for domestically produced enriched uranium, which EREF does not in any case provide, a "no action" alternative should be chosen.

[191-04, Liz Woodruff] After reviewing the draft EIS in full, I believe it inadequately addressed may critical issues and must be revised to integrate the following concerns. Most importantly, the entire premise of the draft EIS, that there is a need for domestically supplied enriched uranium, is deeply flawed, fully hypothetical, repeatedly contradicted and disproven in the draft EIS itself, and an unacceptable warrant for the licensing of this facility. The NRC must either find legitimate warrants for taking the proposed action that actually outweigh the environmental and public health risks associated with this facility, or they must choose the "no action alternative" and not license the proposed EREF.

[191-19, Liz Woodruff] Alternatives

• Since the only justification for the facility is an asserted but unsupported need for domestically produced enriched uranium, which the EREF does not in any case provide, a "no action" alternative should be chosen.

[193-06, Liz Woodruff, on behalf of the Snake River Alliance] First, the purpose and need for this facility is not proven in the draft Environmental Impact Statement, for either current or new reactors. It's inadequately proven. It remains to be a hypothesis.

Response: *National energy policy issues are not within the scope of the EIS for the proposed EREF. The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of enriched uranium.*

Comment: The following comments assert that there is no need for the proposed EREF because an adequate supply of enriched uranium is and will be available, and that construction and operation of the proposed facility would only result in an excess supply of domestically enriched uranium.

[009-02, Steve Barclay; 021-02, Linda Cannarozzo; 081-02, Lea Johnson; 161-02, Marisa Smith; 202-02, Alison Duffin; 205-02, Andrea Guerri; 206-02, Pamela Hanson; 209-02, Courtney Hollar; 210-02, Tyler Hoovis; 211-02, Olivia Joelson; 212-02, Naomi Johnson; 215-02, Verlyn Larsen; 217-02, Jodie Mckelvey; 222-02, Hannah Raines; 224-02, A. Rolsen; 225-02, Lisa Stimpson] The draft EIS makes an unproven assertion that there is a need for domestically produced enriched uranium. However, this claim was never proven and often contradicted in the draft. 1) The nuclear renaissance is too expensive and faces enormous delays; 2) the current US fleet of reactors has operated with an adequate supply of fuel for decades; 3) the draft EIS asserts that the licensing of this facility would create a supply of enriched uranium in excess of the need.

[015-01, Beatrice Brailsford] According to the current Draft EIS, the purpose of AREVA's enrichment factory is to meet two needs, for enriched uranium to fulfill electricity generation requirements, and for domestic supplies of enriched uranium for national energy security. That first need, enriched uranium for electricity generation is undeniably true, as long as the majority of nuclear reactors use low enriched uranium fuel, but the Draft EIS does not even attempt to make the case that that need is not already being met.

Furthermore, the draft clearly acknowledges that even if the nuclear renaissance occurs as advertised, already planned new enrichment would exceed U.S. demand by about the same amount as AREVA's factory might produce.

[015-08, Beatrice Brailsford] One of the most important parts on an EIS is the examination of the purpose and need for the proposed action. According to the current draft EIS, the purpose of Areva's Eagle Rock Enrichment Factory is to meet two needs: 1) The need for enriched uranium to fulfill electricity generation requirements; and 2) the need for domestic supplies of enriched uranium for national energy security.

That first "need" - enriched uranium for electricity generation - is undeniably true as long as the majority of nuclear reactors use low-enriched uranium fuel. But the draft EIS does not even attempt to make the case that that need is not already being met. It must do so. The draft does, however, state "Based on the projected need for LEU by existing reactors and proposed new reactors, with the target capacity of 6.6 million SWUs per year for the proposed EREF, the total enrichment capacity in the United States would exceed the projected demand (approximately 16 million SWUs per year) by about 6 million SWUs per year if all of the enrichment facilities were constructed and operated at their rated capacities" (Draft EIS, 1-6). Thus, even if the "nuclear renaissance" occurs as advertised, which is not at all certain, already planned new enrichment would exceed US demand by about the same amount as Areva's factory is slated to supply.

[030-05, Kerry Cooke] Lack of need: The world already has redundancy in provision of enriched uranium for nuclear plants. With additional enrichment facilities already approved or under construction, the Areva facility would far exceed any expected need for more enriched uranium, in the US and elsewhere. The idea that a new wave of nuclear reactors will demand increased enriched uranium is based on unsubstantiated and wishful prognoses by the nuclear industry. As is playing out every day in the financial market, financiers are shying away from this industry that is risky at all levels: cost, market need, and remuneration, to name three. This plant should be denied until and unless there is solid proof that there is a need.

[068-01, Anne Hausrath] I do not believe that we have been provided with sufficient evidence of a need for domestically-produced uranium, enriched uranium.

[071-03, David Hensel] I think that, I don't mean to be unkind, but I don't think you did a very good job of looking at a very good market analysis. And here I'm going to quote from the Nuclear Engineering International, November 2009. And I'm assuming these guys aren't appearing for Greenpeace. I mean, I don't necessarily read this magazine, but if I could quote once again, they talk about "enrichment requirements for the world's growing fleet of nuclear power plants are expected to expand significantly. Current enrichment capacity on a worldwide basis is just sufficient to meet those requirements." And this is what I want to highlight, "but the potential pace of enrichment capacity expansion is expected to outstrip the growth requirements." So, we use this language of we want to be energy independent. I mean, and that's sort of -- I mean, it's a meaningless term.

[086-02, Paula Jull] A new US plant to enrich uranium for electricity production is not needed. Current supplies are clearly adequate, and already operating or planned new enrichment capacity would exceed US demand by about the same amount as Areva's plant might produce.

[088-02, Stan Kidwell] Current supplies of enriched uranium are more than adequate, and already operating or planned new enrichment capacity would exceed US demand by about the same amount as Areva's plant might produce, even if a nuclear renaissance occurs.

[095-02, Linda Leeuwrik] • There is no need for a new US plant to enrich uranium for electricity production. Current supplies are clearly adequate.

[096-05, Arjun Makhijani] …but I can tell you, simple calculation that the treaty that the U.S. and Russia have signed, if that enriched uranium on both sides is used, plus LES, plus Portsmouth, plus a couple of years of operation of Paducah before it is shut down will provide far more enrichment services than the entire lifetime, so what might happen here is, for the entire U.S. reactor fleet, so you may be building a plant here that may wind up only exporting enriched uranium, if there is a market.

[103-02, Karen McCall] "The potential pace of enrichment capacity expansion is expected to out-strip the growth requirements." Nuclear engineering International , November 2009

[113-06, Ken Miller] First and foremost and as to the need for this facility, I do not believe Areva's application contains a sound justification for this facility. Not only is there an adequate existing supply of enriched uranium to meet current and expected needs of the U.S. domestic nuclear reactor fleet, that capacity would exceed demand roughly by the amount of enriched uranium EREF would produce.

[118-04, Caroline Morris] The draft EIS too asserts without proof a greater need for domestically produced enriched uranium, Yet the document then contradicts the claim by these factors showing no need for the EREF: 1) the enormous expense and delays of the US nuclear renaissance, 2) decades of adequate fuel supply for currently operating the US reactors, and 3) creating an excess supply of enriched uranium by the licensing this proposed facility. Since the only justification given for EREF, the asserted, unsupported need for more domestically produced enriched uranium, is fallacious, a "no action" alternative should be chosen.

[120-03, Frank Nicholson] This enrichment factory: • Is unnecessary. We were told it was for national consumption but as there is not that much demand, the finished product will be sent overseas no matter what they promise.

[122-03, Kathy O'Brien] I understand that there is no need for a new US plant to enrich uranium for electricity production. Current supplies are adequate, so it seems that this plant may be useless as well as dangerous.

[168-08, Lon Stewart] Nuclear engineering periodicals are claiming the world has plenty of enrichment capacity.

[175-03, Ellen Thomas] There is no need for a new US plant to enrich uranium for electricity production. Current supplies are clearly adequate, and as we develop healthy solar, wind, tidal and other truly clean energy systems, there is no need for new nuclear power plants.

[180-11, Kaye Turner] Is it possible we may not need this enriched uranium Areva wants to produce?

[183-06 and 183-14, James Vincent] In conclusion, the EIS (4-136) states the French company, AREVA's enriched product will be shipped overseas as is their profits. I do not see how this proposed project will make my country have any more domestic control over our needs for enriched fuel. The EIS specifies that the numbers of license requests for new enriched uranium, EIS 1-6, are in excess of the need for the new enriched uranium. Given the potential for accidents is considerable, I would urge the Nuclear Regulatory Commission to deny this permit at this time. I would also like to thank the Commission for hearing my testimony.

[191-07, Liz Woodruff] The draft EIS fails to establish that the current approach to supplying enriched uranium is unreliable. There is uranium enrichment in the US, enriched uranium has always been an international market, the raw material comes from foreign sources, and this system has adequately provided fuel for US reactors for decades.

[191-09, Liz Woodruff] The EIS specifies that the numbers of license requests for new enrichment facilities in the US are in excess of the need for new enriched uranium (draft EIS, 1-6). The EIS does not adequately prove that the Areva facility is necessary.

[193-08, Liz Woodruff, on behalf of the Snake River Alliance] Third, there's currently enough enriched uranium for domestic use, and AREVA is a French company and gets it uranium supply from the international market. So how does this facility give us a more reliable source of domestically-produced uranium, enriched uranium?

[193-14, Liz Woodruff, on behalf of the Snake River Alliance] The NRC acknowledges that the licensing if this facility is in excess of the need by 6 million SWUs.

[192-06, Lisa Young] Perhaps if this facility was necessary and urgent, these risks could be ignored. But it's clear that we do not need this facility. The current system and sources for enriched uranium have provided adequate fuel for reactors for decades, and with a total of three enrichment facilities expected in the U.S. in the nature future, one already in operation and two that are being constructed right now, the need for more enriched uranium is nonexistent.

This enriched uranium will be shipped overseas, leaving the dangerous waste in Idaho for at least 30 years and potentially much longer. There's no need to take these risks at this time and the EIS unfairly represents these risks.

Producing this waste is irresponsible and my sense is this facility is irresponsible. Thanks.

[192-12, Lisa Young] Perhaps if this facility was necessary and urgent, these risks could be ignored or set aside, but it is clear that we do not need this facility: the current system and sources for enriched uranium have provided adequate fuel for reactors for decades, and with a total of 3 enrichment facilities expected in the U.S. in the near future (1 already in operation, 2 being constructed), the "need" for more enriched uranium is non-existent. This enriched uranium would be shipped overseas, leaving this dangerous waste in Idaho for at least 30 years, and potentially much longer. No, there is no need to take these risks at this time, and the EIS unfairly represents these risks. Producing this waste is irresponsible and my sense is this facility is irresponsible.

Response: *As pointed out in Section 1.3.1 of the EIS, the need for the proposed EREF includes the need for domestically produced enriched uranium. The only currently operating uranium enrichment facilities in the United States are the Paducah Gaseous Diffusion Plant (PGDP) and URENCO USA (formerly known as the NEF). The operation of the PGDP is expected to cease in the near future due to costs associated with maintaining an aging facility and the inefficiency of the gaseous diffusion process compared to newer technologies such as uranium enrichment using centrifuges. The URENCO USA facility is currently under construction, but started initial operations in June 2010; it is expected to reach a capacity of 1.6 million SWUs per year in August 2011 (about half of its full capacity of approximately 3 million SWUs per year, as currently licensed by the NRC). Full licensed capacity would not be reached until sometime later. An expansion to 5.9 million SWU per year is being considered by URENCO USA, but an application for the expansion has not yet been submitted to the NRC. As discussed in Section 1.3.1, of the other potential domestic sources of enriched uranium, the American Centrifuge Plant (ACP) is not yet in operation and the GE-Hitachi Global Laser Enrichment LLC (GLE) Facility is not yet licensed.*

The decrease in an inadequate supply of enriched uranium for domestic reactors, due to the eventual shutdown of the PGDP and the end of the Megatons to Megawatts Program, together with increased domestic and global demand, emphasize the need for more domestic capacity. As noted in Section 1.3.1, the NRC is currently processing license applications for more than 20 nuclear plants. The availability of foreign enriched uranium is expected to become more competitive with the global expansion of nuclear power. Within the last 10 years, 32 nuclear plants have become operational, with 60 additional nuclear plants currently under construction (IAEA 2010) including one in the United States.

Comment: The following comments assert that it is not clear that new nuclear reactors will be constructed in the United States, thereby increasing the domestic need for enriched uranium.

[009-02, Steve Barclay; 021-02, Linda Cannarozzo; 081-02, Lea Johnson; 161-02, Marisa Smith; 202-02, Alison Duffin; 205-02, Andrea Guerri; 206-02, Pamela Hanson; 209-02, Courtney Hollar; 210-02, Tyler Hoovis; 211-02, Olivia Joelson; 212-02, Naomi Johnson;

215-02, Verlyn Larsen; 217-02, Jodie Mckelvey; 222-02, Hannah Raines; 224-02, A. Rolsen; 225-02, Lisa Stimpson] The draft EIS makes an unproven assertion that there is a need for domestically produced enriched uranium. However, this claim is never proven and often contradicted in the draft. 1) The nuclear renaissance is too expensive and faces enormous delays; 2) the current US fleet of reactors have operated with an adequate supply of fuel for decades 3) the draft EIS asserts that the licensing of this facility would create a supply of enriched uranium in excess of the need.

[030-05, Kerry Cooke] Lack of need: The world already has redundancy in provision of enriched uranium for nuclear plants. With additional enrichment facilities already approved or under construction, the Areva facility would far exceed any expected need for more enriched uranium, in the US and elsewhere. The idea that a new wave of nuclear reactors will demand increased enriched uranium is based on unsubstantiated and wishful prognoses by the nuclear industry. As is playing out every day in the financial market, financiers are shying away from this industry that is risky at all levels: cost, market need, and remuneration, to name three. This plant should be denied until and unless there is solid proof that there is a need.

[110-01, John and Susan Medlin] As the Snake River Alliance presentation pointed out, there is no current need for this facility, no compelling evidence that a nuclear renaissance is coming (or inevitable), no rationale for a French company building a nuclear facility in Idaho that purports to promote US energy security while importing inputs and exporting outputs, no provision for the deteriorating and dangerous waste that will haunt us for decades or maybe forever, no concern for yet another threat to the Snake River aquifer, the lifeblood of Idaho agriculture.

So how can the NRC conclude that building this facility is vital, and that the most problematic outcome to be evaluated is construction dust?

[118-04, Caroline Morris] The draft EIS too asserts without proof a greater need for domestically produced enriched uranium, Yet the document then contradicts the claim by these factors showing no need for the EREF: 1) the enormous expense and delays of the US nuclear renaissance,…

[131-04, Morty Prisament] Finally, the document's projected demand for U2 is based upon certain scenarios regarding future nuclear energy power plants. This scenario needs to be defined in far greater detail and, further, the document needs to present alternative scenarios in recognition of that alternative public policy decisions, domestically and globally, are equally likely. A multitude of factors can influence these projections, including economics of nuclear power as compared to alternatives, resolution of nuclear waste storage issues, liability issues, system safety issues, proliferations concerns, and governments' ability and willingness to provide funding (i.e.; loan guarantees, subsidies, excess liability coverage, etc.) to support nuclear energy development.

[153-05, Andrea Shipley; 197-05, Andrea Shipley, on behalf of the Snake River Alliance] Not to mention that the EIS claims that the need for AREVA's enriched uranium will be spurred by the building of a fleet of reactors. Economic costs, delays, and safety issues all indicate that this supposed renaissance is not only improbable, but unlikely.

[169-01, Margaret Stewart] And aside from AREVA's greed, grim, and very, very devastating global environmental and human rights record around the world, particularly in Africa, I vehemently oppose the NRC licensing of this facility on grounds that the facility has not been proven necessary, a huge amount of dangerous radioactive waste that would be created has no disposal place, the nuclear reactors that the EIS says will need AREVA's product more than likely will never be built.

[169-03, Margaret Stewart] This Draft EIS appears to be based on the unproven assumption that there will be a large number of nuclear reactors built needing AREVA's product. Given that we all live in a globally threatened economic world, where scarce monies are ever-shrinking, there are ever-present reactor construction delays, safety questions unanswered, and spiraling out of control costs, these assumptions seem dubious, at best.

[181-04, Roger Turner] So, this brings to mind the other error in this EIS in assuming a need for enrichment based on new nuclear power plants in the United States. Unfortunately, the NRC fails to take a hard look at this purported need. A nuclear power plant hasn't been built in the United States for two decades. The fact is, most states and power companies don't want nuclear power plants with their high cost, especially the high cost of spent fuel storage and cleanup. Especially considering that there's no permanent repository. The emphasis may be for less nuclear, given the problems with waste, and the fact the higher cost that these states and power companies must endure, because there isn't a permanent repository.

The final EIS should more carefully evaluate and revise the projected need for this plant. The fact is, there's not general support in the U.S. for new nuclear power plants to the extent that warrants this project, and other sources of enriched uranium meets our needs….

[187-06, John Weber] I recommend the "no action alternative" for the following reasons. With many of the current US reactors nearing the end of the design life expectancy and very few, if any, new reactors likely to be build due to economics, a case has not been made for a need for this plant.

[191-11, Liz Woodruff] The EIS claims that the need fulfilled by the Areva facility will be spurred by the building of a new fleet of reactors. Economic costs, delays, and safety issues all indicate that this supposed resurgence is not only improbable, but unlikely.

[193-09, Liz Woodruff, on behalf of the Snake River Alliance] And finally, the draft EIS claims the need for AREVA's enriched uranium will be spurred by the building of a new fleet of reactors. But economic cost delays and safety issues all indicate the supposed renaissance is unlikely.… And we would argue that this is not in fact a renaissance. That the very premise of the EIS is incorrect. We're actually set up for a collapse of the nuclear power industry.

Response: *As discussed in Section 1.3.1 of the EIS, the NRC expects to license the next generation of nuclear power plants using 10 CFR Part 52. Part 52 governs the issuance of standard design certifications (DCs), early site permits (ESPs), and combined licenses (COLs) for nuclear power plants. The NRC staff is engaged in numerous ongoing interactions with vendors and utilities regarding prospective new reactor applications and licensing activities. Based on these interactions, the NRC staff has received a significant number of new reactor COL applications (COLAs) since 2007. As of December 2010, the NRC is actively reviewing*

12 COLAs for a total of 20 nuclear reactor units. The NRC has suspended 6 COLA reviews due to changes in applicants' business strategies or the timing of their construction plans. One of the suspended COLAs was converted by the applicant to an ESP application. Assuming regulatory requirements are met, the NRC expects to issue two COLs by the end of 2011.

The NRC has three DC applications and two DC amendment applications currently under review. As of December 2010, one DC application and one DC amendment are in rulemaking. The NRC has received two Advanced Boiling Water Reactor (ABWR) DC renewal requests in calendar year 2010 and expects to receive one new DC application by fiscal year 2012.

Comment: The following comments assert that foreign ownership of the proposed EREF and other U.S. enrichment facilities does not fulfill the need for a domestic supply of enriched uranium.

[015-02, Beatrice Brailsford] The National Energy Security Policy objective AREVA's plant is supposed to meet was enunciated in a 2002 letter from the DOE to the NRC. The focus of that letter was not that the U.S. needed a foreign company to build a plant here, but rather that an American company should have a stake in U.S. enrichment capacity. Eight years later, there are no more nuclear reactors operating in the world, but as of June, URENCO, a German company, is enriching uranium in New Mexico. The NRC's efforts to ignore that plant in the Draft EIS are painful to watch.

At any rate, let's go back to the need for domestic supplies of enriched uranium. The key word here is "domestic." AREVA is owned by the French government.

[015-10, Beatrice Brailsford] At any rate, Areva is owned by the French government.

[031-01, James Cooper] I am OPPOSED to the Areva project. As an Idaho taxpayer and voter I feel this state does NOT NEED a foreign company to build any facility on our soil - much less one which is subject to accidents and one whose profits go to another country.

[088-04, Stan Kidwell] French-owned Areva's plant will not increase US energy security by providing a "domestic" source of enriched uranium.

[095-04, Linda Leeuwrik; 127-01, Sheila Plowman] Areva's plant would not increase US energy security by providing a "domestic" source of enriched uranium. Areva is owned by the French government.

[110-01, John and Susan Medlin] As the Snake River Alliance presentation pointed out, there is no current need for this facility, no compelling evidence that a nuclear renaissance is coming (or inevitable), no rationale for a French company building a nuclear facility in Idaho that purports to promote US energy security while importing inputs and exporting outputs, no provision for the deteriorating and dangerous waste that will haunt us for decades or maybe forever, no concern for yet another threat to the Snake River aquifer, the lifeblood of Idaho agriculture.

So how can the NRC conclude that building this facility is vital, and that the most problematic outcome to be evaluated is construction dust?

[115-02, Nicholas Molenaar] Why isn't there a United States Corporation capable and willing to build this type of enrichment facility?

[150-07, Katie Seevers] The company who is creating this facility is French, and its production of enriched uranium in the United States does not result in domestic control of that product as addressed in the draft EIS, section 2-17.

[153-03 and 153-04, Andrea Shipley; 191-10, Liz Woodruff; 197-04, Andrea Shipley, on behalf of the Snake River Alliance] The EIS clearly states that Areva's product will be shipped overseas, therefore nullifying the project's effects on domestic uses of enriched uranium. Because Areva is a French company, its production of enriched uranium in the U.S. does not actually result in domestic control of that product (draft EIS, 2-17).

[175-06, Ellen Thomas] Areva's plant would not increase US energy security or nonproliferation by providing a "domestic" source of enriched uranium. Areva is owned by the French government.

[183-06 and 183-14, James Vincent] In conclusion, the (EIS 4-136) states the French company, AREVA's enriched product will be shipped overseas as is their profits. I do not see how this proposed project will make my country have any more domestic control over our needs for enriched fuel. The EIS specifies that the numbers of license requests for new enriched uranium, EIS 1-6, are in excess of the need for the new enriched uranium. Given the potential for accidents is considerable, I would urge the Nuclear Regulatory Commission to deny this permit at this time. I would also like to thank the Commission for hearing my testimony.

[187-07, John Weber] A plan owned by a foreign company will do nothing to protect US national security.

[193-08, Liz Woodruff, on behalf of the Snake River Alliance] Third, there's currently enough enriched uranium for domestic use, and AREVA is a French company and gets it uranium supply from the international market. So how does this facility give us a more reliable source of domestically-produced uranium, enriched uranium?

[193-13, Liz Woodruff, on behalf of the Snake River Alliance] So the uranium, which is what we need the reliable supply of, is coming from international markets. Why does building a facility by a French government-owned company in the US increase the reliability of that supply, if it's coming internationally?

[192-18, Lisa Young] Indeed, I hope that it is recognized that, while the proposal for this facility is based on the sole premise that a domestic uranium enrichment facility is needed to increase our national energy security, it will not increase our national energy security to have a foreign company enrich foreign chemicals, reap foreign profits, and sell the product to other foreign nations, as the AREVA proposal promises to do.

Response: *As discussed in Section 1.6 of the EIS, AES is a Delaware limited liability corporation that was formed solely to provide uranium enrichment services for commercial* *nuclear power plants. The investigation of any foreign relationship to determine whether it is inimical to the common defense and security of the United States is beyond the scope of this EIS and was addressed as part of the NRC's SER (NRC, 2010b).*

Comment: The following comments suggest that the need for domestic production of enriched uranium is not being met because the uranium feed material would be coming from a foreign source.

[083-02, Diane Jones] I believe that the EIS really needs to address the obvious contradiction between the assertion that enrichment uranium is needed for the US energy independence, and the stated fact that the uranium itself may be imported and the product of enrichment may be exported.

[095-03 and 095-04, Linda Leeuwrik; 127-01, Sheila Plowman] Areva's plant would not increase US energy security by providing a "domestic" source of enriched uranium. Areva is owned by the French government. The raw material for the plant would be imported and some portion of its product would be exported.

[153-02, Andrea Shipley; 197-02, Andrea Shipley, on behalf of the Snake River Alliance] The purpose and the need for this facility fails to be addressed in the EIS. There is already uranium enrichment in the U.S., and the raw material comes from a foreign source. Since the uranium that will be enriched by Areva will come from foreign sources, the licensing of this facility does not create increased domestic control of reliable supplies of enriched uranium, Draft EIS, 2-6

[182-02, Brianna Ursenbach] The EIS states the facility is necessary to US energy security; however, this argument is based on the unstated and unproven premise that the U.S. must have domestic sources for all of its nuclear fuel needs.

For the sake of argument, let us accept this dubious notion, and assume all parts of the fuel cycle must be available in the U.S., to have a reliable and secure supply. From there it follows that we would need to source all of our raw uranium domestically as well.

Yet the EIS acknowledges that the U.S. will continue to import yellow cake from foreign countries. If we cannot get all the raw material, then we cannot convert it to UF6 and domestic enrichment facilities become irrelevant.

In many ways, this energy security argument is analogous to saying that we would be insulated from OPEC, and oil supply fluctuations, if only we were to find all or our oil in the U.S. Clearly, both of these ideas are absurd.

Now one may argue that we simply need to resume uranium mining at home to solve this conundrum. But while it is true that U.S. does have extensive uranium reserves, the legacy of destruction and contamination left by past mining efforts make resurgence very improbable.

Indeed, as one example, the Navaho Nation, whose land contains nearly one-quarter of all U.S. reserves, has specifically banned uranium mining If mining is not going to be resumed in the

U.S. in any significant way, then additional enrichment facilities cannot ensure a reliable fuel supply, and the Eagle Rock facility is once again shown to be unnecessary.

[191-08, Liz Woodruff] Since the uranium slated for enrichment will be from foreign sources, the licensing of this facility does not in fact create increased domestic control of reliable supplies of enriched uranium (draft EIS, 2-6).

[193-08, Liz Woodruff, on behalf of the Snake River Alliance] Third, there's currently enough enriched uranium for domestic use, and AREVA is a French company and gets it uranium supply from the international market. So how does this facility give us a more reliable source of domestically-produced uranium, enriched uranium?

[193-13, Liz Woodruff, on behalf of the Snake River Alliance] So the uranium, which is what we need the reliable supply of, is coming from international markets. Why does building a facility by a French government-owned company in the US increase the reliability of that supply, if it's coming internationally?

Response: *Although the NRC staff recognizes that some of the uranium feed material for the proposed EREF may come from foreign sources, the specific need in the case of the proposed EREF is for domestic uranium enrichment capacity, as discussed in Section 1.3.2 of the EIS. The source of the uranium hexafluoride for enrichment is part of the need for energy security, but is a separate concern and, therefore, not within the scope of this EIS. However, it should be noted that, as discussed in Sections 2.1.3, 2.1.4.2, 4.2.9.2, D.3.1.1, and D.4 of the EIS, the proposed EREF would receive a portion of its feed material from a U.S. UF_6 production plant in Metropolis, Illinois; and would also receive UF_6 feed material from a production facility in Port Hope, Ontario, Canada, which obtains some of its uranium feed from a U.S. source (Cameco, 2010).*

Comment: The following comments note that the enriched uranium product could be shipped outside the U.S., thereby negating any enhanced U.S. energy security. Some of these comments also suggest that the profits would also go overseas.

[001-02, Reham Aarti] And I just don't think there's any need for it. There's no need for that uranium, especially when it's going somewhere else. It's not even helping us. It's not doing anything here but creating trash. We.re a big giant trash can for France, and I don't think it's acceptable.

[014-02, William Blair] While some jobs would be created, the processed uranium would likely be exported and much of the financial benefit would be to France.

[015-03, Beatrice Brailsford] And, finally, the product, enriched uranium. The Draft EIS tells us that all AREVA's enriched uranium could, theoretically, be sold to U.S. companies, but it also tells us that potential customers are in Washington, South Carolina, North Carolina, and overseas. Is overseas a new state? But perhaps the theory will play out.

[015-07, Beatrice Brailsford] So, that's the proposal to meet the need of a domestic supply of enriched uranium. A uranium factory without any national purpose will produce fuel for everywhere in the world but here in Idaho, send its profits to France, and leave us with the waste.

[015-11, Beatrice Brailsford] According to Areva, the natural uranium destined for its plant here belongs to American companies. But according to the Nuclear Energy Institute, as of 2007, owners and operators of US nuclear power plants bought 92 per cent of their uranium from foreign sources. And where is the natural uranium converted to uranium hexafluoride on its way to Idaho? According to the draft EIS, in Illinois, Canada, and overseas. And finally, the product, enriched uranium. The Draft EIS tells us that enriched uranium from Areva's plant could "theoretically" all be sold to US companies. But it also tells us that potential customers are fuel fabrication facilities in Washington, South Carolina, North Carolina, and overseas.

[040-02, Collin Day] We don't need this facility. It's already been proven – or it's been shown that all this is going to be exported out. It's not going to help our energy independence.

[031-01, James Cooper] I am OPPOSED to the Areva project. As an Idaho taxpayer and voter I feel this state does NOT NEED a foreign company to build any facility on our soil - much less one which is subject to accidents and one whose profits go to another country.

[032-04, Cindy Cottrell] I'm against a foreign country making the profit from this plant and leaving the contamination in our Country.

[071-04, David Hensel] I think what you need to look at a little more closely is there doesn't seem to be any guarantees that the enriched uranium that this plant is going to produce will be used in this country, meaning there's no guarantee.

[088-03, Stan Kidwell] The raw material for the plant would be imported, a portion of its product would be exported.

[095-04, Linda Leeuwrik; 127-01, Sheila Plowman] Some portion of its product would be exported.

[104-01, Carolyn McCollum] There's little advantage to us Idahoans when Areva's nuclear fuel would be sent worldwide and its profits back to France while we are left with its radioactive waste, compounding INL's nuclear activities that have plutonium-contaminated the aquifer.

[120-03, Frank Nicholson] This enrichment factory: • Is unnecessary. We were told it was for national consumption but as there is not that much demand, the finished product will be sent overseas no matter what they promise.

[147-08, Joey Schueler] 4. Areva, a French company, will be the owner of this company meaning much of the revenues will go over sees. It's also unclear how many employees will be Idaho residents.

[153-03 Andrea Shipley; 197-03, Andrea Shipley, on behalf of the Snake River Alliance] The EIS clearly states that AREVA's product will be shipped overseas, therefore nullifying the project's effects on domestic uses of enriched uranium.

[171-04, John Tanner] Now, okay, we could import enriched uranium, but then not only the profits go abroad, but the jobs, as well. I don't think that's what we want to do.

[175-06, Ellen Thomas] Areva's plant would not increase US energy security or nonproliferation by providing a "domestic" source of enriched uranium. Areva is owned by the French government. The raw material for the plant would be imported. Some portion of its product would be exported.

[180-10, Kaye Turner] Is it true Areva is planning to export most of their product to other countries?

[191-10, Liz Woodruff] The EIS clearly states that Areva's product will be shipped overseas, therefore nullifying the project's effects on domestic uses of enriched uranium. Because Areva is a French company, its production of enriched uranium in the US does not actually result in domestic control of that product (draft EIS, 2-17).

[193-07, Liz Woodruff, on behalf of the Snake River Alliance] Secondly, the draft EIS clearly states that AREVA's product will be shipped overseas, nullifying the project's effects on domestic uses of enriched uranium.…
And finally, quote: "Potential customers are fuel fabrication facilities in Richmond, Washington, Columbia, South Carolina, Williams, North Carolina, and overseas, through ports in Virginia and Maryland." So this domestic reliable supply of enriched uranium that we need in this country will be shipped overseas by AREVA. The need argument is highly problematic and doesn't stand.

[192-18, Lisa Young] Indeed, I hope that it is recognized that, while the proposal for this facility is based on the sole premise that a domestic uranium enrichment facility is needed to increase our national energy security, it will not increase our national energy security to have a foreign company enrich foreign chemicals, reap foreign profits, and sell the product to other foreign nations, as the AREVA proposal promises to do.

Response: *As discussed in Section 1.3.2 of the EIS, one purpose of the proposed EREF is to promote U.S. energy security by providing an additional domestic source of enriched uranium production capacity. The export of any enriched uranium from the proposed EREF in excess of that required by domestic U.S. customers is not inconsistent with that purpose, as long as this export complies with applicable laws and regulations. The destination of the enriched uranium from the proposed EREF is specified by the utility customer who is also responsible for specifying the supplier of the uranium to be enriched. The NRC licenses the import and export of radioactive materials under 10 CFR Part 110.*

As discussed in Section 1.6 of the EIS, AES is a Delaware limited liability corporation that was formed solely to provide uranium enrichment services for commercial nuclear power plants. AES's principal business location is in Bethesda, Maryland, while operations would occur at the proposed EREF in Bonneville County, Idaho. These locations, both within the United States, would benefit from the investments made to construct and operate the proposed EREF. Determination of the destination of any additional profits is not within the scope of this EIS.

I.5.5 Scope of the EIS Analysis

Comment: The following comment discusses national versus local issues pertaining to the construction of the proposed EREF.

[035-01, Stephen Crowley] I guess my concern is a certain kind of inconsistency in how you're evaluating the cost and benefits. And it might just be a misunderstanding. But it seems to me that the primary positive reason for constructing an enrichment facility is one having to do with provision of safe energy resources for the nation. If that's correct, then what you've given me is an argument for building an enrichment plant somewhere. Okay. Now I'm not -- I don't want to bore into the issue of whether or not that's correct. But what I'm going to say is what you're talking about is whether or not we should have a plant at all.

That's what I got. They call that dancing, where I'm from. Right. So the-- yes. So putting aside any issues about the correctness or incorrectness of this judgment -- right -- this is an argument for building a plant somewhere. Right.

Now what we haven't heard -- so what that makes me worry about, then is the process that the EIS went through in ruling out a certain kind of alternative sources for this product; right? Because, really, in conducting that process, what you thought about was whether or not to build the Eagle Rock facility. Right? So it's a question of should the Eagle Rock facility be built or not, and then you looked at alternative locations and ruled those out.

But that's not the same question; right. That's a question about a particular facility at a particular place, and we've been -- we've identified positives and negatives of building that particular facility; right. And whatever you think of those, those would be equally true if you built that facility anywhere at all; right. There would be waste concerns. There would be economic benefits.

So there's a certain kind of mismatch between the primary motivation for the existence of this facility, right, which is a national motivation, and the terms of the debate, which is a particular debate about an individual facility; right. So whether I agree with the proponents, or whether I agree with the people who aren't impressed, I'm like -- I'm saying that seems to be inconsistent with your primary motivation. That seems to me, that given that this is an EIS for a particular facility, that general -- or that national level motivation has to come off the table; right. It should be the issues about the particular facility under consideration, and if what you're doing is identifying features of this facility that could equally well be provided by any other facility, then those are not relevant to identifying whether or not to build this facility.

Response: *As pointed out in the comment, the need for the proposed EREF is national in scope. The process used to select the location of the proposed EREF is discussed in Section 2.3.1 of the EIS. Potential impacts of construction, operation, and decommissioning of the proposed EREF at the chosen site are analyzed to comply with NEPA. All impacts, regardless of whether they are similar to those if the facility were built elsewhere, must be considered in the EIS.*

Comment: The following comment requests that certain conditions be included in AES's license.

[066-01, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] In addition to comments on the EIS, if the AREVA facility is granted a license by the NRC we requested the following conditions be included in the license.

1. The state requests the NRC require AES to submit a yearly report to the Director of the Idaho DEQ on or before January 15th of each year that identifies the number of cylinders of DUF6 stored on site and the date of the longest stored container.

2. The state requests the NRC require AES to provide the state the same access to documents and materials relating to the AES radiation protection program that is required to be provided to the NRC.

3. The state requests the NRC require AES to allow Idaho DEQ to accompany NRC staff on any of its inspections of the AES facility. In this regard, the state requests the NRC require AES to allow Idaho DEQ staff the same access to its facilities, documents, materials and personnel to which NRC is entitled. Idaho DEQ shall execute any confidentiality agreement necessary to participate in such inspections and shall comply with all appropriate AES plant rules (e.g., safety, security) and any applicable NRC requirements when participating in such inspections.

4. The state requests the NRC require AES to provide the Idaho DEQ the physical security plan for the AES facility.

5. The state requests that NRC require AES to provide periodic training to local emergency responders for both transportation and plant operation incidents, and that the Idaho DEQ be sent a copy of the training plan and notified when such training occurs.

6. It is common for facilities of this nature to fund monitoring programs run by a separate party, in addition to their own program. The state requests that NRC require AES to fund an independent third party Environmental Monitoring program for the Eagle Rock Facility.

Response: *As stated by the Idaho Department of Environmental Quality (IDEQ) in the above comment, its request for including the license conditions is "in addition to comments on the EIS." AES's license and the conditions in that license are not included in the scope of the EIS analysis, and are separate issues that are determined by the Commission following the issuance of the SER and Final EIS and the conclusion of the mandatory hearings. In the meantime, the NRC plans to work with IDEQ and AES regarding IDEQ's requested license conditions.*

Comment: The following comment relates to spent fuel rod reprocessing and high-level waste generation and handling.

[091-01, Arthur Kull] I have followed the debate and arguments from both sides of the spectrum and came to the conclusion that the NRC should grant AREVA the permit to build and operate the uranium enrichment facility planned for the Idaho Falls area. It is an important step for us in the US that spent fuel rods be reprocessed to

• Increase the utilization factor of the material that is now stored at the many power plants.

• Reduce the amount of high level waste generated that needs a permanent storage facility like Yucca Mountain.

Response: *The construction, operation, and decommissioning of the proposed EREF does not involve the reprocessing of spent fuel rods or the generation or handling of high-level waste. Therefore, the subject of the above comment is not within the scope of the EIS.*

Comment: The following comments question the pursuit of technology that appears to have a limited lifetime.

[183-04, James Vincent] My other issue is about estimates of uranium throughout the world. The research I have done shows that there's somewhere between 50 years at the low end, and 100 years on the optimistic side. Why would we utilize a technology that costs literally billions of dollars to implement, with public tax dollars for a loan guarantee, and I realize that it is a guarantee, and Idaho tax incentives for a limited time technology? Even 100 years is not very long, as far as reserves.

[183-11, James Vincent] My research has found known estimates world wide of uranium somewhere between 50 years on the low end and 100 years on the optimistic side. Why would we utilize a technology that costs literally billions of dollars to implement with public tax dollars for a loan guarantee and Idaho tax incentives for a limited time technology, Even 100 years is not very long as far as reserves.

Response: *The pursuit of the gas centrifuge technology for uranium enrichment, which has a limited lifetime, is a national energy policy issue that is not within the scope of this EIS (which is for the proposed EREF). As discussed in Section 1.3 of the EIS, the proposed action is intended to satisfy the need for an additional reliable and economical domestic source of uranium enrichment services. The above comments are directed at the choice of nuclear power as an energy source. These comments are not within the scope of the EIS.*

Comment: The following comments raise various U.S. government issues that are not directly related to the scope of the EIS.

[110-02, John and Susan Medlin] In the US today, government oversight of corporate behavior is laughable, regardless of the riskiness of corporate operations. And the quaint concept of "corporate social responsibility" has been completely replaced with single-minded pursuit of profitability regardless of consequences to human, economic, and environmental health. Ergo, corporations operate with neither external nor internal restraint, however vile the consequences might turn out to be.

Now in Idaho we have the perfect combination: tough times, high joblessness, hungry contractors, no government oversight at any level, and corporate greed. This is the recipe for ruination of our environment, and subsequently our health and long term economic development potential.

Add our unequivocal "NO" to the responses you have received regarding approval of this proposal.

[180-12, Kaye Turner] And finally, I wonder if Iran was proposing a plant like this would the United States have an objection to it?

Response: *U.S. government policies, including national energy policy issues, are not within the scope of this EIS, which is for the proposed EREF. The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of uranium enrichment services. The issues raised in the above comments are national policy issues that are outside the scope of this EIS.*

Comment: The following comments relate to parts of the nuclear fuel cycle other than uranium enrichment.

[131-08, Morty Prisament] Source and Implications of Uranium Proposed to be Used: The source of uranium to be used and environmental implications related to extraction and transport needs to be evaluated, including environmental justice and socioeconomic considerations. National security considerations related to using proposed sources versus alternative sources should also be discussed.

[191-06, Liz Woodruff] Radioactive material is inherently dangerous. Just the activities directly connected with uranium enrichment pose risks, as do all other parts of the fuel chain. The NRC should perform a complete analysis of the risks of uranium mining and milling, mixing yellow cake with hexafluoride (itself a dangerous material), enriching UF6 in gas centrifuge plants, storing and deconverting depleted UF6, disposing of depleted uranium and low level waste, fabricating fuel from enriched uranium, and all intermediate transportation steps.

[193-02, Liz Woodruff, on behalf of the Snake River Alliance] But when we talk about the waste, it's really important that everybody here understand what is being proposed. The proposal is for a uranium enrichment factory, but that's only one part of the nuclear fuel chain. The entire nuclear fuel chain is dirty, dangerous, and promotes the transportation of radioactive materials on interstates, railways, and highways, which presents an enormous risk.

First, uranium is mined, which produces a waste stream, then it's transported, and it's milled and refined, which produces a waste stream. Then it's transported and it's converted, which produces a waste stream. And then it is transported to a uranium enrichment factory. That is what is being proposed in Idaho. It's very important that we understand that this is in the middle of the fuel chain. This not a nuclear power reactor. This is not a reprocessing facility. It's an enrichment factory.

Response: *The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of uranium enrichment services. The comments are directed at evaluating impacts related to the origin of the uranium to be enriched and impacts of other parts of the nuclear fuel cycle, which are not part of the proposed action. Therefore, these comments are not within the scope of the EIS.*

Comment: The following comments suggest that other energy options be pursued.

[008-03, Carol Bachelder] But the decommission process and the construction process, and the transportation, and on and on and on -- how can we possibly expect any sort of economic feasibility for the price of this energy that we're paying for with all these extensive expenses? It boggles the mind. I don't see how we could possibly get, you know, the amount out of -- the amount of energy out of this thing that we're going to put into it, you know, in the terms of money. Energy is really kind of behind the whole argument here, and I'm interested in alternative forms of energy, so I would have to support the not action alternative for the nuclear plant. But solar has great potential because of economic warming. A month ago, the entire United states, on the weather map, was red. If we could only figure out storage for this energy from the sun, we could get through the whole winter. My neighbor has a big solar panel, and she put drapes over it because, I mean, you don't want to warm your house in the summer time, do you? But if you could store the energy from the heat of the sun during this summer, you could get through the winter, and I don't think that the cost could possibly compare to the amount of money that you're proposing to spend on this thing.

[025-03, Hon. Sue Chew] You know, when we look at our energy needs, you know, I really am the "big picture" person. And not only should we look at nuclear as a source of energy, but, you know, we've got a lot of other things that we really should be looking at in the state and in this nation.

And I would like as much effort being put forth, and as much support, being put forth with our other sources of energy. When we look at solar, we look at geo, when we look at wind, I'd like to see that develop, especially in this state. And, you know, we've heard that the energy that would be developed through this particular mechanism doesn't benefit our state. I'd like for us to reflect on that.

And I'd like for, you know, the ingenuity of Idahoans here, our researchers are regular people that have good ideas, really, to be supported in our state with regard to these other sources. Conservation goes a long way, and I think that all these things need to be at the table, not just nuclear, and, you know, I really have a caveat with regard to this, because of potential dangers.

[032-06, Cindy Cottrell] The jobs that this plant will produce will be few in comparison to the cost of allowing it here. Maybe 300 people will get jobs that will not last forever, but only for the lifetime of the plant. Right now it will cost tax payers would have to loan Areva $2 billion. Other types of energy would be much more worth the taxpayer's money. That's a lot of money for 300 jobs and waste to manage forever. Other kinds of energy that is less risky would be better to invest in.

[040-03, Collin Day] We need to look at things like – I've been reading about the "smart grid." I think we have got plenty of energy in this country. We just need to use it smarter, or we need to be smarter about how we use it.

[044-01, Dennis Donnelly] I would point out that this section of considering alternatives assumes that it has to supply enriched uranium for national energy security; that is, they assume that this plant is going to be built, and it neglects the alternative of not building these plants.

I would point out that if you build this facility, it commits America, this is the unstated thing, it commits America essentially to a future that includes nuclear power, and all the nightmares associated with it. I would like to point out that there are other options that some of the nightmares would be a police state in our communities, where the Soviet Russians and the Germans that we already have that police state. These things are so dangerous that we're considering bombing Iran and the Israelis are considering bombing Iran for exactly the same facility. It's so dangerous. The reason is, of course, that you build this facility, and then you build the reactors, the reactors breed plutonium, plutonium can make weapons. You can't take that away once you've done it.

The police state is a terrible thing. The rest of it has to do with the threat of military attack on these facilities, on the plants. Nobody seems to address that all these atomic power plants are built above ground. Any kind of terrorist or military attack on any one of them can take out two states, that much area. We've seen Chernobyl. We know it can happen, and it has happened. Even accidents can take out a large area. Right now we have major problems still from Chernobyl, and everyone knows it.

I would like to point out there are alternatives that have not been considered, that I'd like to mention. A couple of weeks ago, there was an announcement in the "New York Times", and I followed it up, and yes, it's true, there was a study in North Carolina that concluded for the first time that new power plants in North Carolina were cheaper to build with solar power than with nuclear power. This is a major crossover point that should be considered. And you see there are none of the problems, there are no activation products, there are no fission products, there are no actinides, there is no pluming of unmanageable wastes that we're casting into the future for all of geologic time that require management and armies to manage them. None of the problems if you go with solar power, and with -- instead of nuclear power. And I would urge everyone to consider personally their own career options right now.

If we go ahead with this plant, we're committing to a future that dumps unmanageable problems, and a police state on the future of this country, and every country. Whereas, if we do the unspoken thing, let all our aging and outdated nuclear plants expire, and then use clean energy, non-carbon energy for the future, and not this totally toxic nuclear energy.

[050-06, Joanie Fauci] The money being spent on these EIS documents, the hearings, the pre-building, and the rest should instead be spent on research and production of alternative energy sources. Alternative energy research and production also brings jobs.

[071-01, David Hensel] I'm not a proponent of nuclear power, and I may be a wacko, but the reason I'm not a proponent of nuclear power, one of the reasons is don't think it's a very cost-effective or a very good energy source as far as being competitive on the energy market.

[083-03, Diane Jones] As far as need, I know some speakers have attempted to make a case for need in terms of jobs and tax base, and any project can be justified in terms of jobs and tax base, including cleaning toxic waste. That's no really what we want in Idaho. There are plenty of alternatives. I know that's not covered by the EIS, but in the "big picture," jobs could be created with energy systems that might be based on wind and solar, that would have less adverse environmental effects.

[095-10, Linda Leeuwrik] In both Idaho and the entire United States, we need to focus our resources on developing clean and renewable sources of energy, rather than investing more money into "dirty" sources and technologies that will leave us with waste that we have no good solutions for dealing with. Thus, I cannot state adamantly enough, how opposed I am to Areva's proposed enrichment facility in South East Idaho.

[113-02, Ken Miller] There's been talk about nuclear as a baseload power source, and as a clean alternative to coal, and also gas to a degree, I suppose. It is true that nuclear power has a capacity factor, as we heard earlier tonight, that does qualify it as baseload, but it's not the only resource that can fill that bill. The U.S. Department of Energy does not put all of the nation's future energy eggs in the nuclear basket. Far from it, it envisions a much more diverse energy portfolio that is more reliant than ever on energy efficiency, and conservation, and other truly renewable baseload energy resources.

In Idaho, we have other baseload energy resources, such as hydropower and geothermal, and our utilities are working hand and glove with DOE at the INL, and at the National Renewable Energy Laboratory, to more efficiently integrate wind and solar into our increasingly smart grid. Our region's six power plan, which was adopted by the Northwest Power and Conservation Council, projects that our region can meet 85 percent of our new load growth over the next 20 years through energy efficiency, and to a degree, renewable energy. The plan does not envision the development of any large-scale regeneration for the next 20 years, and that would include nuclear.

[103-06, Karen McCall] Areva wants US Federal loan guarantees in the amount of $2 billion dollars. US taxpayers would get far more energy for that money spent on renewables. An analysis by Idaho Power shows that nuclear power would cost significantly more per megawatt hour than wind, geothermal and biomass.

[106-04, Ted McConaughey] I also think that the – maybe the most interesting issue in favor of this project is the idea that we need a stable baseload, and a carbon-free stable baseload. And I feel like this – that there are alternatives for the baseload. I mean, certainly, hydro is one, and we have other ways of storing energy.

For example, for instance, any of these – any electricity generator can produce hydrogen, and we could store hydrogen, and I don't know the economics of these various things, but what I do know is there are many possible ways of storing energy with efficient retrieval possible.

And so to think that we require immediate access to baseload power, at all times, I think ignores the possibility that we have other storage options that might be – that might work in conjunction with ephemeral power sources like wind and solar, in order to give us the essential benefits of baseload power.

[120-02, Frank Nicholson] Thorium is a viable alternative making this type of enrichment obsolete.

[120-05, Frank Nicholson] There are less dangerous methods of nuclear power being developed. i.e., thorium. Wait until these methods are practical and then relook at a modified proposal.

[132-01, Margo and Dennis Proksa] However, there are many who know the truth about nuclear power - from mining to uranium enrichment and all the steps between - it's dirty, dangerous, and expensive, And we think there's no need for a renaissance at all because there are wiser alternatives to renewable sources.

We propose the following energy efficient strategies to be paid for with the $2 billion loan from the feds, and whatever Idaho is throwing in. Buy and install energy efficient appliances for every Idahoan who needs them: hot water heaters, refrigerators, washers, and dryers, insulate Idaho homes and commercial buildings that are inadequately protected, more cash for clunkers, expand renewable energy resource development, wind, solar, geothermal, and the grid, build bike paths throughout Idaho communities for everyone to use for commuting to work, and to schools, and for recreation, encourage bike travel by making it safe and enjoyable, get young people involved in energy issues and problem solving by developing an education program that encourages imagination, ingenuity, and self-sufficiency that are carbon-free and nuclear-free. Why not?

This would be an economic stimulus package that would diversify the population that needs help the most, the unemployed and the middle class. This could have a positive and profound effect locally and globally. It would create jobs for Americans, the appliance manufacturers who buy raw materials like steel, and delivery and installation jobs, and jobs to extract recyclable materials from old appliances. Jobs where they make insulation, and jobs to install the insulation, jobs in manufacturing fuel efficient cars, trucks, and buses, jobs in city planning to route bike paths throughout their communities, and jobs for road and path construction, as well as the materials for that expansion, jobs in bike manufacturing, jobs in renewable energy technologies.

There are abundant health benefits and energy savings with this plan. A healthier population, because of the option to pedal around town, a broader cross section of Americans who will find work in their communities, and the cost of energy at home and fuel for their vehicles will be reined in, stress levels will drop improving everyone's attitude and outlook. Other states and countries would admire Idaho for its truly progressive focus on the short and long-term goals. Idaho could become a model for sustainable living. Tourism would increase just because people would want to see progress to believe it, especially in such a scenic state.

In addition to these straightforward suggestions for energy savings, job creation, health benefits, and collective attitude adjustment, there are a wealth of other positive side effects for Idaho if AREVA does not build a uranium enriching plant here.

We would not have to loan a foreign company/country billions of dollars we can put to better use ourselves. And we don't have to give them any more money if they underestimate costs, or have technical problems they don't expect during construction, or pay for cleanup after they take their profits and return to France. Idaho would not be responsible for the safety and cost of storing tons of depleted uranium waiting patiently until the day comes when someone figures out what to do with it, and where to put it. Idahoans would not have to share the roads with thousands of loads of toxic and dangerous materials. Idahoans won't have to worry about living downwind of smoke or emissions should there be a fire, or terrorist attack at the facility. We don't have to endanger any wildlife because of habitat destruction, or lose productive farmland. We can rest assured radioactive materials will not be lost in the system and used for making bombs, since enrichment is a proliferable technology. The Snake River Aquifer would be protected from further contamination.

The advantages of not financing AREVA are huge. U.S. energy policy must shift its attention and resources to the development of carbon-free and nuclear-free alternatives that are faster, cheaper, and less risky. We can think outside the dirty, dangerous, and expensive nuclear power box.

[147-19, Joey Schueler] 15. Many things can be done to align our energy needs with the other options available to power our grids in America and with far less reliance on foreign trade:

> a. Renewable energy sources are available and new technologies can be developed through U.S. ingenuity, providing a global demand for American jobs and products.
>
> b. The American grid is old and outdated. The restructuring of our grid will effectively limit waste, save the environment and provide an economic growth engine based on America's "needs" not it's consumerist wants.
>
> c. Perhaps we should limit our energy use… I know most Americans don't want to hear that, but if it's that or sunbathing next to a depleted Uranium cesspool, which would you choose?

[168-09, Lon Stewart] The United States could invest the DOE $2 billion loan in American companies that would apply towards carbon free renewable energy such as geothermal, wind and solar power systems along with energy efficiency and conservation programs that would be on line sooner than any nuclear facility. The money would be distributed over many multiple companies rather than one facility. Even if a portion of the loan(s) defaulted, at least the money was spent in the United States, on our projects, employing our people, and we saved some energy in the process. The stone age did not end because we ran out of stone. The nuclear age should not end because we used up all the uranium. The US can become energy independent if we utilize our renewable energy sources and concentrate on conservation and efficiency measures. This sounds much better to me.

[175-03, Ellen Thomas] There is no need for a new US plant to enrich uranium for electricity production. Current supplies are clearly adequate, and as we develop healthy solar, wind, tidal and other truly clean energy systems, there is no need for new nuclear power plants.

[181-10, Roger Turner] The following conditions, in combination, eliminate the need for this project: (a) recent finds of large amounts of natural gas in the U.S. is reducing interest in nuclear power and rendering nuclear power uneconomical in comparison. (b) the cost of solar and wind power are coming down resulting in a larger role for these power sources and; (c) with the reduction of nuclear power plants in the U.S. domestic uranium enrichment plants will be able to supply the nuclear power industry with ample supplies of U-235, without the need for this proposed, expensive, AREVA plant. The aforementioned points are detailed below:

(A) Recent finds of large amounts of natural gas fields in the U.S. reducing the interest and momentum by power companies in developing nuclear power. New finds of domestic natural gas has resulted in a switch in interest from coal and nuclear to gas for power supplies. A recent MIT study, that is more up-to-date than the study referenced in the draft EIS, reveals a likely economically realistic switch to natural gas for the United States power supplies. This study, by a group of 30 MIT faculty members, researchers and graduate students reflects the more accurate conditions for power plant construction in the United States for the next 40 years. The study shows a baseline global estimate of recoverable gas resources reaching some 16,200 trillion cubic feet (Tcf), enough to last over 160 years at current global consumption rates. (The Future of Natural Gas -- Study finds significant potential to displace coal, reducing greenhouse gas emissions, MIT, June 2010) In addition the study reports the following trend:

"Natural-gas consumption will increase dramatically and will largely displace coal in the power generation sector by 2050 (the time horizon of the study) under a modeling scenario where, through carbon emissions pricing, industrialized nations reduce CO_2 emissions by 50 percent by 2050, and large emerging economies, e.g. China, India and Brazil reduce CO_2 emissions by 50 percent by 2070. This assumes incremental reductions in the current price structures of the alternatives, including renewables, nuclear and carbon capture and sequestration."

According to U.S. Energy Information Administration Annual Energy Outlook 2010, domestic and Canadian gas supply will increase, at least to 2035.

Shale gas provides largest source of growth in U.S. natural gas supply

The increase in U.S. natural gas production from 2008 to 2035 in the AEO-2010 Reference case results primarily from continued growth in production of shale gas, recent discoveries in deep waters offshore, and, to a lesser extent, stranded natural gas brought to market after construction of the Alaska natural gas pipeline is completed in 2023. Shale gas and coalbed methane make up 34 percent of total U.S. production in 2035, doubling their 17-percent share in 2008. Shale gas is the largest contributor to the growth in production, while production from coalbed methane deposits remains relatively stable from 2008 to 2035.

(B) The cost of solar power is lower than nuclear power, resulting in a larger role for these power sources. The New York Times reports the following article:

Solar power costs have been declining, the costs of nuclear power have been rising inexorably over the past eight years, said Mark Cooper, senior fellow for economic analysis at Vermont Law School's Institute for Energy and Environment. Estimates of construction costs — about $3 billion per reactor in 2002 — have been regularly revised upward to an average of about $10 billion per reactor, and the estimates are likely to keep rising, said Mr. Cooper, an analyst specializing in tracking nuclear power costs. (New York Times; Special Report: Energy and Environment, Nuclear Energy Loses Cost Advantage, July 26, 2010)

(C) Switch to other power sources means no need for Areva. Given the above two examples of a switch to other power sources than nuclear, the existing plans for enrichment will be adequate to supply the U.S. nuclear industry. The Les Urenco company has plans to produce up to

6 million SWU; while the USEC produces 10.5 Million SWUs. Also, in 2008, an amended agreement allows Russia to export increasing amounts LEU available to nuclear power companies to the United States, starting with 442,000 pounds in 2011 and up to 13.7 Million pounds in 2020.

While it is true that some nuclear plants may expand their existing power plant, such as Watts Bar 2 (TVA), there will be nowhere near the number of new units predicted by the NRC's Energy Assessment Administration Report (EIA 2009a) and nowhere near the need for SWUs referenced in the draft EIS for AREVA; and because of many nuclear plants are decommissioning -- there will be less and less need for enriched uranium. Many of the firms that initially consider nuclear construction are bound by State requirements that they be 'prudent investors'. Therefore, many initial applicants to NRC are dropping out completely, or keeping them on hold.

Consequently, the EIS should carefully review current studies and assessments that show a general swing to natural gas, solar and wind. Unfortunately the NRC fails to take a hard look at this purported need. A nuclear power plant hasn't been built in the United States in two decades. The EIS needs to provide economic comparisons of nuclear vs. Solar and Natural Gas. More and more companies are dropping their nuclear power applications to NRC, and therefore the need for this plant is not justified, given the existing and soon to open facilities in the U.S. to provide sources of enriched uranium.

[193-12, Liz Woodruff, on behalf of the Snake River Alliance] This is from a study by Mark Cooper of Vermont Law School in June of 2009, and he argues that the cost projections for new reactors are four times as high as the initial nuclear renaissance projections. So there's an economic obstacle, significant economic obstacle that has to be overcome for this supposed renaissance to occur.

He argues that nuclear reactors are, in fact, the worst option from the point of view of the consumer in society.

He talks about the ways in which efficiency, cogeneration, biomass, geothermal, other renewables, are less costly and more viable forms of energy production, leaving us with six cents per kilowatt hour versus 12 to 20 cents per kilowatt hour, to pursue the nuclear option.

And I would argue, in fact, that this third point should have been an alternative pursued in the EIS. You heard them say that they looked at the "no alternative," or the "no action alternative." Why didn't they look at the efficiency and renewable energy alternative?

And finally, the additional cost of building a hundred new nuclear reactors could be 1.9 to 4.4 trillion dollars. Now I know that "billion" has lost its shock value lately, but we should kind of be shocked by the trillion number, and this economic obstacle is certainly one that calls into question the hypothesis posed by the NRC, that there'll be a need for new enriched uranium.

And just to underscore this, this is a chart that was just released in a Duke University study in July of this year, and it shows, with the yellow line, the cost of nuclear going up and the cost of solar coming down.

So this economic obstacle presented by the nuclear -- you know, before the nuclear industry, is one that renewables are not facing. As a matter of fact, the costs are coming down.

And again, this obstacle is one that we believe will stop the supposed nuclear renaissance, and actually lead to a nuclear collapse, therefore nullifying the claim that's the premise of the NRC, that there's a need for new enriched uranium.

Response: *The issues raised in the above comments are national energy policy issues that are not within the scope of this EIS, which is for the proposed EREF. The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of uranium enrichment services. The alternatives in the comments raise national policy issues (e.g., finding other sources of energy) that would not satisfy the need of the proposed action, and therefore such alternatives are not within the scope of the EIS.*

Comment: The following comments raise objections to the preconstruction exemption granted to AES by the NRC and suggest that the impacts of preconstruction were not evaluated in the Draft EIS.

[015-18, Beatrice Brailsford] Because of an exemption granted in March 2010, Areva will be allowed to start "preconstruction" activities as early as October 2010. This preconstruction exemption shows a bias towards licensing. It appears the NRC has already made the decision to allow the project to move forward even before the necessary impact assessments and public comment periods have been completed. Preconstruction constitutes one part of a major federal action. 40 CFR 1500.1(b) requires that information be available before an agency makes decisions or takes any action. It is impossible for the NRC to produce a final EIS and ROD before preconstruction starts in October. The NRC must either revise the current draft to include the impacts of preconstruction or must write an additional EIS that specifically addresses preconstruction activities. The NRC must not allow preconstruction to commence until after a ROD is issued.

[015-20, Beatrice Brailsford] The transmission lines compound the negative impact the will accrue to pronghorn antelope, greater sage grouse, and ferruginous hawks, which will all likely abandon the Areva site and surrounding areas. Sage grouse is a candidate species for federal protection. The Idaho Department of Fish and Game reaffirmed the threats transmission lines would pose to wildlife, challenged the methodology of sage grouse and lek analysis in the draft EIS, recommended burying transmission lines, and suggested Areva submit to plans to mitigate for the expected wildlife impacts. These concerns do not appear to have been addressed in this EIS and must be addressed before any preconstruction activities are allowed or before this EIS review continues.

[018-02, Deb Brown; 035-01, Stephen Crowley; 055-02, Claudia Galaviz; 056-01, Mark Galaviz; 063-02, Martha Haga; 101-02, Jody May-Chang; 117-02, Richard Morgan; 188-02, Lana Weber-Wells] In particular, I am concerned that the NRC will allow Areva to start "pre-construction" activities in October of 2010 — which would be before the Record of Decision on this license is released. Moreover, preconstruction constitutes one part of a major federal action and 40 CFR 1500.1(b) requires that information be available before an agency makes decisions or takes any action. The impacts of preconstruction must be evaluated in the draft EIS, or another EIS should be initiated to assess preconstruction impacts.

[025-05, Hon. Sue Chew] Trained as clinical pharmacist, I am taught to make sure of the facts and additionally to cut corners ultimately costs lives or causes morbidity. I am thus particularly concerned that the NRC start of the “preconstruction” activities in October of 2010 - which would be before the Record of Decision is released.

In addition, preconstruction comprises one part of a major federal action in which 40 CFR 1500.1(b) requires that information be available before an agency makes decisions or takes any action. The impacts of preconstruction must be evaluated in the draft EIS before preconstruction begins. Alternatively, I would strongly recommend that an additional EIS should be initiated to assess preconstruction impacts.

[027-02, Sara Cohn] Preconstruction has been mentioned by other folks, and I will mention it also. It is unclear under what authority NRC can offer the exemption for preconstruction activities when such impacts extend outside of NRC jurisdiction. For example, preconstruction activities will impact species protected under the Endangered Species Act, such as sage grouse, and others, and waters protected under the Safe Drinking Water Act, specifically the sole source aquifer, the eastern Snake River plain. The project must consult with agencies like EPA and the U.S. Fish and Wildlife Service, in order to analyze and release for public comment the environmental and public health impacts of preconstruction activities, including clearing, blasting, and grading, prior to conducting such activities.

[027-12, Sara Cohn] Preconstruction Exemption: It is unclear under what authority NRC may offer exemptions for preconstruction activities when such impacts extend outside of NRC jurisdiction. For example preconstruction activities may impact waters protected under the Safe Drinking Water Act – the Eastern Snake River Plain Aquifer. The project must consult with EPA in order to ensure the preconstruction activities will not impact the Eastern Snake River Plain aquifer, a sole source aquifer for eastern Idaho.

[027-21, Sara Cohn] Preconstruction Exemption: It is unclear under what authority NRC may offer exemptions for preconstruction activities when such impacts extend outside of NRC jurisdiction. For example preconstruction activities will impact sensitive and candidate species. Project impacts would normally require NRC to coordinate with the Idaho Department of Fish and Game in order to analyze and release for public comment the environmental and public health impacts of preconstruction clearing, blasting, and grading prior to conducting such activities. According to the draft EIS, such preconstruction activities are expected to take place prior to the licensing of the proposed facility. These efforts undermine the purpose of the EIS process. A mitigation plan must be created to avoid, minimize, and plan for mitigation of affected habitat.

[030-01, Kerry Cooke] There is nothing in the EIS to suggest there is any reason for haste. There’s no emergency facing this country, or any other country, that this facility must be built as soon as possible. There’s -- I guess I’m just going to say, that I think that there’s -- there must be some proof laid out here, that there’s any reason to say work needs to start in October, when so many questions are left to be answered, so much is still -- we’re here talking to you tonight about effects on the environment, many questions we have about the road into it, transmission, and yet, you’re going to allow preconstruction. It’s totally puzzling to me, and I think really needs much more explanation, and I actually believe shouldn’t happen.

[030-06, Kerry Cooke] Haste: What's the hurry? Why is the NRC allowing Areva to start a "preconstruction" phase this fall? During so-called preconstruction, the environment will be greatly disturbed. I appear before you today in good faith that a decision has not been rendered on this proposal, that all Verbal Comment will be considered, and that the EIS will be properly completed and vetted before a decision is reached. There is no emergency that demands that this project be fast-tracked, no national crisis dictating that rules be bent to allow early work. The haste shown by Idaho lawmakers in pushing through funding for a road to the Areva site, while not part of NRC domain, raises even higher my concern that decisions are being make by greed rather than science and sound energy and fiscal policy. There is no reason to start preconstruction before the EIS is released in final form.

[035-02, Steve Crowley] In particular, I am concerned that the NRC will allow Areva to start preconstruction" activities in October of 2010 - which would be before the Record of Decision is released. Moreover, preconstruction constitutes one part of a major federal action and 40 CFR 1500.1(b) requires that information be available before an agency makes decisions or takes any action. The impacts of preconstruction must be evaluated in the draft EIS, or another EIS should be initiated to assess preconstruction impacts.

[048-04, Genevieve Emerson] I am appalled that pre-construction would even remotely be considered as a viable option, as sage brush steppe can take a very long time to recover after it has been razed. I strongly feel that the citizens of Idaho need more time to consider the implications of such a facility, and pre-construction is extremely short-sighted and hasty.

[078-03, Hon. Wendy Jaquet] 3. I thought the exemptions were excessive.

[086-01, Paula Jull] The NRC has shown bias in allowing Areva to begin preconstruction activities before the decision has been made.

[087-01, Dennis Kasnicki] Comment 1: At the subject meeting some attendees commented that the NRC giving AREVA a "preconstruction exemption" constituted a bias toward ultimate license approval. I totally agree. As paranoid as the NRC was regarding "appearances" (as I saw it when I was with Region II) I can't believe you guys got away with that one.

[088-07, Stan Kidwell; 095-07, Linda Leeuwrik; 122-06, Kathy O'Brien; 175-02, Ellen Thomas] The NRC has demonstrated a clear bias toward licensing by granting Areva permission to begin "preconstruction" activities in October, long before any final decision has been made. The NRC must withdraw its permission to begin.

[105-02, Eve McConaughey] Why were exemptions for pre-construction activities given prior to licensing?

[113-03, Ken Miller] On the transmission issue, the NRC's exemption that authorizes AREVA to undertake preconstruction activities as not part of the proposed action should not include exempting utilities' installations including transmission lines and associated substations, and other utility infrastructure.

[113-14, Ken Miller] As mentioned above, NRC erred in permitting AES to undertake myriad preconstruction activities as beyond the purview of the EIS. This is only one indication that the

NRC appears biased toward approval of the EREF application even as it is soliciting public comment and review of the Draft EIS. It is not too late for the NRC to remedy this egregious oversight – deliberate or otherwise – and to subject this project to a complete environmental review before any further preconstruction activities are allowed to take place.

[118-02, Caroline Morris] The possibility of NRC's allowing the contractor Areva to begin "preconstruction" activity in October 2010 troubles me, because it would predate release of this license's Record of Decision. Clearly, preconstruction is one part of this major federal action. 40 CFR 1500.1(b) requires agencies to release available information before making the pertinent decisions or taking relevant actions. This draft EIS must evaluate the preconstruction impact factors, since there is no time to initiate another EIS to consider preconstruction.

[144-02, Sara Rodgers] Given that nuclear energy and the extraction of nuclear material create multi generational risk to human and environmental health, it is important to ensure all necessary precautions are taken seriously and that the preventative principle is the dominant paradigm when considering or planning their use. I am concerned that the NRC may allow preconstruction activities prior the adoption of the EIS. This is a poor use of wise decision making and resources. To demonstrate good faith efforts in preserving the health of Idaho and Idahoans, I request that no activities are undertaken until the EIS includes preconstruction activities and the entire EIS is adopted.

Given that Areva corporation which desires this license and access to Idaho's resources is an international firm with a poor environmental record, it is important to ensure no risk to domestic communities in case a environmental hazard occurs in the near or very long future. Since the risk of nuclear waste may occur for thousands of years, a prolonged planning process with thoughtful regulations to ensure no risk to domestic populations seems a small sacrifice than to start preconstruction without a well thought out and enforceable plan.

[148-01, Eric Schuler] Taken as a whole, the EIS suggests that this facility will have a relatively low impact on the environment. Of course several aspects of this, of the — have been overlooked in making this conclusion. For instance, as others have already noted, it does not consider the impact of the exempted preconstruction activities, the high risk of wildfires in the area, or the lack of an appropriate disposal pathway for depleted uranium. Accordingly, the true impact of this facility is certainly larger than the DEIS suggests.

[153-11, Andrea Shipley] Because of an exemption granted in March 2010, Areva will be allowed to start "preconstruction" activities as early as October 2010. This preconstruction exemption shows a bias towards licensing. It appears the NRC has already made the decision to allow the project to move forward even before the necessary impact assessments and public comment periods have been completed. (draft EIS, xxviii).

Preconstruction constitutes one part of a major federal action. 40 CFR 1500.1(b) requires that information be available before an agency makes decisions or takes any action. Considering that public comment is open until September 13, 2010. It is impossible for the NRC to produce a final EIS and ROD before preconstruction starts in October.

[197-11, Andrea Shipley, on behalf of the Snake River Alliance] Because of an exemption in March 2010, AREVA will be allowed to start preconstruction activities as early as October 2010. This preconstruction exemption shows a bias toward the licensee.

[169-04, Margaret Stewart] And it has been spoken about before that preconstruction activities by AREVA are a travesty to the public process of honest democracy. Allowing preconstruction activities to proceed without an analysis of the ensuing environmental and human effects shows a clear intention by the NRC to license this facility. And, to me, that appears to make a total sham of the impact assessments, and also of these public comments and hearings.

[181-23, Roger Turner] NRC erred by approving pre-construction of AREVA before an EIS was provided to the public. The timing of an EIS is critical. CEQ regulations instruct agencies to "integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values." 40 CFR §1501.2 (1987). An EIS must be prepared "early enough so that it can serve practically as an important contribution to the decision-making process and will not be used to rationalize or justify decisions already made." Andrus, 442 U. S., at 351–352, n. 3 (quoting 40 CFR §1502.5 (1979)).

BY NRC already approving pre-construction designs, they have showed that they are using the EIS to rationalize or justify decisions already made. Federal funds have already been spent on this project, before the EIS was available to the public. This is in violation of NEPA.

[184-16, Kitty Vincent] Because of an unwarranted exemption granted in March 2010, Areva will be allowed to start "preconstruction" activities as early as October 2010. This preconstruction exemption shows a bias toward licensing. It appears the NRC has already decided to allow the project to move forward even before the necessary impact assessments and public comment periods have been completed. (draft EIS, xxviii). Preconstruction constitutes one part of a major federal action. 40 CFR 1500.1(b) requires that information be available before an agency makes decisions or takes any action. Considering that public comment is open until September 13, 2010. It is impossible for the NRC to produce a final EIS and ROD before preconstruction starts in October.

[184-21, Kitty Vincent] The Idaho Department of Fish and Game, in a response to NRC dated April 14, reaffirmed the threats transmission lines would pose to wildlife (draft EIS B-26) and challenges the methodology of sage grouse and leak analysis in the EIS (B-27), recommends burying transmission lines, and suggests Areva submit to plans to mitigate for the expected wildlife impacts. These concerns do not appear to have been addressed in this EIS and must be addressed before any preconstruction activities are allowed or before this EIS review continues.

[191-01, Liz Woodruff] Most importantly, preconstruction cannot begin in October 2010. That would be a completely unacceptable outcome of these proceedings.

[191-05, Liz Woodruff] Moreover, preconstruction plans must be halted and no preconstruction activities should be allowed until an evaluation of the environmental impacts of those activities has been integrated into an EIS. To allow preconstruction in October of 2010 is unacceptable, and I believe such action will be adamantly opposed by residents of the state.…

• Because of an exemption granted in March 2010, Areva will be allowed to start "preconstruction" activities as early as October 2010. This preconstruction exemption shows a bias towards licensing. It appears the NRC has already made the decision to allow the project to move forward even before the necessary impact assessments and public comment periods have been completed. draft EIS, xxviii)

• Preconstruction constitutes one part of a major federal action. 40 CFR 1500.1(b) requires that information be available before an agency makes decisions or takes any action. Considering that public comment is open until September 13, 2010. It is impossible for the NRC to produce a final EIS and ROD before preconstruction starts in October. The NRC must either revise the current draft to include the impacts of preconstruction or must write an additional EIS that specifically addresses preconstruction activities. The NRC should not allow preconstruction to commence until after a ROD is filed.…

• The draft EIS (draft 4-5) notes that "The greatest potential for impacts on historic and cultural resources would occur during ground disturbance during preconstruction." Yet these preconstruction activities are specifically removed from review in this study. *Again, the impacts of preconstruction must be integrated into this draft EIS.*

[193-15, Liz Woodruff, on behalf of the Snake River Alliance] AREVA was given an unwarranted exemption, granted in March of 2010, to start preconstruction activities as early as October of this year, two months away. This preconstruction exemption shows a bias towards licensing, without hearing public comment first.

But preconstruction constitutes one part of a major federal action. 40 CFR 1500.1(b) requires that information be available before an agency makes decisions or takes any action.

The NRC cannot simply grant an exemption for activities with excessive environmental impacts.

If you look at the EIS, all the environmental impacts happen in preconstruction, and then they aren't being taken into consideration, in the EIS, as an area of impact because we granted an exemption for those impacts.

And they must either include preconstruction in the EIS, or write an additional EIS to evaluate preconstruction impacts. Preconstruction activities cannot occur until the impacts are analyzed, and the record of decision is signed, and your comments getting in on September 13th will certainly not give them adequate time before preconstruction starts to issue a record of decision, and this is unacceptable.

[193-19, Liz Woodruff, on behalf of the Snake River Alliance] Now this is something that's considered as a preconstruction impact in EIS, so this isn't given the weight and the technical impact review, the small, moderate, and large that you saw.

But more specifically, in the EIS, in Appendix B, the Idaho Department of Fish and Game affirms that the threat to transmission lines would be great for wildlife, and they recommend barring transmission lines and suggest AREVA submit to plans to mitigate for the expected wildlife impacts. These concerns must be addressed in the EIS, before any preconstruction activities are allowed.

[193-20, Liz Woodruff, on behalf of the Snake River Alliance] And all of the issues associated with the construction of this facility -- accidents, fire, air and water quality degradation, the development of this land will impact several species, including raptors and sagebrush obligate species. This includes the sage grouse. The sage grouse is a candidate species for federal protection, and the only reason it's not listed yet is because of bureaucratic process of listing. There's a delay. But the treatment of this issue is inadequate in the draft EIS.

The impacts to sage grouse from transmission and preconstruction warrant integration into this EIS, or separate EISs, specifically around preconstruction and transmission issues.

[192-14, Lisa Young] Indeed, I hope to see preconstruction activities prohibited until a further analysis of the environmental impacts of these activities can be fully evaluated, and until the facility is actually licensed (a rather logical notion, I think).

Response: *On March 17, 2010, the NRC granted AES an exemption from the requirements of the regulations under 10 CFR 30.4, 30.33(a)(5), 40.4, 40.32(e), 70.4, and 70.23(a)(7), which govern the commencement of construction (NRC, 2010c). This action was in response to AES's request dated June 17, 2009 (AES, 2009b), as supplemented by letter dated October 15, 2009 (AES, 2009c), that requested an exemption from specific requirements of 10 CFR Parts 30, 40, and 70 to allow AES to commence certain construction activities associated with the proposed EREF before completion of the NRC's environmental review under 10 CFR Part 51. The exemption authorizes AES to conduct the specified preconstruction activities, provided that none of the facilities or activities subject to the exemption would be components of AES's Physical Security Plan or its Standard Practice Procedures Plan for the Protection of Classified Matter, or otherwise be subject to NRC review or approval.*

As discussed in the March 17, 2010, exemption approval, the NRC staff determined that granting AES's exemption request is authorized by law; and has reasonable assurance that granting the exemption request would not endanger life or property or the common defense and security, and is otherwise in the public interest. Also, pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment.

Approval of the exemption request does not indicate that a licensing decision has been made by the NRC. Preconstruction activities would be completed by AES with the risk that a license may not be issued. Some of the preconstruction activities may be deferred by AES until, or continue after, the commencement of construction, if a license is issued. Before a license would be granted, the Final EIS must be issued, and the ASLBP must review the NRC staff's SER (NRC, 2010b) and Final EIS, conduct mandatory hearings on the staff's safety and environmental reviews, and issue adjudicatory decision(s), which are subject to Commission review.

Although the exemption allows AES to proceed with certain activities that are considered outside of NRC regulatory purview (they are not related to radiological health and safety or the common defense and security) before obtaining an NRC license to construct and operate the proposed EREF, the potential impacts of preconstruction were fully and accurately analyzed in detail, in Section 4.2 of the Draft EIS. In addition, other Federal agencies, the Shoshone-Bannock Tribes, and State and local government agencies have been consulted or otherwise contacted regarding these impacts and the other impacts of the proposed project, as required.

The Federal, State, and local agencies with jurisdiction over, or other interest in, the preconstruction activities, and the Shoshone-Bannock Tribes, have reviewed the Draft EIS and have raised no objections to the preconstruction exemption. By law, AES is required to obtain all other required Federal, State, and local permits and approvals in order to conduct preconstruction activities.

I.5.6 Nuclear Proliferation

Comment: The following comments relate to issues and concerns about proliferation and nuclear weapons development related to the uranium enrichment technology and enriched uranium product of the proposed EREF.

[015-17, Beatrice Brailsford; 191-24, Liz Woodruff] The NRC should produce an unclassified non-proliferation assessment for the Areva enrichment plant. To refuse to do so based on the fact that Areva intends to enrich uranium to no more than 5% misses an important point. Gas centrifuge uranium enrichment is a proliferable technology. A comparable case occurred in Idaho during the environmental evaluation of pyroprocessing. In that instance, no one was arguing that the DOE intended to recover pure plutonium. But, because pyroprocessing is a proliferable *technology,* the DOE produced a non-proliferation assessment as part of the final EIS on the *facility.*

[029-02, Richard Conner; 063-04, Martha Haga; 099-02, Brent Mathieu; 100-07, Wendy Matson; 112-02, Mark Menlove; 161-04, Marisa Smith; 199-02, Dina Bond; 200-02, Sean Campbell; 201-02, Giovanna Campos; 203-02, Danielle Dugge; 204-02, Susan Filkins; 207-02, Drew Harris; 208-02, Emily Harvey; 213-02, Darvel Jones; 214-02, Jacob King; 216-02, Beau Lee; 218-02, David Minick; 219-02, Neil Miyaoka; 220-02, Tim Naftzger; 221-02, Mike Perrington; 223-02, Mason Richens; 226-02, Jessica Toinga; 227-02, Joseph Voss] The draft EIS is inadequate and fails to address the fact that uranium enrichment is a technology used for proliferation. The NRC should produce an unclassified non-proliferation assessment for the EREF. To refuse to do so based on the fact that Areva intends to enrich uranium to no more than 5% misses an important point: Gas centrifuge uranium enrichment is a proliferable technology and precedents exist for nonproliferation assessments of proliferable technology whether the license allows for proliferation or not.

[044-01, Dennis Donnelly] I would point out that this section of considering alternatives assumes that it has to supply enriched uranium for national energy security; that is, they assume that this plant is going to be built, and it neglects the alternative of not building these plants.

I would point out that if you build this facility, it commits America, this is the unstated thing, it commits America essentially to a future that includes nuclear power, and all the nightmares associated with it. I would like to point out that there are other options that some of the nightmares would be a police state in our communities, where the Soviet Russians and the Germans that we already have that police state. These things are so dangerous that we're considering bombing Iran and the Israelis are considering bombing Iran for exactly the same facility. It's so dangerous. The reason is, of course, that you build this facility, and then you build the reactors, the reactors breed plutonium, plutonium can make weapons. You can't take that away once you've done it.

The police state is a terrible thing. The rest of it has to do with the threat of military attack on these facilities, on the plants. Nobody seems to address that all these atomic power plants are built above ground. Any kind of terrorist or military attack on any one of them can take out two states, that much area. We've seen Chernobyl. We know it can happen, and it has happened. Even accidents can take out a large area. Right now we have major problems still from Chernobyl, and everyone knows it.

I would like to point out there are alternatives that have not been considered, that I'd like to mention. A couple of weeks ago, there was an announcement in the "New York Times", and I followed it up, and yes, it's true, there was a study in North Carolina that concluded for the first time that new power plants in North Carolina were cheaper to build with solar power than with nuclear power. This is a major crossover point that should be considered. And you see there are none of the problems, there are no activation products, there are no fission products, there are no actinides, there is no pluming of unmanageable wastes that we're casting into the future for all of geologic time that require management and armies to manage them. None of the problems if you go with solar power, and with -- instead of nuclear power. And I would urge everyone to consider personally their own career options right now.

If we go ahead with this plant, we're committing to a future that dumps unmanageable problems, and a police state on the future of this country, and every country. Whereas, if we do the unspoken thing, let all our aging and outdated nuclear plants expire, and then use clean energy, non-carbon energy for the future, and not this totally toxic nuclear energy.

[050-14, Joanie Fauci] The last point I wish to have addressed in the EIS concerns the enriched uranium product. As this material has the potential to be used in nuclear weapons, I ask that the NRC make it a requirement of the license that the enriched uranium is not to leave US soil.

[061-01, Nancy Greco] I am very concerned about the possibility that Areva, a French owned company, can quite possibly put our country in danger by opening the way to nuclear weapon development.

[067-07, Mike Hart] With respect to proliferation, I am a member, or I was a member, of the Global Freeze Movement. I'm a member of Global Zero. I don't like nuclear weapons. I have concerns about proliferation, but not for this project. Uranium enrichment is going to occur throughout the world because there will be nuclear energy throughout the world. I would like to see that enrichment occur in the United States, and I think if there's any place the bad guys won't find enrichment technology, and proliferate nuclear technology to weapons it would be right here in Idaho Falls. I just don't see that technology escaping our backyard. So, I think with respect to proliferation, the NRC probably should give credit to this facility, because it will be contained, and by having proliferation -- by having enrichment here, there would be far fewer proliferation concerns for my part. I'd much rather have the global nuclear fuel cycle provided by the United States, even if we do export the fuel.

[071-02, David Hensel] A big concern I have with nuclear power is the risk of weapons proliferation. And I don't think the EIS does a very good job of addressing that. The Federation of American Scientists call, and I'm going to quote here, "Gas Centrifuge Uranium Enrichment an open road to a nuclear weapon." It is what they consider breakout technology, meaning that a plant that enriches uranium for nuclear power production can also be used to convert uranium to a level rich enough to be used in a weapon. Once the feedstock has been raised to what you guys call a low-level of enrichment, you're more than halfway to the point of being able to produce weapons-grade uranium.

The gas centrifuge plants like AREVA is talking about using are definitely more efficient than the old methods, but they're also smaller, easier to hide. They do use less electricity and less water, which is a great thing, but it also means that it's more difficult to detect where they're being used, and where they're being used in a manner that's not appropriate. And I think Iran has come up several times, and it's going to be one of the flashpoints in the world, and it's all about this technology that we're discussing here. And I'm not worried about what's going to happen over here as far as producing nuclear-grade uranium. We have other ways of doing that, but I think we need to pay attention to our perception with the rest of the world. The United States, for better or worse is no longer the only big guy on the block. And if you look at the people that have nuclear weapons now, nuclear power generation was the path, whether they did it dangerously or not, to get to their nuclear weapons capabilities.…

One thing I would specifically like to ask you to do, I think you, the NRC, should produce an unclassified non-proliferation assessment for this plant. And I know that the talk has been well, the uranium is only going to be enriched to 5 percent, so it's not a proliferation risk, but that does miss the point. It's a proliferable technology. And a few years ago, a decade ago, or whatever, there was the pyroprocessing plant that the Department of Energy was going to build here. No one was saying that they were going to make weapons grade plutonium, but they did this assessment because the process that they were doing was a proliferable technology. And I really think that you should do this, and provide it in a non-classified manner, and provide that to the public.

[088-06, Stan Kidwell; 095-06, Linda Leeuwrik; 175-05, Ellen Thomas] Gas centrifuge uranium enrichment is a technology the Federation of American Scientists calls "an open road to a nuclear weapon." At the very least, the Nuclear Regulatory Commission must produce an unclassified proliferation assessment of Areva's plant.

[096-03, Arjun Makhijani] Finally, I would just remind you that there needs to be a non-proliferation section in this. The non-proliferation is dismissed by saying 5% uranium cannot be used to make weapons. This is completely correct, of course. But it has been the foreign policy of this country with respect to Iran that a commercial enrichment plant has a proliferation risk, even though they say, rightly or wrongly, which is a separate issue, that they're building a commercial plant for commercial purposes. It's different to build a commercial enrichment plant in a weapon state that's got surplus highly enriched uranium, completely different, but it has to be part of your analysis. You can't say -- you can't undermine US-Foreign policy by saying 5 percent enrichment plant is not a proliferation issue, because you can't make weapons with 5 percent enrichment. You change the valving arrangement in the enrichment plant, you can make 90 percent enriched uranium. And you know that, and I know that. You can't ignore this very critical problem in your haste to give a license, and undermine non-standing U.S. non-proliferation policy.

[098-05, Linda Martin; 098-14, Linda Martin] In addition, there is no evidence of any danger or threat of nuclear proliferation from the design, construction, or operation of the proposed facility.

[103-07, Karen McCall] A uranium enrichment plant can easily be converted into to making bombs. This is an unacceptable possibility for nuclear proliferation.

[108-01, John McMahon] • The USA spent $5+TRILLION on Nuclear Weapons and related technology since 1945. This is an astounding waste of our Nations' engineering skill and industrial capability!

The Obama administration apparently has already decided to enrich Uranium, something we may even go to war over (again!!) to prevent the Iranians from doing! This can only mean the US Congress will give its "blessing"(?) [The same "blessing" they gave to Custer and Generals Crook and Miles]. Only this time it will be to make new Nuclear Weapons.

- This is unacceptable in light of our having just recently re-negotiated the Strategic Arms Reduction Treaty (START) with Russia, et al.

- If the United States continues to enrich Uranium it does not need (or use) for Power production and nuclear weapons retrofits, or God forbid, "New" N-Weapons, then this is the height of fear mongering stupidity.

- This is not about our National Defense or our Energy Policy!

- It is irresponsible fiscal treachery! Taxpayers will revolt once they learn the true motives for the Eagle Rock Enrichment Facility!

Here in Idaho we can and will mount a campaign to unseat some or all of the Four Horsemen of the Apocalypse we send to the US Congress, especially since they are receiving heaps of filthy lucre from the special interests promoting the Areva boondoggle!

[131-05, Morty Prisament] Proliferation and Terrorism: The draft EIS fails to adequately address the fact that uranium enrichment is a technology used for proliferation. The NRC should produce an unclassified non-proliferation assessment for the EREF. To refuse to do so, based on the fact that Areva intends to enrich uranium to no more than 5%, misses an important point: Gas centrifuge uranium enrichment is a proliferable technology and precedents exist for non-proliferation assessments of proliferable technology, whether the license allows for proliferation or not. NRC is aware that enriching uranium from commercial to weapons-grade is hardly a formidable obstacle. In fact, the enrichment process becomes exponentially easier as levels of enrichment increase. Moreover, the new centrifuge technology essentially doubles this nuclear enrichment capability. These are the very issues that the U.S. is concerned about in the case of Iran's nuclear program. Absent a thorough analysis of proliferation and terrorism issues, the DEIS would be clearly inadequate.

[147-12, Joey Schueler] 8. Enriched Uranium is one of the critical components required for nuclear weapons: http://en.wikipedia.org/wiki/Enriched_uranium. Bringing this component to Idaho means an increased risk of terrorist threat and/or at least the assistance in nuclear proliferation.

16. This one's more personal, but my mom taught me to be a "lover not a fighter" and the product of this plant can be used to devastate entire civilizations (I say this on the 65th

anniversary of the bombing of Hiroshima and Nagasaki). We only just now sent a representative from the U.S. to stand with the Japanese people in remembrance to those hundreds of thousands of innocent civilians killed by this action. This is an important step in the United States diplomatic stance with the world. Why do we insist on undermining it by not practicing what we preach in regards to nuclear non-proliferation? In the words of a beautiful woman who made public comment at the EIS hearing who had been notified of her potential exposure to radiation by the government near the Hanford Nuclear Plant, “Such Hubris”. Can’t we find a better path? Is the money too good?

[168-05, Lon Stewart] If this is a similar type of enrichment plant that Iran has built, and the US is contemplating war over this issue, why would the US allow such a plant to be built on their shores? We are having enough problems world wide, why create more problems for ourselves. There are no huge benefits for the US in this venture. This does not sound good to me.

[175-06, Ellen Thomas] Areva’s plant would not increase US energy security or nonproliferation by providing a “domestic” source of enriched uranium. Areva is owned by the French government. The raw material for the plant would be imported. Some portion of its product would be exported.

[181-12, Roger Turner] The Draft EIS States that nuclear proliferation was dropped from the scope of this EIS:

In the case of nonproliferation, the intent of constructing and operating the EREF is to produce uranium enriched in uranium-235 up to approximately 5 weight percent for use in commercial nuclear reactors, as mentioned in Section 1.2. This level of enrichment is not sufficient to produce nuclear weapons. Nonproliferation is therefore out of scope.

The Non Proliferation Treaty (NPT) Signed by the U.S. and 188 other countries, provides, among other thing, that members will: Provide assurance through the application of international safeguards that peaceful nuclear energy in NNWS will not be diverted to nuclear weapons or other nuclear explosive devices. The centrifuge technology violates this agreement. The NPT is an indispensable legal and political instrument in preventing further proliferation of nuclear weapons. In the absence of the NPT, many other countries might well acquire nuclear weapons. Without the NPT safeguards requirements, monitoring and inspections of nuclear materials and facilities in non-nuclear weapon states would be significantly weakened.

Although the 5% level of enrichment is not sufficient to produce nuclear weapons, the simple addition of more centrifuge units, or a re-arrangement of the cascade system, may render such a facility capable of producing weapons-grade Uranium. Consequently, the draft EIS erred in not addressing the proliferation potential of this project. The Treaty on the Non-Proliferation of Nuclear Weapons, also Nuclear Non-Proliferation Treaty (NPT or NNPT) is a treaty to limit the spread (proliferation) of nuclear weapons. The treaty came into force in1970, and currently there are 189 states party to the treaty, five of which are recognized as nuclear weapon states: the United States, Russia, the United Kingdom, France, and China. Four nonparties to the treaty are known or believed to possess nuclear weapons.

Monitoring and verification is very important under the Treaty and it would be improbable that the U.S. or the International Atomic Energy Agency (IAEA) could count the centrifuge units or the analyze the way that a facility would carry out repeating cycles through the centrifuge units to achieve weapons grade Uranium.

Consequently, the issue of enrichment through the centrifuge method, must be reviewed and added to the EIS review. The NRC is obligated through NEPA to review the proliferation risks of this technology, and it violates the principles of the Treaty, be dropped from the alternatives. If the project is approved at all, the EIS should review other technologies that eliminate the proliferation threat that this one poses.

[184-09, Kitty Vincent] Given this information, the Alliance believes the NRC should produce an unclassified non-proliferation assessment for EREF. To refuse to do so based on the fact that Areva intends to enrich uranium to no more than 5% misses an important point: Gas centrifuge uranium enrichment is a proliferable technology. A comparable case occurred in Idaho during the environmental evaluation of pyroprocessing. In that instance, no one was arguing that the DOE intended to recover pure plutonium. But because pyroprocessing is a proliferable *technology,* the DOE produced a non-proliferation assessment as part of the final EIS on the *facility.*

[192-15, Lisa Young] Indeed, I hope to see a nonproliferation assessment devised to address the fact that this plant will have the technology and the capability to enrich the uranium hexafluoride to *beyond* the indicated 5%, posing an unacceptable proliferation risk (this is not *at all* assuming that AREVA or America or any other party would assuredly *proceed* with this process, but is merely recognizing the fact that this risk *exists* and because the consequences of such a risk are so extremely significant, the least that needs to be done is a formal assessment of the situation).

[193-16, Liz Woodruff] But the NRC should produce an unclassified nonproliferation assessment for the EREF, because gas centrifuge uranium enrichment is a proliferation technology. A comparable case occurred in Idaho during the environmental evaluation of pyroprocessing.

In that instance, no one was arguing that the DOE intended to recover pure plutonium, but because pyroprocessing is a proliferable technology, the DOE produced a nonproliferation assessment as part of the final EIS on the facility. And we are asking that the NRC include a nonproliferation assessment on this facility as well. Why? This is a demonstration of the rapidity with which you can move from the generation of fuel for power reactors to fuel for weapons, a key ingredient in weapons.

Each one of these rows is a cascade. Each one of these bars is a centrifuge, those big things they use to enrich the uranium; right?

So you need 24 cascades to enrich uranium to fuel grade, and you can see as we go in a linear fashion toward, you need two cascades to get it to weapons grade.

In other words, it’s incredibly efficient technology for producing material that’s a key ingredient in nuclear weapons, and this underscores the point of why a nonproliferation assessment must be included in the EIS, and is currently lacking.

Response: *In response to the above comments, the NRC staff provides the excerpt below from an August 25, 2010, letter from Chairman Gregory B. Jaczko of the NRC to the Honorable John M. Spratt, Jr., Congressman, U.S. House of Representatives (NRC, 2010d). This letter was in response to Congressman Spratt's June 30, 2010, letter (Spratt et al., 2010) in which he requested that the NRC conduct a nuclear nonproliferation assessment as part of the review of license applications for new nuclear technologies.*

> *"The NRC has adopted a comprehensive regulatory infrastructure and implements an integrated set of activities directed against the unauthorized disclosure of information and technology considered important to common defense and security and the diversion of nuclear materials inimical to public health and safety and the common defense and security. The NRC's key regulations in this area (10 CFR Parts 73, 74, and 95) provide comprehensive requirements governing the control of, and access to, information, physical security of materials and facilities, and material control and accounting. Other NRC regulatory requirements are directed at preventing unauthorized disclosure of classified information, safeguards information (SGI), and sensitive unclassified nonsafeguards information. As appropriate, the NRC may supplement these requirements by order consistent with its statutory obligation to protect the common defense and security and public health and safety.*
>
> *"Beyond the NRC's regulations, uranium enrichment facility licensees have voluntarily committed to implement additional measures to protect information associated with classified enrichment technologies. The Nuclear Energy Institute developed a guidance document for the enrichment facility licensees and certificate holders which the NRC staff has endorsed. Licensees are now implementing these additional measures and incorporating their commitments in their site security plans. These additional measures and commitments become part of their licensing basis. In addition, the staff is working with other agencies to provide additional Federal involvement in protecting uranium enrichment technologies and establishing information protection measures.*
>
> *"Given the NRC's comprehensive regulatory framework, ongoing oversight, and active interagency cooperation, it is the NRC's current view that a formal nuclear nonproliferation assessment would not provide any additional benefit to protection of the common defense and security....*
>
> *"I want to assure you that the NRC takes your concerns very seriously and that we will continue to regulate nuclear materials and sensitive technology to ensure protection of public health and safety and the environment, promotion of the common defense and security, and fulfillment of U.S. obligations for nonproliferation and international agreements."*

I.5.7 Alternatives Considered but Eliminated

Comment: The following comments suggest that the proposed action is unnecessary because the current U.S. program to purchase and downblend Russian highly enriched uranium could be extended.

[096-04, Arjun Makhijani] Alternatives are not considered. This is also not in conformity with the National Environmental Policy Act. You've eliminated alternative by fiat, saying we're not going to have down blending of surplus HEU …

[147-18, Joey Schueler] 14. The United States currently purchases enriched Uranium from Russia for use in the few facilities it does have. While this may sound negative at the outset, we are actually aiding Russia in downsizing its nuclear arsenal, which only further secures the United States due to the instability of such a vast arsenal of weapons that could be sold on the black market to terrorists or foreign Para-military groups. Enriching our own Uranium devalues this peace seeking process and results in excessive storage of a highly toxic chemical on our soil.

[131-03, Morty Prisament] Need for Action: The DEIS has not established a "need" for this action, as required under NEPA. Need is required to be discussed in specific, quantitative, terms and within the scope of global production and markets. there exists a competitive global market to provide enriched uranium. Russia (CIS) has been one of the leading suppliers of enriched U2. If there is a national security rationale for building such facilities in the U.S., the EIS needs to discuss and document such an assertion. Moreover, the document needs to explore the reasons why the supply of enriched U2 from nuclear weapons decommissioning could not meet projected demand for enriched U2.

[148-02, Eric Schuler] But there's a bigger issue here. Before we can ask whether the impact will be small or devastating, we need to ask why we're making an impact at all. This question is paramount, but the draft EIS failed to provide a convincing answer. The EIS claims that the EREF needs to be build to improve national security. For this to be a legitimate need, however, the U.S.'s supply of enriched uranium would have to be unreliable currently. This is not the case.

The U.S.'s enriched uranium sources are reliable partners and the U.S. even seems to tacitly acknowledge this fact, when it states that some of the enriched uranium will be exported to foreign countries. Even so, it is useful to evaluate the sources more fully, just to understand just how unnecessary this facility is.

Now we've heard earlier that 90 percent of our enriched uranium is imported, and about half of that is from Russia, and we've also heard that uranium enrichment is a necessary technology because we need nuclear power to deal with global warming.

However, strictly speaking, that's not true, as a great example of that is the megatons to megawatts program that we operate with Russia. This is an agreement between Russia and the U.S. where by Russian nuclear warheads are downblended to make fuel grade uranium, and thus, since we have an abundant supply of warheads, is a very bountiful source of this enrichment – or of enriched uranium. Moreover, this program diminishes the threat of proliferation and prevents the environmental degradation associated with continued mining.

In other words, it's beneficial in many ways, and it's been existing for several years and there is no reason to expect that it would not be renewed in the future.

The other enriched uranium sources are also reliable. Although much of the enriched uranium is, indeed, imported, this fact alone does not indicate instability. We live in an age of globalization and there is no international market for enriched uranium. Credit counseling with a comparative advantage in the production of enriched uranium, whether because they have highly-accessible reserves, low-cost labor in Africa, or other factors, will specialize in producing enriched uranium while the U.S. focuses its resources in other areas, like agriculture.

Our reliance on this market is not a sign of weakness or vulnerability, but a sign of efficiency. Energy independence is an outdated idea, is one that is not based on security or patriotism, but of ignorance.

The current system works, and has worked for several years. The entire project that we are discussing here tonight is predicated on the assertion that it will provide national energy security with respect to enriched uranium.

The fact of the matter is that this security already exists and the EREF facility is not necessary, and if the benefits stated in this proposal do not exist, no amount of environmental impact is tolerable, and this facility cannot be licensed.

[181-13, Roger Turner] Add Alternative to extend the Megatons to Megawatts Program in order to supply the U.S. with enriched Uranium. The EIS should re-evaluate interest by the U.S. to extending the Megatons to Megawatts program in order to obtain enriched uranium. The EIS should re-evaluate the possibility of receiving other Foreign supplies of enriched uranium to supply the U.S. needs.

Response: *Downblending of Russian highly enriched uranium under the Megatons to Megawatts Program is an issue of national energy policy and is set to expire in 2013, as discussed in Sections 1.3.1, 2.2, and 2.3.2.2 of the EIS. As such, this alternative does not fulfill the need for the proposed action because it does not meet the objective of developing a reliable domestic source of low enriched uranium to fulfill electricity generation requirements. Therefore, it is not considered a viable alternative to enriched uranium from the proposed EREF and, therefore, was eliminated from further consideration in the EIS.*

I.5.8 Land Use

Comment: The following comment expresses concern that farm land would be lost if the proposed EREF project goes forward.

[036-07, Christina Cutler, on behalf of the Shoshone-Bannock Tribes] Also the loss of farm land needs to be addressed. Loss of farm is and will continue to be an issue in this country, we need to address the impact that loss has and how AREVA plans to mitigate the loss.

Response: *As stated in Section 4.2.1.1, approximately 202 hectares (500 acres) of farm land would be lost due to construction and operation of the proposed EREF. The impacts of this loss would be SMALL because that area constitutes approximately 0.25 percent of the land currently cultivated in Bonneville County. In addition, the current zoning for the area is compatible with the use for which the proposed EREF is intended.*

Comment: The following comment expresses concern about the likely, permanent loss of BLM-managed public land to wildlife and to wildlife-related recreation access due to the construction and operation of the proposed project

[089-06, Sharon Kiefer, on behalf of the Idaho Department of Fish and Game] Loss of Public Lands to Public Access - The Department remains concerned about the likely, permanent loss of public land to wildlife and to wildlife-related recreation access due to the construction and operation of the proposed project. There is a BLM owned and managed parcel of land entirely within the property boundary. Concerns regarding the loss of this parcel from wildlife-related recreation and BLM management could be mitigated by the project proponent exchanging a similar acreage outside the project area to be managed by BLM for multiple uses including wildlife habitat and wildlife-related recreation. We are willing to work with AES and other parties to pursue a solution but do not believe delay of the DEIS process and facility consideration is necessary to address this issue.

Response: *Development of the proposed EREF would not alter the current situation on the BLM-owned parcel of land, and BLM's access to this land will be unaltered (AES, 2010a). No licensed activities will occur on the parcel.*

Comment: The following comment adds clarity to the nature of recreational impacts to the Hell's Half Acre Wilderness Study Area (WSA).

[140-02, Wendy Reynolds, on behalf of the Bureau of Land Management, Upper Snake Field Office] 2) While the BLM has commented on the reduction of the visual quality of the area as a result of the construction and operation of the facility (Boggs, 2010), the BLM would like to add clarity to the nature of recreational impacts as it concerns the Hell's Half Acre WSA. First, the camping area described in the DEIS is not within the WSA itself. The proposed facility would be seen from this area (particularly at night), however, so from a recreational standpoint a more appropriate impact analysis might read, for example, "The construction and operation of the proposed facility would reduce the quality of the recreational experience for campers at the Hell's Half Acre trailhead."

Response: *The NRC appreciates the clarification and has modified the text accordingly in Section 4.2.3.2 of the EIS.*

Comment: The following comment relates to Bonneville County's appraisal of the quality of the farmland at the proposed EREF site and vicinity.

[152-05, Steven Serr] Issues were brought up, which I don't remember in particular were addressed, as to the viability of the area out there as being a prime agricultural area. It is a desert that we're irrigating and farming. A good portion of this site is not farmed.

Some of the facility will be on irrigated acreage. We have farms out on the west side that are shutting down, and reverting back to natural habitat. Issues of suitability for that agricultural use because of high-life pumping and that. So we don't consider it to be an extreme prime agricultural area that far out. Closer in, lower depths, it would be more prime.

Response: *It is acknowledged in Section 3.2.1 of the EIS that some prime farmland is found on the proposed EREF property. However, the proposed EREF is sited in an area with county zoning consistent with AES's intended operations. As discussed in Section 4.2.1, and as noted in the comment, this area is not considered a prime agricultural area.*

Comment: The following comments note the suitability of the location of the proposed EREF site, including with respect to Bonneville County's comprehensive plan and zoning rules and regulations.

[133-05, Richard Provencher] The land where the facility is being located is baron with virtually no other viable use other than farming, however, there are thousands of acres in this area that are also not being used for farming.

[135-04, Hon. Dave Radford] Being a political subdivision of the State of Idaho, Bonneville County adopted a comprehensive plan that included located nuclear growth west of -- on the western side of -- Bonneville County, so we think that will help expedite the process. We, as the commission, agree with the Environmental Impact Statement's conclusion.

[152-03, Steven Serr] As far as compliance with zoning rules and regulations, that area was designed specifically for this type of facility. It's not designed to have other uses out there that could be impacted by those uses.

[152-09, Steven Serr] I wanted to address the issue as to the suitability of this property for development of that site. Again, as the Commissioner mentioned earlier, this area has been zoned and designated for this type of use. It's been planned that it could accommodate this type of operation since 1960. So, it's been a long-designated piece of property, tract of land out there for this type of use.

I approach this as an enforcement site for any facility that's built in the county. Our concern in the county is making sure that things are built to code, built complaint, built safe, protect public health, safety, and welfare. My office, we are responsible for enforcement of the building code, the fire code, mechanical code, flood plain rules and regulations, and we have addressed most of these issues with AREVA. We've made modifications for some of their design issues on what they contemplate doing to try to mitigate, and make sure that the operation that they're proposing out there will be a safe compliant operation.

Response: *The NRC appreciates the confirmation of the information presented in Section 3.2.1 that the zoning of the area where the proposed EREF is to be located is compatible with the intended use of the site.*

Comment: The following comments suggest that the Federal Farmland Protection Policy Act (FPPA) applies to this EIS and to the proposed EREF project.

[013-02, Kit Blackburn; 063-03, Martha Haga; 093-02, Louis Landry; 109-02, Eugene McVey; 120-07, Frank Nicholson; 121-02, Jennifer Nordstrom] Additionally, the draft EIS may not be in compliance with the Federal Farmland Protection Act. The EIS claims that the licensing of this facility is exempt from the Farmland Protection Act since the site is on private property (EIS, 3-3). But because Areva has accepted a $2 billion federal loan guarantee from the Department of Energy, the Federal Farmland Protection Act applies to this license and the required procedures under the Act must be completed prior to licensing.

[015-21, Beatrice Brailsford; 088-09, Stan Kidwell; 122-05, Kathy O'Brien; 175-07, Ellen Thomas] The NRC should address both Areva's failure to comply with the Federal Farmland Protection Act and its own failure to fully analyze the environmental effects of a large range fire at the Areva site.

[095-09, Linda Leeuwrik] The NRC should address both Areva's failure to comply with the Federal Farmland Protection Act and its own failure to fully analyze the environmental effects of a large range fire at the Areva site.

[118-03, Caroline Morris] The draft EIS also may not comply with the Federal Farmland Protection Act (Act), which applies because Areva has a $2 billion federal loan guarantee from the Department of Energy. The EIS claim of being exempt from the Act because the EREF site is on private property is wrong. Areva's licensing must comply with the Act and its procedural requirements before licensing.

[127-02, Sheila Plowman] Also, The NRC should address both Areva's failure to comply with the Federal Farmland Protection Act and its own failure to fully analyze the environmental effects of a large range fire at the Areva site.

[153-01, Andrea Shipley; 197-01, Andrea Shipley, on behalf of the Snake River Alliance] Areva's proposed uranium enrichment factory will…utilize farmland that is potentially protected by the Federal government.

[153-12, Andrea Shipley; 184-17, Kitty Vincent] Further, The EIS may not be in compliance with the Federal Farmland Protection Act. The EIS claims that the licensing of this facility is exempt from the Farmland Protection Act since the site is on private property (EIS, 3-3). But because Areva has accepted a $2 billion federal loan guarantee from the Department of Energy, the Federal Farmland Protection Act applies to this license and the required procedures under the Act must be completed prior to licensing.

[184-07, Kitty Vincent] Areva's proposed Eagle Rock Enrichment Facility (EREF) will…obliterate farmland that is potentially protected by the federal government.

[191-02, Liz Woodruff] But I did want to provide further details on one aspect of the testimony that I gave in Idaho, and that has to do with the fact that the DEIS may not be in compliance with the Federal Farmland Protection Act. The EIS claims that the licensing of this facility is exempt from the Farmland Protection Act, since the site is on private property. To quote the Draft EIS, "Some of the land located within the proposed property was designated as prime farmland by the U.S. Natural Resource Conservation Service. This is a federal designation. Prime farmland is protected by the Federal Farmland Protection Policy Act. The intent of this act is to protect prime farmland from other uses as the result of federal actions." I'm still quoting from the EIS. "The act does not apply to federally permitted or licensed actions of private lands, therefore, the act and its designation as prime farmland do not restrict land use on the proposed EREF property." And this is from EIS 3-3.

So, from information the Alliance gathered from the Idaho State USDS we confirmed that because AREVA has accepted a $2 billion federal loan guarantee, and this is a form of financial insurance from the federal government with your taxpayer dollars, AREVA has even been quoted as saying without access to this cheap capital, they would not build this facility in the U.S., so this is clearly a form of financing. That the Federal Farmland Protection Act absolutely applies to this license, and when the NRC consulted with the USDA in Idaho, they did not share the information with that agency that there would be a loan guarantee. Perhaps it was not known at that time, but it is known now.

Specifically, from 7 CFR, Section 258.2, "Federal program means those activities are responsibilities of a federal agency that involve undertaking financing or assisting construction, or improvements projects, or acquiring, managing, or disposing of the federal lands and facilities." So, simply put, this loan guarantee changes the game. And this isn't a claim that you can't license the facility, this is a claim that you absolutely must go through the processes that fall under the Federal Farmland Protection Act. It would be unacceptable to do otherwise.

[191-20, Liz Woodruff] • The EIS may not be in compliance with the Federal Farmland Protection Act. The EIS claims that the licensing of this facility is exempt from the Farmland Protection Act since the site is on private property. To quote the draft EIS:

"Some of the land located within the proposed property was designated as prime farmland by the U.S. Natural Resources Conservation Service (NRCS). Prime farmland is protected by the Federal Farmland Protection Policy Act (see Title 7of the U.S. Code of Federal Regulations (7 CFR 658.2). Per 7 CFR 658.2 (c)(1)(i), the intent of this Act is to protect prime farmland from other uses as the result of Federal actions. The Act does not apply to Federally permitted or licensed actions on private lands. Therefore, the Act and its designation as prime farmland do not restrict land use on the proposed EREF property" (EIS, 3-3).

From information gathered from the Idaho State USDA, I've confirmed that because Areva has accepted a $2 billion federal loan guarantee from the Department of Energy, the Federal Farmland Protection Act likely applies to this license and the required procedures under the Act must be completed prior to licensing. From 7 CFR Section 258.2 (c):

"Federal program means those activities or responsibilities of a Federal agency that involve undertaking, financing, or assisting construction or improvement projects or acquiring, managing, or disposing of Federal lands and facilities."

[193-21, Liz Woodruff, on behalf of the Snake River Alliance] My next point is that this Environmental Impact Statement and the proposed licensing is potentially in violation of the Farmland Protection Act. The EIS claims that this facility is exempt from the Farmland Protection Act since the site is on private property.

So a red flag went off for me when I read this in the EIS, and so I called the relevant agencies, federally, and in the state, and I was told that because AREVA accepted a $2 billion federal loan guarantee from the Department of Energy, the Farmland Protection Act applies, because it's a federally-funded project.

The NRC must go back, review this section of the EIS, talk to the relevant agencies, discuss the issues around this huge Department of Energy loan, and go through the process and procedures necessary to determine that you're in compliance with the Farmland Protection Act. This is on Prime A age farmland that they're proposing for this facility.

[197-12, Andrea Shipley, on behalf of the Snake River Alliance] Further, the EIS may not be in compliance with the Federal Farmland Protection Act.

Response: *The FPPA is discussed in Section 3.2.1 of the EIS. As stated in the Draft EIS, it is correct that the FPPA does not apply to Federally permitted or licensed actions on private lands (including the potential licensing by the NRC of the proposed EREF) (7 CFR 658.2 (c)(1)(i)). However, the text of Section 3.2.1 has been modified to acknowledge that the DOE, in issuing a Federal loan guarantee to AES, is required by the FPPA to assess the project's effect on the prime farmland that would be converted on the proposed EREF site.*

I.5.9 Historic and Cultural Resources

Comment: The following comment asks the NRC to incorporate design features in the proposed EREF project to minimize impacts to cultural resources and to prepare a plan to mitigate for impacts that cannot be avoided or minimized.

[027-22, Sara Cohn] *Avoid, Minimize, Mitigate:* In terms of priorities, the NRC should first site facilities and infrastructure to avoid impacts to wildlife and cultural resources. If impacts cannot be entirely avoided, the NRC should incorporate design features to minimize impacts. Lastly, a plan should be prepared to mitigate for impacts that cannot be avoided or minimized.

Response: *The siting of a uranium enrichment facility involves a number of requirements, as discussed in Section 2.3.1 of the EIS. Environmental protection and land use/demography were two of the criteria categories used. Mitigation measures identified by AES to minimize impacts to cultural resources during preconstruction, construction, and operation of the proposed EREF are presented in Section 4.2.2.3 and Chapter 5. Further, procedures to address unexpected discoveries in the case of cultural resources have been put in place, as mentioned in Section 4.2.2.3.*

The NRC's action with regard to the proposed EREF project is limited to granting a license, if found to be warranted, for the construction, operation, and decommissioning of the proposed facility. NRC is not the implementer or funding entity for the proposed activity. As a result, NRC generally limits its analysis to the alternatives and actions reasonably available to the applicant.

When NRC reviews a proposed action, its ability to impose additional requirements and environmental mitigation and monitoring measures beyond those proposed as part of the license application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the proposed facility be built in accordance with the submitted application, including mitigation and monitoring measures proposed by the applicant that are not specifically required *by or directly related to NRC's regulations. Thus, the NRC does have the ability to hold licensees to key mitigation and monitoring measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.*

Comment: The following comment states that mitigation of impacts to aboriginal and ceded areas, and to water, soil, plants, animals and air, need to be addressed in the EIS.

[036-06, Christina Cutler, on behalf of the Shoshone-Bannock Tribes] Mitigation of impacts to aboriginal and ceded areas needs to be addressed. Mitigation issues regarding environmental impacts to water, soil, plants, animals and air.

Response: *Mitigation measures identified by AES to minimize impacts during preconstruction, construction, and operation of the proposed EREF are presented in Section 4.2 and Chapter 5 of the EIS for all resource areas as applicable. Further, procedures to address unexpected discoveries in the case of cultural resources have been put in place, as mentioned in Section 4.2.2.3.*

Comment: The following comment suggests that mitigation for all culturally sensitive items needs to be done.

[036-08, Christina Cutler, on behalf of the Shoshone-Bannock Tribes] Mitigation for all culturally sensitive items needs to be done. It is my understanding that since AREVA is required to follow the NEPA process we can request mitigation for all of our concerns.

Response: *All known impacts on historic and cultural resources, as discussed in Section 4.2 of the EIS, will be mitigated by AES.*

Comment: The following comment relates to a Memorandum of Agreement between the Idaho State Historic Preservation Office (SHPO) and the NRC to resolve the effects on site MW004.

[126-01, Susan Pengilly, on behalf of the Idaho State Historic Preservation Office] Our only recommendation is to add a statement saying that effects on site MW004 will be resolved through a Memorandum of Agreement (MOA) between the NRC and the Idaho SHPO (assuming that the Advisory Council on Historic Preservation does not want to be a signatory). This statement should be added somewhere in Section 4.2.2, perhaps in the paragraphs bounded by lines 13-24.

Also, please be aware that the MOA needs to be signed *befor*e the ROD is issued to ensure compliance with Section 106. This has been a problem in the past with other Federal projects, and the Advisory Council has made it very clear that the MOA needs to be finalized before issuance of the ROD.

Response: *The most recent information of the consultations between the NRC, SHPO, and Federally recognized Shoshone-Bannock Tribes concerning impacts on historic and cultural resources has been added to Section 4.2.2.1 of the EIS.*

Comment: The following comment requests notification of the Heritage Tribal Officer of the Shoshone-Bannock Tribes of any inadvertent cultural or archaeological discoveries, and training of EREF site workers in cultural resources regulations and laws.

[129-03, Willie Preacher, on behalf of the Shoshone-Bannock Tribes] Regarding cultural issues the tribes would like to have the Heritage Tribal Office (HeTO) to be a part of the cultural surveys of this proposed site and to be notified of any inadvertent cultural or archaeological discoveries. Also inform the contractors who may be utilized for the construction of the facility and for the permanent employees of the cultural regulations and federal laws concerning artifacts, retrieving and removing historic items, The INL who is a neighbor to this proposed site has experienced decades of this type of behavior.

Response: *An inadvertent (unanticipated) discovery plan has been developed by AES for the proposed EREF project and is discussed in Section 4.2.2.1 of the EIS. Pre-project training of workers in cultural resources legislation and rules is identified as a mitigation measure in Section 4.2.2.3 and Chapter 5 of the EIS.*

Comment: The following comment states that the Final EIS should discuss both (1) how issues raised by tribes would be addressed by the project and (2) the outcomes of ongoing work with the Idaho SHPO and affected tribes on potential effects requiring Section 106 review of the *National Historic Preservation Act*.

[138-08, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] Consultation with Tribal Governments - The draft EIS indicates that there have been contacts with Tribes that may be affected by the proposed project. This is especially important because the DEIS states that the project would result in up to large impacts to resources important to tribes (p. 4-4), including historical and cultural, visual, and ecological resources. Construction activities, for example, would destroy historic and cultural resources at MW004 site, while increased traffic and construction activities and the presence of an industrial complex would significantly alter the visual landscape. Because of these and other impacts that may be discovered during the project operations, we recommend that the final EIS include a discussion of how issues raised by Tribes would be addressed by the project and outcomes of the ongoing work with the Idaho State Historic Preservation Office and affected Tribes on potential effects requiring Section 106 review of the National Historic Preservation Act.

Response: *Consultation with the SHPO and the affected Federally recognized Shoshone-Bannock Tribes has been ongoing throughout the EIS process. The information on the status of these consultations in Sections 1.5.4.2 and 4.2.2 of the EIS has been updated. An updated discussion of the impacts on specific cultural resources is also presented in Section 4.2.2.*

Comment: The following comments were expressed over the destruction of the John Leopard Homestead (site MW004).

[135-04, Hon. Dave Radford] Historically, I serve on the Heritage Commission. I think history is important, that homestead, I think, could be mitigated out there. Historically, Bonneville County, my predecessors at the County Commission, took very limited resources in terms of property tax dollars and invested them in improved roads to get out to the site 60 years ago. So, historically, we've been a nuclear-friendly county, and I believe that it will continue. And we applaud your work, we respect your work, and we hope for a great outcome for an expedited license for AREVA.

[147-15, Joey Schueler] 11. A historical landmark and a vast expanse of Idaho native habitat will be destroyed to build this plant.

[153-01, Andrea Shipley; 197-01, Andrea Shipley, on behalf of the Snake River Alliance; 184-07, Kitty Vincent] Areva's proposed uranium enrichment factory will…support destruction of the John Leopard homestead which has been recommended for the National Register of Historic Places

[191-23, Liz Woodruff] Construction of the facility would lead to the destruction of a site that has been recommended for the National Register of Historic Places. The John Leopard homestead (MW004), would be destroyed in preconstruction activity. A Memorandum of Understanding must be signed with the Idaho State Historic Preservation Office before any activity is initiated that would affect this historic site.

[193-24, Liz Woodruff, on behalf of the Snake River Alliance] Areva's proposed Eagle Rock enrichment facility will…impair a national monument in Idaho, and support destruction of a historic site….

Response: *Impacts on historic and cultural resources are discussed in Section 4.2.2 of the EIS. The NRC has been in involved in consultation with the Idaho SHPO concerning the impacts on the John Leopard Homestead (site MW004) throughout the EIS process. The discussion of the consultation and mitigation efforts in Section 4.2.2 has been updated.*

AES archaeological consultant, Western Cultural Resource Management, Inc. (WCRM), conducted professional excavation and data recovery as mitigation site MW004 in October–November 2010 following the process identified in a Treatment Plan previously reviewed by the Idaho SHPO (Idaho SHPO, 2010). WCRM submitted a summary report on these data recovery efforts to the Idaho SHPO on November 17, 2010 (WCRM, 2010). In a letter dated November 26, 2010, the SHPO stated that the data recovery report had been reviewed and accepted (Idaho SHPO, 2010). A detailed report on the site MW004 mitigation is being prepared by AES.

I.5.10 Visual and Scenic Resources

Comment: The following comment states that the Final EIS should include a discussion of how issues such as visual impacts raised by tribes would be addressed by the project.

[138-08, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] Consultation with Tribal Governments - The draft EIS indicates that there have been contacts with Tribes that may be affected by the proposed project. This is especially important because the DEIS states that the project would result in up to large impacts to resources important to tribes (p. 4-4), including historical and cultural, visual, and ecological resources. Construction activities, for example, would destroy historic and cultural resources at MW004 site, while increased traffic and construction activities and the presence of an industrial complex would significantly alter the visual landscape. Because of these and other impacts that may be discovered during the project operations, we recommend that the final EIS include a discussion of how issues raised by Tribes would be addressed by the project and outcomes of the ongoing work with the Idaho State Historic Preservation Office and affected Tribes on potential effects requiring Section 106 review of the National Historic Preservation Act.

Response: *Consultation with the SHPO and the affected Federally recognized Shoshone-Bannock Tribes has been ongoing throughout the EIS process. The visual impacts associated with the project are discussed in Section 4.2.3 of the EIS.*

Comment: The following comment relates to mitigation measures for visual impacts from the proposed EREF.

[152-13, Steven Serr] There was discussion as far as potential moderate impact on the facility that it could create a visual impact on site. One of the very early things we discussed with AREVA when they looked at the site was the potential for location on the site to keep it back from visual appearances to the public, and also discussing what landscaping features might be incorporated into it to even buffer it, to mitigate any visual impacts. We discussed lighting issues, treescape, approach roads, and we feel that before this project would fully be built, that we would have some approved mitigation plans to help eliminate any of those visual impacts, so we could take that down from a moderate impact to a slight impact.

Response: *The NRC recognizes the ongoing consultations between AES and Bonneville County regarding the construction and operation of the proposed EREF. Visual impact mitigation measures that AES has identified are presented in Section 4.2.3.3 and Chapter 5 of the EIS.*

Comment: The following comment relates to impacts on the wilderness values of Hell's Half Acre WSA due to construction and operation of the proposed EREF.

[140-03, Wendy Reynolds, on behalf of the Bureau of Land Management, Upper Snake Field Office] Second, Mr. Boggs indicates that the proposed facilities would be seen from certain areas of the Hell's Half Acre WSA (particularly from the northern end of the hiking trail). Because these areas are within the WSA itself, there would be adverse impact on wilderness values associated with the implementation of the proposed action. The analysis in this case could read, for instance, "The construction and operation of the proposed facility would have an adverse impact on wilderness values because opportunities for solitude would be reduced due to the facility being within sight of users of certain areas of the WSA. The impact would be greatest at night when artificial lighting is in use". The BLM agrees with the characterization of these impacts as MODERATE.

Response: *The NRC appreciates the clarification and has modified the text of Section 4.2.3.2 of the EIS accordingly.*

Comment: The following comments relate to the impacts of light pollution on Hell's Half Acre WSA.

[067-01, Mike Hart] With respect to what I view as the public's best interest, first, I thank you for the analysis. Looking through the EIS, Section 4.2.3, you analyze visual impacts which include light pollution. As an astronomer, we use the area, Hell's Half Acre, for astronomy parties. We use that because it's a good dark sky location that's relatively convenient. The EIS doesn't specifically mention that, but in mitigation, it does identify that there will be low – or the lights will be pointed downwards, and I would appreciate further mitigations to acknowledge that the sky should be kept as dark as possible. Possibly for security, if you could use infrared technology or something that doesn't require high light levels that would very much be appreciated.

[067-08, Mike Hart] With respect to environmental impacts, I'd like to thank the NRC for listening to my scoping comments about light pollution. This facility is located near 20 Mile Rock, as we call it, or the lava hiking trail. We use that for star parties. If you go out tonight, it's the Perseid Meteor Shower peak. This would be a great time to visit a dark sky 20 miles from town. You can get away from the city lights. I hope this facility continues to be pursued, but with the idea of keeping those lights to a minimum and keep that dark sky, preserve that resource.

Response: *AES has stated that light noise will be minimized to the extent practicable and that all perimeter lights would be downfacing (AES, 2010a), as discussed in Section 4.2.3.3 and Chapter 5 of the EIS.*

Comment: The following comments noted that the proposed EREF could have impacts to Hell's Half Acre WSA.

[153-01, Andrea Shipley] Areva's proposed uranium enrichment factory will…impact the Hell's Half Acre National Monument

[184-07, Kitty Vincent] Areva's proposed Eagle Rock Enrichment Facility (EREF) will…impair the Hell's Half Acre National Monument

[191-32, Liz Woodruff] Visual and scenic resources. The proposed facility will have a visual impact on the Hell's Half Acre National Monument.

[193-24, Liz Woodruff, on behalf of the Snake River Alliance] AREVA's proposed Eagle Rock enrichment facility will…impair a national monument in Idaho….

Response: *Visual impacts on Hell's Half Acre WSA from the construction and operation of the proposed EREF are discussed in Section 4.2.3 of the EIS. AES has identified a number of measures to mitigate these impacts, as presented in Section 4.2.3.2 and Chapter 5 of the EIS.*

I.5.11 Air Quality

Comment: The following comment expresses concern about the potential release from the proposed EREF of radioactive, hazardous, and toxic materials into the air.

[027-13, Sara Cohn] The ICL is very concerned about the potential release of radioactive, hazardous and toxic materials into the air. Potential air releases associated with operation of this facility should be further analyzed, reported, and permitted though Idaho's Department of Environmental Quality.

Response: *Potential emissions of criteria pollutants and hazardous air pollutants during facility operation are analyzed in Section 4.2.4.2 of the EIS. Potential radiological releases during facility operation are analyzed in Section 4.2.10.2. The license that would be issued to AES by NRC, if granted, would not exempt AES from its obligation to comply with other applicable Federal, State, and local regulations or requirements, as noted in Section 1.5 of the EIS. Under Idaho State regulations, AES would have to satisfy all air quality regulatory and permitting requirements that may be enforced by the IDEQ.*

Comment: The following comment deals with mitigation of air pollution resulting from construction of the proposed EREF.

[027-17, Sara Cohn] Air pollution resulting from construction of the proposed facility should be avoided or reduced using the best available management practices and control technology. To preserve Idaho's clean air during construction operations, the NRC should include mitigation measures for these pollutants. For example, fugitive dust emissions can be controlled through the use of water trucks, provided the Storm Water Pollution Prevention Program (SWPPP) ensures no discharge of sediment from the site. Additionally, diesel emissions should be reduced using best management practices for construction including limited idling of diesel equipment and the use of low-emitting fuels and low-emitting technology for construction equipment.

Response: *Mitigation measures for control of air pollutants during preconstruction and construction of the proposed EREF have been identified by AES, and are presented in Section 4.2.4.3 and Chapter 5 in the EIS. Further, IDEQ has the authority to require AES to control fugitive dust emissions throughout the preconstruction and construction phases.*

Comment: The following comment requests that AES/NRC re-evaluate the need for an air permit to construct using uncontrolled emission rates of toxic air pollutants.

[066-24, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 22. Chapter 1: pp 1-17, Table 1-2. This table summarizes that an air quality permit to construct is not required for this project because the exemption criteria of IDAPA are satisfied. Toxic air pollutant emissions are discussed on pages 4-24 through 4-27. In these pages it is concluded that emissions of fluoride, ethanol, methylene chloride, and uranium from normal operations meet the exemption criteria for toxic air pollutants in IDAPA 58.01.01 Section 223. In order to meet the Section 223 exemption criteria for toxic air pollutants, uncontrolled emissions must meet the exemption criteria as opposed to emissions from "normal" operations as discussed in the Draft EIS.

In accordance with IDAPA 58.01.01 Section 210 an uncontrolled emissions rate of a toxic air pollutant from a source or modification is calculated using the maximum capacity of the source or modification under its physical and operational design without the effect of any physical or operational limitations. Examples of physical and operational design include but are not limited to: the amount of time equipment operates during batch operations and the quantity of raw materials utilized in a batch process. Examples of physical or operational limitations include but are not limited to: shortened hours of operation, use of control equipment, and restrictions on production which are less than design capacity. It is not clear from the information provided in the draft EIS whether uncontrolled emissions of fluoride, ethanol, methylene chloride, and uranium were compared to the exemption thresholds, but the use of the term "normal emissions" on page 4-27, line 37 does imply that air pollution mitigation measures were inappropriately considered in the toxic air pollutant exemption determination. DEQ requests that AES/NRC reevaluate the need for an air permit using uncontrolled emission rates of toxic air pollutants.

Response: *The NRC staff based its analysis of air releases on operational data and experiences provided by AES for other AES facilities using similar enrichment technology and controls. This information from AES was reviewed and independently verified by the NRC staff before using it in the EIS. To ensure the most conservative estimate possible, the NRC staff constrained the releases of the subject materials to the shortest reasonable time frame, given the nature of the activity resulting in a release. For example, methylene chloride is used for equipment refurbishment, but that activity takes place only during the first shift. Consequently, that time frame is reflected in the NRC's estimate of the rate of methylene chloride release. In the case of methylene chloride release, the NRC understands that this does represent an uncontrolled release because it is the result of evaporative losses from benchtop operations where methylene chloride vapors are subsequently vented to the atmosphere without passing through any control devices. Although the NRC believes that its application of the IDEQ regulations in the EIS is reasonable and conservative, the determination of whether the scenario described meets the permit exemptions contained in IDEQ rules is solely the province of IDEQ; and AES will be dealing directly, and the NRC will not be involved, with IDEQ with regard to air permitting for construction and operation of the proposed facility.*

The NRC's use of the term "normal emissions" is meant to describe a condition where all systems are operating as designed (i.e., no upset or off-normal conditions exist) and pollution control devices are operating in accordance with their performance guarantees.

Comment: The following comment asserts that there is a contradiction in statements in the EIS regarding exceedances of ambient air quality standards for particulate matter during preconstruction and construction of the proposed EREF.

[066-25, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 23. Chapter 4: pp 4-20, Table 4-5. This table shows that the National Ambient Air Quality Standards will be exceeded for particulate matter during preconstruction and construction. Mitigation measures are discussed in Section 4.2.4.3, pp-4-28. The opening paragraph of this section states, “Impacts from the release of criteria pollutants from the operation of vehicles and equipment during preconstruction, construction, and operation are not expected to result in exceedances of ambient air quality standards....” This statement contradicts with the estimated ambient impacts presented in Table 4-5 (which shows violations of the particulate matter standards). It appears that the predicted ambient impacts shown in Table 4-5 should be updated to reflect the ambient impacts that would occur when operating using the listed mitigation measures which are expected to result in lower emissions that do not cause an exceedance.

Response: *To clarify, the EIS language quoted in the comment was included to emphasize that exceedance of the particulate standard would result primarily from fugitive dust generation and not from operation of reciprocating internal combustion engines (RICE). The estimated ambient air impacts in Table 4-5 in the EIS include contributions from all sources of criteria pollutants. The opening paragraph in Section 4.2.4.3 was revised to make that distinction. In this case, mitigations of fugitive dust would be more valuable than efforts to minimize emissions from RICE.*

Data in Table 4-5 resulted from application of the appropriate U.S. Environmental Protection Agency (EPA) AERMOD dispersion models. The mitigation measures identified by AES and presented in the EIS can be expected to result in reduced emissions of criteria pollutants. However, since a final mitigation strategy is not available, the suggested updated emission reduction calculation cannot be completed at this time.

Comment: The following comment expresses agreement with the Draft EIS that any potential negative impacts on the air and water resources would be SMALL.

[102-02, R.D. Maynard] After reviewing the summary of the environmental consequences and mitigation section of the draft EIS, I’m confident that any potential negative impact on the air and water resources would be small.

Response: *The NRC staff acknowledges this comment and appreciates the participation.*

Comment: The following comment recommends that the NRC maximize implementation of the air pollution mitigation measures described in the EIS and coordinate with the IDEQ throughout the project lifespan to assure that federal and state air quality standards will be met by the proposed project.

[138-02, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] For better protection of public health from air pollution exposure, EPA has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants or criteria pollutants (see http://www.epa.gov/air/criteria.html) that should be used to determine if emissions from a project would exceed daily and annual standards. Any projects that would generate emissions exceeding the standards would have to include measures to demonstrate that, if implemented, the project would comply with both state and federal air quality regulations. Even though background concentrations of criteria pollutants within the project area and environs are currently below the standards, it is likely that emissions within the project area could exceed the standards because of the proposed project. As the DEIS noted, particulate matter (PM) concentrations during construction activities would be moderate to large (p. 4-1 1) due to fugitive dust releases to the air during ground disturbing activities even after application of mitigation measures, although they would be temporary and brief in duration. The DEIS indicates that air emissions associated with the ERF preconstruction and construction activities alone would be 271.5% and 105% higher than NAAQS for 24-hour PM10 and PM2.5 concentrations, respectively (p. 4-20). Because of these anticipated exceedances of ambient air quality standards, we recommend that NRC maximize implementation of the mitigation measures described in the DEIS and coordinate with the Idaho Department of Environmental Quality (IDEQ) throughout the project lifespan to assure that federal and state air quality standards will be met by the project.

Response: *The NRC staff concurs with EPA's assessment that a properly designed and executed mitigation plan will be essential for preserving ambient air quality during certain phases of facility construction and agrees that collaboration with IDEQ is the best way to ensure that adequate controls will be included in IDEQ permits.*

The NRC's purpose and need statements in its environmental review documents reflect that NRC is not the implementer or funding entity for the proposed activity. As a result, when the NRC reviews a proposed action, its ability to impose additional requirements and mitigative measures beyond those proposed as part of the application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the facility be built in accordance with the submitted application, including mitigation measures proposed by the applicant that are not specifically required by or directly related to the NRC's regulations. Thus, the NRC does have the ability to hold licensees to key mitigation measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.

Comment: The following comments express the belief that fugitive dust generation during construction would not be a LARGE impact.

[094-02, Michael Lange] There are very few disagreements I would have. Only, I guess the one I could say would be the dust mitigation issue more than likely can be mitigated down to a moderate level. And I believe that we do that out at IWTU everyday now, so I think that's pretty accurate. The rest of it looks very professionally done.

[098-08, Linda Martin] In the NRC assessment, the only topic which was described as small to large concerns the subject of Air Quality. In this geographic region local, state, and regional governments, agricultural interests, and private landowners frequently encounter dust or "fugitive" dust when working on projects concerning the land. Therefore, these impacts would be and should be considered to be normal, temporary, and brief in duration.

[152-14, Steven Serr] The dust issue was one of the other issues in the EIS that was mentioned, that it would be a potential moderate impact. We do have a fairly aggressive plan for onsite maintenance of water application to construction sites to mitigate any dust out from it. I feel that given what we have encouraged developers to do on site during construction, that that could also be minimized down to a small impact, as opposed to a moderate impact.

Response: *The NRC staff acknowledges these comments and appreciates the participation. However, the NRC staff stands by its determination that fugitive dust generation would result in a LARGE impact, for reasons discussed in Section 4.2.4.1 of the EIS.*

I.5.12 Geology, Minerals, and Soil

Comment: The following comments are related to the seismic hazards to the proposed EREF.

[014-01, William Blair] Idaho does not need more radioactive waste placed over the Snake Plain Aquifer in an active earthquake area. Until a safe method of handling and storing radioactive wastes for thousands of years is devised, NO new facilities should be approved.

[016-01, Manley Briggs] I think that the seismic activity in the area around the plant needs to be considered. I understand that that was addressed and it was felt to not be significant. But Idaho is very seismically active. It has the fifth largest number of earthquakes in the country. The most recent earthquake was August 1st, 2010. It has had the two largest earthquake in the lower United States in the last 50 years. The Hebo Lake earthquake on the Idaho-Montana border was a 7.5 magnitude, and the Borah Peak earthquake, in 1983, was a 7.3 magnitude. And if this material is being stored in an area close to those potential earthquakes, I feel that that has to be addressed. There are fault lines that essentially completely surround the INL, comes down from the Lost River, comes down from the north, and I think that certainly needs to be addressed from the health point of view, because an earthquake could certain disrupt storage.

[0163-03, Manley Briggs] Accordingly, I am concerned about the development of Areva's Eagle Rock Enrichment Facility, where depleted uranium hexafluoride will be stored over the aquifer. One of my concerns is that the INL is located in a seismically active area, and in addition of numerous other natural and manmade accidents that could compromise the safety of the stored material, an earthquake could pose a serious hazard.

As you are probably aware, Idaho is very active seismically, and has the fifth highest earthquake activity in the nation. In addition, Idaho has experienced the two largest earthquakes in the contiguous United States in the last fifty years – the 1959 Hebgen Lake Earthquake (M7.5) and the Borah Peak earthquake (M7.3) in 1983. Both of these quakes occurred in locations close to EREF. I have enclosed maps showing the close proximity of fault lines to the INL. The Areva EIS needs to address this danger.

[100-03, Wendy Matson] Due to the indefinite storage of depleted uranium hexafluoride on site, seismic activity in the area of the proposed facility poses a major safety hazard that could lead to a critical level accident. And I wish that the NRC could clarify why a complete analysis of this risk is delayed until the safety evaluation report.

[150-04, Katie Seevers] NRC should clarify why a complete analysis of seismic risk is delayed until the safety evaluation report.

[152-06, Steven Serr] The issues they had, that were addressed, as to seismic protection, life, safety, protection from earthquake damage. This area is in a seismic zone C on the building code map, cause it's not an extreme risk area for seismic activity. The INL is in the same seismic zone designation. We have multiple nuclear facilities that have been constructed, nuclear reactors that have been built there have been safely functional during the seismic events we have experienced in the past, with no negative impacts on it. We have discussed the seismic issues with AREVA, and NRC staff, it was in my office, and felt that with compliance with the building code requirements that we have, that we fully intend to implement, that we don't see that there would be an issue with--issues of seismic, inappropriateness for this site to be built.

[152-11, Steven Serr] Discussion regarding the seismic area out there, we have talked about seismic conditions, what the facility will need to be doing to meet safety issues as far as seismic design criteria. The safety issue of long-term storage was addressed, also, as to the containers that will be stored on site. The containers that they have on site, just to check and see, they're designed for transportation containers. They're able to survive an auto wreck, impact damage in an auto accident. Seismic conditions on site, worst case we'd have where there are outside storage, if something would fall over, be a low impact on it. We determined that that would not be a problem, as far as damage creating an issue in a seismic event that there could be any potential leakage.

[169-05, Margaret Stewart] And, finally, I need to know why a complete analysis of the seismic risks of this facility is being delayed until the safety evaluation report. As you all know, this area has always been seismically active, and the production, transportation, and storage of such dangerously radioactive materials in such a volatile region seems irresponsible, at best.

Now, I've used these signs before at hearings, and I use them again because geology doesn't change that much. Back in -- before 1982, the U.S. Building Code upon which all buildings in the U.S. must adhere to, and follow their codes, shows that this is the State of Idaho. Here's INEL, as it was called back then, and this is a zone three potential for major damage. Just after this date, INEL was looking to get approval from the U.S. Congress to build a nuclear facility, a very, very -- I won't go into that -- but a very specific nuclear facility with lots of inherent dangers, and it needed approval from Congress. And, uniquely, after 1992, the potential for major damage changed. And INEL is here completely outside of the danger zone. And now we go to 1989, and here is the potential for major damage with the yellow, and the proximity for major fault system damage practically inevitable is here, and here is INEL, this little island that there's no problem. So, I think that we really need to look at experts and science to give us this kind of information that, in my book, appears to be based on politics, not on science.

[171-01, John Tanner] The entire Snake River Plain has been known as an area of very low seismic activity, in spite of the high seismic activity in the surrounding hills and mountains. I was working at the chemical processing plant when the Mt. Borah earthquake, a giant earthquake struck, which caused a fault displacement of about, I think over 10 feet there, but we just barely felt a tremor at the chemical processing plant, at the INL. And I point out how well the reactors in Japan and Armenia have stood up to earthquakes that have happened there. I think it was Armenia, not Azerbaijan, which is next door.

[184-05, Kitty Vincent] Who in their right mind would come to a city that has a nuclear facility eighteen miles to the West at the foot of one of the most active seismic areas in the country? Especially a facility that is owned and managed by a company that has a history of problems?

[191-21, Liz Woodruff] Geology and Soils. Due to the indefinite storage of depleted uranium hexafluoride on site, seismic activity in the area of the proposed facility poses a major safety hazard that could lead to a critical level accident. The NRC should clarify why a complete analysis of seismic risk is delayed until the Safety Evaluation Report.

Response: *As noted in Section 3.6 of the EIS and in accordance with 10 CFR 51.71(c) and NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC, 2003), a seismic hazards analysis is outside the scope of the EIS. The seismic hazards analysis is addressed in Section 1.3.3.4.1 of the SER, NUREG-1951 (NRC, 2010b). As discussed in Section 1.4 of the EIS, the development of the SER was closely coordinated with the EIS analysis. Section 3.6.1.1 of the EIS describes the seismic setting and earthquakes in the vicinity of the proposed EREF site as part of the regional geology discussion and summarizes the results of the probabilistic seismic hazard study conducted as part of the safety review of AES's license application and documented in the SER. Section 4.2.5.1 considers this information along with local soil and groundwater conditions to conclude that the liquefaction potential of soils near the proposed EREF is also low.*

Section 3.6.1.1 of the EIS provides a map (Figure 3-15) showing the locations of Quaternary faults and earthquakes of magnitudes greater than 3.0. This figure illustrates the low seismic activity within the Snake River Plain. A new map (Figure 3-17), based on information from the U.S. Geological Survey's Earthquake Hazards Program, has been added to Section 3.6.1.1 to illustrate the low level of ground shaking in the vicinity of the proposed EREF associated with earthquakes in the region.

Note that there is no risk of a criticality accident involving depleted uranium in the storage yard as a result of seismic activity (or any other catastrophic event) as suggested in some of the comments.

I.5.13 Water Resources

Comment: The following comment talks about injection wells through which waste was introduced into the aquifer.

[008-06, Carol Bachelder] I would like to speak about water. I'm not a nuclear engineer. I'm not an expert in the field of water, but I've lived in Idaho most of my life, and I've educated myself a little bit. I watch the news, and I read, and I remember the aquifer from years ago when they had injection wells. Now, these injections wells were developed by nuclear scientists, and engineers, and professional people. And you know what they did? They put waste down into the aquifer, because at the time we thought that a little bit of waste wouldn't hurt anything. You know, just sort of diffuses into the aquifer, and won't hurt anybody. I like to compare it to just a little bit of Drano, you know, you put just a little Drano in your cereal, and it won't hurt you, because it's just a little bit. So, they invented the injection wells, and another reason that they thought this was safe was because they thought that there was very little movement of the water down there. And the scientists, they figured that out, there's no movement. But when they put microphones down into the injection wells, what did you get? You had gurgling.

Now, still water doesn't gurgle, so they concluded that there was movement of the water. And the water was carrying the waste, and this was all done in the name of science.

Response: *No injection wells are associated with the proposed EREF project. Also there would be no wastewater discharges associated with the operation of the proposed EREF (see*

Section 4.2.6.2 of the EIS). Therefore, contamination of the underlying aquifer would not be expected.

Comment: The following comment expresses concerns over the various potential avenues for water quality impacts and urges that updated information on the National Pollutant Discharge Elimination System (NPDES) permit process and water protection measures be presented in the Final EIS.

[138-05, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] The DEIS indicates that water quality may be adversely affected if the project construction activities (blasting, surface grading, excavation, and surface pavement, building roofs) alter the hydrology of springs and surface runoff such that erosion carries sediment and pollutants to local drainages (p. 4-32), accelerating infiltration and migrating through soils to the underlying aquifer. Also, groundwater extraction, land disturbance, material storage, waste disposal, inadvertent chemical or hazardous liquid spills, and compaction produced by vehicular traffic can all affect recharge to the local aquifer and groundwater quality. Because of such potential impacts to water quality, we recommend that this aspect of the project be monitored to assure that water quality is protected. The NRC should continue to coordinate with IDEQ and Tribes that may be affected by the project to assure that the state and tribal water resources (quantity and quality) are protected and used judiciously.

Since the project anticipates obtaining a National Pollutant Discharge Elimination System (NPDES,) permit for planned preconstruction and construction activities likely to disturb up to nearly 600 acres, the final EIS should include updated information on the permit application process and measures to protect water quality.

Response: *As stated in Table 1.2, and Sections 4.2.5.3 and 4.2.6.3 of the EIS, AES must obtain an NPDES Construction General Permit for its site preparation and construction activities. The NPDES permit sets standards and limits pertaining to the facility's industrial wastewater, sewage, and stormwater discharges. Updates on the NPDES permitting process can be viewed on the EPA's website at: http://cfpub.epa.gov/npdes/stormwater/noi/noidetail_new.cfm?ApplId=IDR10CI01. This has also been added as a footnote to Table 1-2 in Section 1.5.2 and a footnote in Section 4.2.6 of the FEIS. Water protection (i.e., mitigation) measures to be implemented by AES are discussed in Section 4.2.6.3 and Chapter 5.*

The NRC's purpose and need statements in its environmental review documents reflect that the NRC is not the implementer or funding entity for the proposed activity. As a result, when the NRC reviews a proposed action, its ability to impose additional requirements and mitigation and monitoring measures beyond those proposed as part of the application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the facility be built in accordance with the submitted application, including mitigation measures proposed by the applicant that are not specifically required by or directly related to the NRC's regulations. Thus, the NRC does have the ability to hold licensees to key mitigation measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.

Comment: The following comment encourages the use of low impact development techniques to reduce adverse water resource impacts.

[138-06, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] In keeping with the use of sustainable practices, we encourage NRC to consider use of Low Impact Development (LID) techniques during the proposed project activities because some of them have the potential to reduce stormwater volumes and thus mimic natural conditions as closely as possible. The techniques also lessen the impacts of stormwater runoff from impervious surfaces such as paved parking lots, roads and roofs, and can provide energy other utility savings. More information about LID practices can be found online at: http:/www.low/impactdevelopment.org/ and http://www.epa.gov/smartgrowht/stormwater.htm.

Response: *The EPA's "low impact development" practices have been added to the list of mitigation measures recommended by the NRC in Section 4.2.6.3 and in Chapter 5, Table 5-2.*

The NRC's purpose and need statements in its environmental review documents reflect that the NRC is not the implementer or funding entity for the proposed activity. As a result, when the NRC reviews a proposed action, its ability to impose additional requirements and mitigation measures beyond those proposed as part of the application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the facility be built in accordance with the submitted application, including mitigation measures proposed by the applicant that are not specifically required by or directly related to the NRC's regulations. Thus, the NRC does have the ability to hold licensee's to key mitigation measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.

Comment: The following comment expresses concerns regarding the amount of water that will be used in the enrichment process, and the safety of the filtration system that will be used for the evaporation process.

[183-02 and 183-08, James Vincent] I also am particularly concerned with the amount of water that will be used in the enrichment process, and the safety of the filtration system that will be utilized for the evaporation process.

Response: *The amount of water expected to be used by the proposed EREF is less than the current appropriation for water use; therefore, the amount of water used would have a SMALL impact, as further explained in Sections 4.2.6.1 and 4.2.6.2 of the EIS. Solid waste from the filtration system is addressed in Section 4.2.11.2, with SMALL impacts expected.*

Comment: The following comments are concerned with water quality permitting issues.

[027-12, Sara Cohn] It is unclear under what authority NRC may offer exemptions for preconstruction activities when such impacts extend outside of NRC jurisdiction. For example preconstruction activities may impact waters protected under the Safe Drinking Water Act – the Eastern Snake River Plain Aquifer. The project must consult with EPA in order to ensure the preconstruction activities will not impact the Eastern Snake River Plain aquifer, a sole source aquifer for eastern Idaho.

[066-20, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 18. The Proposed Eagle Rock Enrichment Facility potable water system will be classified as a non-transient non-community public water system and subject to the requirements of the Idaho Rules for Public Drinking Water Systems (IDAPA 58.01.08). DEQ expects that AES will comply with all applicable regulations of the DEQ concerning the design, construction and operation of the water system (Refer to IDAPA 58.01.08 for official rule language).

[066-21, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 19. Clean Water Act/surface water issues and requirements
We expect that AES will comply with all applicable DEQ regulations concerning surface and ground water quality protection including but not limited to the requirements of IDAPA 58.01.02 and IDAPA 58.01.1 1. In that regard, DEQ would identify the following issues that this EIS should consider and that AES in preconstruction, construction and operation should note:

- There are a number of intermittent or ephemeral streams on the property. AES will need to obtain a Clean Water Act Section 404 dredge and fill permit from the US Army Corps of Engineers (USACOE) if these are deemed waters of the U.S. and AES plans to place dredge or fill material in the streams. The USACOE and EPA make the determination if a stream is considered waters of the U.S.

- Construction projects larger than 1 acre are required to get coverage under the construction storm water general permit from EPA if the storm water discharges to waters of the U.S.

- If storm water discharges to waters of the U.S., then AES should determine whether this facility is regulated under EPA's Multi-sector General Permit (MSGP) for storm water.

[036-03, Christina Cutler, on behalf of the Shoshone-Bannock Tribes] Question on what about the water permits, not only the permits to use water for processing but also potable water, as well the permits for disposal of water from the processing as well as septic water. They will also need to address plant protection runoff water issues.

Response: *The approvals and permits pertaining to water use, water quality, and water runoff, required for preconstruction, construction, and operation of the proposed EREF must be obtained by AES from other regulatory agencies. Tables 1-1 and 1-2 of the EIS list applicable requirements and the agencies to which AES must submit the appropriate applications.*

The Safe Drinking Water Act and Idaho Administrative Procedures Act (IDAPA) 58.01 are listed in Table 1-2 as potentially applicable permitting and approval requirements for the proposed EREF's drinking water system.

The U.S. Army Corps of Engineers has issued a letter (Joyner 2008) stating that a Section 404 permit (authorized by the Clean Water Act) is not required for the intermittent streams located on the proposed EREF property (see Table 1-2). A statement to this effect has also been added to Section 3.7.1.

Updates on the NPDES construction permitting process can be viewed on the EPA's website at: http://cfpub.epa.gov/npdes/stormwater/noi/noidetail_new.cfm?ApplId=IDR10CI01.

Comment: The following comments present observations on water use and threats to the Eastern Snake River Plain (ESRP) Aquifer.

[007-01, Arnold Ayers] For one, disposal wells don't gurgle. For two, we put monitors around those wells which Jack Barraclough was well associated with, and instigated in the back history of his time to monitor those things. And those wells worked, and those wells were able to monitor what was coming out of the facilities directly under the facilities, as well as outside of the facilities. If AREVA is monitoring what's going on, as they should do, there will be no discharges that I can see that could ever come undetected from those facilities, in my experience.

[023-02, Rebecca Casper] I will tell you that at no time since April 2007 has there been one official conversation or unofficial conversation that I'm aware of, of the need for us, as a planning committee, to prepare to alter our plan for any threats that might be posed by AREVA. We were in existence before AREVA came on the scene. We still are, and it's never been a problem. We've more talked about climate change than we have from threats of radioactivity, or anything like that.

I will say that we've had no discussion, in my opinion, not because we've been remiss, but rather because there are no threats that meet the worry and action threshold. Again, we care about the safety and quality of the water. We would not -- we would be remiss in our duties if we didn't explore every viable threat out there. And I am confident that my friend Jack would have -- he spoke earlier -- would have told you if there were some threats.

[102-02, R.D. Maynard] After reviewing the summary of the environmental consequences and mitigation section of the draft EIS, I'm confident that any potential negative impact on the air and water resources would be small.

[133-06, Richard Provencher] The facility does not require a large amount of water to operate. This is good from an aquifer conservation and a waste minimization standpoint.

[143-03, Hon. James Risch; 172-03, Amy Taylor, on behalf of Hon. James Risch] The process will use 50 times less electricity than a gaseous diffusion plant, and the amount of water used by the plant is less than the current irrigation appropriation.

Response: *The comments are consistent with the NRC's finding that impacts on water resources from preconstruction, construction, and operation of the proposed EREF would be SMALL.*

Comment: The following comments express concern about contamination of the ESRP Aquifer as a result of the proposed EREF project.

[008-07, Carol Bachelder] Another thing about the water was the hearings I went to several months ago in Mountain Home, again, the scientists, the nuclear scientists were going to build a reactor, and they started in one county, and it was disproved, and they went to another county and it was disproved. The Snake River Alliance finally called this nuclear reactor Idaho's "Nomadic Nuclear Reactor," which wasn't very scientific, but boy, it was funny. I mean, I liked that. The "Nomadic Nuclear Reactor," because nobody wanted it. And the hearings from them were mainly from the farmers around there. It was an agricultural area, and they were scared, and they were mad, because they said this nuclear reactor is going to take our water. And this is the west. And a lot of fights, and hangings, and range wars happened in the early west over water. This is still the west, and these farmers were saying we don't want this nuclear reactor here, and so it was disproved, and now it's off down somewhere else trying to get approval. And that is stuff I've learned from the Snake River Alliance. They're not -- maybe they're not scientific, maybe they're not totally educated, but they have a contribution to make.

[010-02, Jack Barraclough] When they say that this plant is going to ruin the aquifer, just read the EIS and find out they're not going to discharge. And if they do, the monitor will pick it up and changes will be made. So. I don't worry about this plant and what its effect on the aquifer is.

[014-01, William Blair] Idaho does not need more radioactive waste placed over the Snake Plain Aquifer in an active earthquake area. Until a safe method of handling and storing radioactive wastes for thousands of years is devised, NO new facilities should be approved.

[015-05, Beatrice Brailsford] The most domestic part of the proposal is that the waste will, in fact, stay here. The plant would produce 320,000 tons of depleted uranium hexafluoride over its licensed lifetime, and the door is already ajar for the license to be extended. That waste might be stored on outdoor concrete pads above the Snake River aquifer until the plant is decommissioned.

It's worth noting that New Mexico sharply limits how much, and how long waste can stay at the plant there. The waste has to be treated before it can be disposed of. Two government-owned treatment plants are under construction, over budget, and behind schedule. Waste the U.S. has already accumulated will take a combined 43 years to process.

[015-14, Beatrice Brailsford] The EREF will produce more than 350,000 tonnes of depleted uranium hexafluoride (DUF6) over its licensed lifetime, and the door is already ajar for the license to be extended. That waste would be stored in 25,718 cylinders on outdoor concrete pads above the Snake River Aquifer as long as the plant operates. DUF6 is both radioactive and chemically toxic and has to be treated before it can be disposed of. The DOE has built two plants to treat depleted uranium hexafluoride waste the US has already accumulated. That treatment will take a combined 43 years to process. A private US corporation is seeking a license for its own treatment plant. The draft EIS cavalierly dismisses any potential bottlenecks by stating that the waste could simply be sent to the DOE treatment plants before they're ready to process it and then their operating lives extended. But it is at least as likely that the DUF6 will be stored in Idaho for an uncertain length of time above the Snake River Aquifer, a sole source aquifer for nearly 300,000 people. Storage under these conditions must be fully evaluated under NEPA.

[017-03, Sally Briggs] At Stake is the very air we all breath and the water we receive from our amazing and priceless aquifer.

[019-01, George Buehler] As a long time resident of Southeast Idaho, I am very disturbed by the possibility of the Areva Uranium Enrichment being located in my neighborhood. This area is above a highly permeable aquifer which provides water for the most populous cities in the state.

[020-01, Tracey Busby] I do not support the idea of putting any type of nuclear plant / enrichment facility above the Snake River Aquifer for the obvious environmental risks.

[025-02, Hon. Sue Chew] So, you know, when I look at the fact that we have an aquifer, and we have potential waste that would be created upstream, I want to make sure that we have a good plan there when we look at transportation into Idaho and out, that those things are considered.

[027-11, Sara Cohn] Water Resources: The ICL is very concerned that spillage or leakage of hazardous materials and waste from the proposed facility will further contaminate Idaho's surface or groundwater. We are concerned that there will be large quantities of hazardous, toxic, and radioactive materials produced and stored onsite and that these materials may contribute to existing contamination of Idaho's waters. The Snake River Plain Aquifer is southern Idaho's primary source of drinking and irrigation water and is already contaminated with materials stored within the Idaho National Laboratory as well as nutrients associated with historical and existing agricultural practices. Should the facility operations result in further contamination of the aquifer, this pollution would have wide reaching affects on public health and Idaho's agricultural economy. Toxic and radioactive materials from enrichment facilities have been shown to leak through detention basins and contaminate groundwater. We are very concerned the proposed facility may contaminate Idaho's waters the way similar facilities have contaminated groundwater in Paducah, KY and Portsmouth, OH.

Due to the amount of pollutants expected to be stored onsite, the extremely hazardous nature of waste products like depleted uranium, the possibility of waste spills, the possibility of leakage from proposed retention basins, and the importance of the Snake River Plain Aquifer, much more information is needed, in the final EIS, to ensure no endangerment of public health or contamination of precious water resources. We request more information with regard to the amount of waste and hazardous materials expected to be stored onsite, the types of preventative measures that will be in place to ensure no contamination of water, as well as plans outlining monitoring and reporting methods and responsible parties. The applicant should also prepare reports and plans that detail the roles and responsibilities of agencies and AREVA in the event of spillage or contamination from the site. These plans should outline remediation, public alerts, public safety measures, and clean up strategies, among all other necessary actions to protect environmental and public health.

Nitrate contamination of groundwater is also of concern. Recent findings indicate that long-term exposure to elevated concentrations of nitrate may contribute to the risk of developing bladder and ovarian cancers and non-Hodgkin's lymphoma.

[030-03, Kerry Cooke] One of the worst places anyone could think of for nuclear waste is above the Snake River Plain Aquifer.

[032-02, Cindy Cottrell] Another reason Idaho should never be considered is because of the risk involved to main waterways and land. If any accident were to occur which exposes the environment to radiation or the storing of the waste to do so, it would contaminate much more area than if it were next to the ocean somewhere. It would first contaminate one of the largest underground aquifers, then continue down the beginning of the Snake River, passing all through Southern Idaho and then into the Columbia River, contaminating the length of Oregon and Washington before reaching the ocean. The contamination would ruin lands that grow needed crops and range land for wildlife and cattle. The fish would also suffer and eventually the ocean life would suffer. If it was near the ocean, it would reach the ocean which would be a disaster but at least the in land would be free of the radiation.

[040-01 and 040-04, Collin Day] But are we really willing to risk storing all this stuff right on top of an aquifer? It makes no sense to me. I mean, not only -- I mean, can you guarantee that 30 years from now, there will be no accidents, and none of that's going to leak into an aquifer?… But there's just no need to take risks and gamble with things like the aquifer that, you know, supplies drinking water to some 300,000 people, because 500 people need jobs.

[048-01, Genevieve Emerson] As a fifth generation steward of the land in Southern Idaho, as well as a biologist, I found that the EIS for the proposed Eagle Rock Facility fails to consider how such a facility, poised directly over the Snake River Aquifer, could have extremely serious health implications for both wildlife and human beings who rely on this sole source of precious water in a high mountain desert.

[050-04, Joanie Fauci] There is also the question, unknown scientific impact, of the interaction of the waste and water. There is risk of it getting into the aquifer as well as how it reacts with rain and excess moisture.

Safety should be given the highest risk factor in the EIS.

[068-02, Anne Hausrath] I am very much opposed to the storage of radioactive [waste] above an important aquifer. This is a huge risk that I do not believe has been adequately addressed.

[074-01, Don Howard] I've been on the focus group at INEL forever, under Mark Marinet (phonetic). We'd go out and we'd look at the site and the projects, and when you say a leach to, on the water, well, they have a deal out there called Pit 9, that they dump this raw nuclear waste in, and it's down, I thing, about 139 feet in the aquifer, Under it is down about 459 feet. And if we have leach, the gentleman said that they was putting a leach to rejuvenate the waters.

[078-04, Hon. Wendy Jaquet] I could not get a feeling for the safety processes that would make me feel comfortable regarding our sole source aquifer. After the BP fiasco, I am now more concerned.

[087-02, Dennis Kasnicki] Comment 2a: Many attendees expressed concern regarding contamination, especially depleted uranium, getting into the Snake River Aquifer; that, by far, seemed to be the biggest concern, and rightfully so. Does AREVA's Integrated Safety Assessment address ALL CREDIBLE accident scenarios whereby depleted uranium (or other contamination) could get into the Snake River Aquifer? Are the "probabilities" of all such scenarios deemed at least "highly unlikely", or otherwise meet the requirements of 10 CFR 70? If so, or if not, this should be loudly and clearly "called out" in the Draft EIS.

[092-01, Ginna and Ken Lagergren] The Areva plant is a BAD idea anywhere, and even worse where they want to locate it over the Snake River Aquifer. Please listen to the testimony of the organization Snake River Alliance for all the scientific reasons why the Areva uranium factory should NEVER BE BUILT!!!

[100-04, Wendy Matson] The facility will store radioactive waste above the sole-source aquifer for nearly 300,000 people. This scares me. This threat to a vital and unique resource outweighs any perceived benefit of the facility.

[102-01, R.D. Maynard] I'm interested in any potential impacts to the environment, particularly the Snake River aquifer, that construction and operation of the Eagle Rock enrichment facility might cause.

Past waste disposal practices at the INL site, along with land application of fertilized and pesticides, and excessive irrigation, have already caused some contamination of the aquifer.

[103-03, Karen McCall] The radioactive risk to Idaho is significant as this plant is proposed to be built upstream of the Snake River Aquifer which is already contaminated by the activities at the INL. Further degradation of this enormous water source is unacceptable and a risk to agriculture in the state.

[105-05, Eve McConaughey] No mention was made of the potential contamination of the aquifer or mention made of the location near the Snake River.

[110-01, John and Susan Medlin] As the Snake River Alliance presentation pointed out, there is no current need for this facility, no compelling evidence that a nuclear renaissance is coming (or inevitable), no rationale for a French company building a nuclear facility in Idaho that purports to promote US energy security while importing inputs and exporting outputs, no provision for the deteriorating and dangerous waste that will haunt us for decades or maybe forever, no concern for yet another threat to the Snake River aquifer, the lifeblood of Idaho agriculture.

So how can the NRC conclude that building this facility is vital, and that the most problematic outcome to be evaluated is construction dust?

[122-04, Kathy O'Brien] I am also concerned about the wildlife in the area as well as the Snake River Aquifer. This must be taken into account and given priority.

[128-04, Bob Poyser] Second, during the design of this facility, AREVA has applied standards for environmental practices and protection above and beyond acceptable industry practices, wherever possible. At the Eagle Rock facility, even rainwater runoff from the site will be directed to a storm water retention basin. Similarly treated liquid waste from the domestic sanitary sewer treatment plant will be directed to a fully lined retention basin with no outlet.

The lined retention basins will use evaporation, thus precluding any interaction with the water in the aquifer.

These additional features are a part of Areva's commitment to sustainable development, and the deployment of our best know-how to protect the environment.

[147-06, Joey Schueler] The site of this nuclear facility is located directly above the Snake River Aquifer, which supplies water to over 300,000 individuals in Idaho (including the entire Treasure Valley).

[150-01, Katie Seevers] The potential for a nuclear facility, which will site over a sole source aquifer for about 300,000 residents, is beyond disconcerting. The location of the facility above the Snake River aquifer causes further alarm when additional environmental effects are considered.

[153-01, Andrea Shipley; 197-01, Andrea Shipley, on behalf of the Snake River Alliance] Areva's proposed uranium enrichment factory will store radioactive waste above the sole source aquifer for nearly 300,000 people,

[168-03, Lon Stewart] What does Idaho get out of this? We get highly radioactive waste that increases in intensity over time, we get a chance to pollute the Eastern Snake River Aquifer, the main source for water for all of Southeast Idaho and then pollute the Snake River which flows through the Southwest portion of the state….

[181-06, Roger Turner] It would be opposed, because the waste is likely to remain in eastern Idaho, posing a risk to the Snake River Plain Aquifer.

[183-01, James Vincent] Since the two US de-conversion facilities are not operational, and if they do become operational they will first process already existing depleted uranium waste for 60 plus years of existing waste, from the 100 plus nuclear energy producing plants here in the US, the timeline for the removal of the on site storage of Uranium hexafluoride DUF6 from Idaho is in doubt. I have a problem with storing this waste above ground and possible leaching of contaminants into the aquifer for our state.

Their figures are that these are increasing to 2,000 metric tons per year. And, in addition, there's like 12 million cubic feet of low-level waste from these plants. Supposedly, we have around 60,000 metric tons of waste in this country that we have to get rid of one way or another.

[183-07, James Vincent] Since the two US de-conversion facilities are not operational, and if they do become operational they will first process already existing depleted uranium waste for 60 plus years of existing waste, from the 100 plus nuclear energy producing plants here in the US, the timeline for the removal of the on site storage of Uranium hexafluoride DUF6 from Idaho is in doubt. I have a problem with storing this waste above ground and possible leaching of contaminants into the aquifer for our state.

[184-02, Kitty Vincent] What matters is Areva's history of leaks and pollution overseas as well as the fact that this plant would sit atop this magnificent aquifer.

[184-01, Kitty Vincent] Water is a resource in scarce supply in the West. The Snake River aquifer is a huge water source for now and the future in not only the State of Idaho but also the entire West. While several scientists at the meeting denied the potential threat to this water source by the Areva project -- they are not employed by Areva so whatever expertise they have is a moot point.

[184-07, Kitty Vincent] Areva's proposed Eagle Rock Enrichment Facility (EREF) will store radioactive waste above the sole source aquifer for nearly 300,000 people;

[191-33, Liz Woodruff] The facility will store radioactive waste above the sole source aquifer for nearly 300,000 people. This threat to a vital and unique resource outweighs any perceived benefit of the facility.

[192-05 and 192-11, Lisa Young] Idaho will not allow for this kind of risk, especially over its precious aquifer, which could easily be contaminated after an accidental spill of depleted uranium hexafluoride waste. With a spill of this material, the radioactive material has a potential to enter the aquifer and poison our sole source of water.

[192-11, Lisa Young] This risk is unacceptable anywhere with the storage of depleted uranium hexafluoride, and Idaho will certainly not allow for this kind of risk, especially over its precious aquifer, which could easily be contaminated after an accidental spill of depleted uranium hexafluoride waste…poisoning our sole water source.

Response: *As discussed in Section 4.2.6.2 of the EIS, there would be no wastewater discharges associated with the operation of the proposed EREF. Chemical spills or releases around vehicle maintenance and fueling locations, storage tanks, and painting operations are not expected to affect groundwater in the Eastern Snake River Plain aquifer because it occurs at great depths (about 660 ft) below the ground surface (see Section 3.7.2.2) and contaminants would likely be cleaned up quickly and otherwise likely adsorbed by overlying soils long before reaching the aquifer. Compliance with the facility's Spill Prevention Control and Countermeasures (SPCC) Plan would minimize the likelihood of inadvertent releases to the ground surface during all project phases. Therefore, contamination of the underlying aquifer would not be expected.*

Section 4.2.6.2 has been modified to provide further information on the measures (e.g., system or basin design) that would be taken by AES to assure that contaminated effluents are contained within the Liquid Effluent Collection and Treatment System and potentially contaminated effluents from the cylinder storage area are retained in the Cylinder Storage Pads Stormwater Retention Basins and that inadvertent releases would be detected and corrected in a timely manner. Releases associated with an accident would be addressed as part of the facility's emergency response planning with technical support and oversight from various Federal, State, and local agencies. Any ground contamination from depleted uranium material released by a potential accident would be isolated and retrieved in a timely manner.

I.5.14 Ecological Resources

Comment: The following comment states that there is no discussion of impacts to the greater sage-grouse (*Centrocercus urophasianus*) from the operation of the plant, and that AES should place metal reflectors on the top wire of the fence to reduce the probability of sage-grouse colliding with the fence, thus reducing mortality.

[140-04, Wendy Reynolds, on behalf of the Bureau of Land Management, Upper Snake Field Office] 3) The BLM appreciates the lengthy and thorough discussion of the greater sage grouse, particularly in the affected environment section of the document. In terms of the analysis, however, there is no discussion of impacts to the greater sage grouse from the operation of the plant. Here too, as with the impacts from preconstruction and construction activities, the greater sage grouse would likely avoid the area due to human presence, noise, and the use of artificial lights resulting in habitat displacement over an area substantial larger than the footprint of the facility itself. Further, indirect impacts would occur once the boundary fence is in place. Greater sage grouse are known to collide with the top wire of fences like the fence proposed to encircle the AES property. Such collisions are known to be a source of mortality amongst local and regional sage grouse populations. In view of this fact, the BLM requests that AES place metal reflectors on the top wire of the fence. This mitigation measure has been shown in recent preliminary and, as of yet, unpublished studies to reduce the probability of sage grouse colliding with fence, thus reducing mortality.

Response: *Wildlife avoidance of the areas around the proposed facility is acknowledged in Section 4.2.7.2 of the EIS, Facility Operation. Additional information has been included in Section 4.2.7.2 regarding effects on sage-grouse during operation of the proposed EREF. Information regarding the inclusion of markers on the boundary fence and metal reflectors on the top wire of the fence has been added to the NRC-recommended additional mitigation measures in Section 4.2.7.3 and Table 5-4, Section 5.2.*

When NRC reviews a proposed action, its ability to impose additional requirements and environmental mitigation measures beyond those proposed as part of the license application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the proposed facility be built in accordance with the submitted application, including mitigation and monitoring measures proposed by the applicant that are not specifically required by or directly related to NRC's regulations. Thus, the NRC does have the ability to hold licensees to key mitigation measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.

Comment: The following comment expresses concern that the transmission lines compound the negative impact that will accrue to wildlife, and points to the Idaho Department of Fish and Game's (IDFG's) comments on this matter.

[015-20, Beatrice Brailsford] The transmission lines compound the negative impact the will accrue to pronghorn antelope, greater sage grouse, and ferruginous hawks, which will all likely abandon the Areva site and surrounding areas. Sage grouse is a candidate species for federal protection. The Idaho Department of Fish and Game reaffirmed the threats transmission lines would pose to wildlife, challenged the methodology of sage grouse and lek analysis in the draft EIS, recommended burying transmission lines, and suggested Areva submit to plans to mitigate for the expected wildlife impacts. These concerns do not appear to have been addressed in this EIS and must be addressed before any preconstruction activities are allowed or before this EIS review continues.

Response: *The concerns of IDFG are addressed in the EIS. A supplementary lek survey was conducted by AES (see Section 3.8.3), and AES is committed to coordinating with IDFG during monitoring (see Section 6.2.2). Measures for the protection of birds would be implemented in* *the construction of the transmission lines (see Section 4.3.7). Regarding transmission line burial, the cumulative impacts of a proposed, above-ground, 161-kV transmission line that would serve the proposed EREF are analyzed (see Section 4.3), and this analysis concludes that the line would have SMALL contributions to cumulative impacts in all resource areas. Information regarding monitoring of the transmission line right-of-way for avian mortality has been added to Section 6.2.2.*

Comment: The following comment asks the NRC to incorporate design features in the proposed EREF project to minimize impacts to ecological resources and to prepare a plan to mitigate for impacts that cannot be avoided or minimized.

[027-22, Sara Cohn] *Avoid, Minimize, Mitigate:* In terms of priorities, the NRC should first site facilities and infrastructure to avoid impacts to wildlife and cultural resources. If impacts cannot be entirely avoided, the NRC should incorporate design features to minimize impacts. Lastly, a plan should be prepared to mitigate for impacts that cannot be avoided or minimized.

Response: *The siting of a uranium enrichment facility involves a number of requirements, as discussed in Section 2.3.1 of the EIS. Environmental protection was one of the criteria categories used. Mitigation measures identified by AES to minimize impacts to wildlife during preconstruction, construction, and operation of the proposed EREF are presented in Section 4.2.7.3 and Chapter 5.*

The NRC's action with regard to the proposed EREF project is limited to granting a license, if found to be warranted, for the construction, operation, and decommissioning of the proposed facility. NRC is not the implementer or funding entity for the proposed activity. As a result, NRC generally limits its analysis to the alternatives and actions reasonably available to the applicant.

When NRC reviews a proposed action, its ability to impose additional requirements and environmental mitigation and monitoring measures beyond those proposed as part of the license application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the proposed facility be built in accordance with the submitted application, including mitigation and monitoring measures proposed by the applicant that are not specifically required by or directly related to NRC's regulations. Thus, the NRC does have the ability to hold licensees to key mitigation and monitoring measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.

Comment: The following comment expresses concern regarding impacts to sage-grouse.

[027-23, Sara Cohn] There is significant concern regarding the long-term viability of greater sage-grouse populations. The US Fish and Wildlife Service concluded that Greater sage-grouse are warranted for protections under the Endangered Species Act but this action is precluded by other priorities. The US Fish and Wildlife Service will continue to reassess the status of sage-grouse. If sage-grouse are listed, the protections could have far reaching effects on land management in Idaho and in the region.

Greater sage-grouse suffer from the loss, degradation, and fragmentation of habitat throughout the west. It's estimated that only 50-60% of the original sagebrush steppe habitat remains in the west (West 2000), and in 2007, the American Bird Conservancy listed sagebrush as the most threatened bird habitat in the continental United States. 4 As such, we cannot stress enough how important it is for agencies to consider impacts to sage-grouse, conserve existing habitat, and actively restore altered sagebrush steppe habitats due to project-related impacts.

Depending on location and design specifics, the construction of additional roads within sage-grouse habitat could constitute "nonlinear infrastructure" under the *Conservation Plan for the Greater Sage-grouse in Idaho (Idaho Sage-Grouse Advisory Committee 2006).* Nonlinear infrastructure is defined as "human-made features on the landscape that provide or facilitate transportation, energy, and communications activities." The *Conservation Plan* lists infrastructure such as this as the second greatest threat for sage grouse, with wildfires as the greatest risk. Road construction and use associated with the facility represents high risk for loss of lek areas, nesting locations, and brood-rearing habitats (Braun 1986, Connelly et al. 2004)

Coordination with local stakeholder groups: We believe that an integral part of conserving and recovering sage-grouse will be relying on the guidance from local stakeholder groups. As such, we recommend that the applicant coordinate further efforts more closely with the US Fish and Wildlife Service, local Sage-grouse Working Groups, the Idaho State Sage Grouse Advisory Council, the Idaho Department of Fish and Game, and the Governor's Office of Species Conservation. Conservation groups to consult include the Audubon Society, the Idaho Chapter of the North American Grouse Partnership, the Idaho Falconer's Association, the Nature Conservancy, the Western Watersheds Project as well as the Idaho Conservation League.

Response: *Impacts on sage-grouse are discussed in Section 4.2.7 of the EIS, along with mitigation measures that include the planting of disturbed areas with sagebrush steppe species. As shown in Figure 4-4, the site access road avoids sagebrush steppe habitat, being located entirely within nonirrigated pasture. AES has committed to working with the U.S. Fish and Wildlife Service (FWS), Bureau of Land Management (BLM), and IDFG in the development of action levels and/or reporting levels for the ecological monitoring program for the proposed EREF (see Section 6.2.2.1). These agencies work with many conservation groups for the protection of sage-grouse and other species.*

When considering the long-term viability of sage-grouse populations the proposed action is evaluated considering short term impacts during preconstruction and construction (Section 4.2.7.1) and cumulative impacts (Section 4.3.7) during the life of the facility. By necessity, the viability of an entire population has to be viewed at the ecosystem level. The ecosystem level used in this analysis was the Upper Snake sage-grouse planning area as described in the July 2006 Idaho sage-grouse conservation plan (ISAC, 2006). The evaluation takes into account past, present and reasonably foreseeable impacts. As part of the evaluation it was recognized that past actions have caused extensive habitat fragmentation at the proposed site and future actions were evaluated in terms of the incremental contribution to environmental impacts from an area already heavily impacted by prior activities (e.g., cultivation and cattle grazing). For example, the July 2006 plan describes the impact of roads as a linear infrastructure feature and contributor to habitat fragmentation. US 20 is considered to be a major highway in the project area and forms the southern boundary of the proposed EREF site.

The July 2006 plan describes taking into account a 6.2 mile buffer on either side of a major road to account for its impact.

Comment: The following comment discusses the effects of operation of the proposed EREF on sage-grouse that are on public land.

[089-05, Sharon Kiefer, on behalf of the Idaho Department of Fish and Game] Recent research on sage-grouse suggests that disturbance-related impacts from energy development on counts of displaying male sage-grouse at leks were apparent out to 6.4 km or approximately 4 miles (Naugle et al. *in press),* and that most (79%) nests occur within 4 miles of leks (Doherty et al. *in press* citing Colorado Division of Wildlife 200S-Appendix B Page 7). As noted in the DEIS the property is adjacent to mapped key sage-grouse habitat with one sage-grouse lek approximately 3.5 miles away from the site. Presence of an industrial facility this distance from occupied sage-grouse habitat remains a consideration although we recognize the facility direct footprint excludes occupied habitat.

There are guidelines that should be considered to help steer significant construction activity that could benefit sage-grouse. The Upper Snake Sage-Grouse Local Working Group work plan includes the following recommendation that would be applicable: *All land management agencies adjust timing of energy exploration, development, and construction activity to minimize disturbance of sage-grouse breeding activities. Energy-related facilities should be located* >3.2 *kilometers from active leks whenever possible. Human activities within view of or* <0.5 *kilometers from leks should be minimized during the early morning and late evening when birds are near or on leks.* http://fishandgame.idaho.gov/hunt/grouse/conserve_plan/upsnake_workplan.pdf

Likewise, Idaho Bureau of Land Management's (BLM) Seasonal Wildlife Restrictions and Procedures for Processing Requests for Exceptions On Public Lands in Idaho (Information Bulletins No. ID-2010-039) also includes recommendations for controlled surface and timing limitation use near sage-grouse leks and/or nesting/early brood rearing habitat: *Potentially disruptive larger-scale construction activities (e.g. , infrastructure/ energy development and similar projects), shall be avoided within* 6.4 *km* (~4 *miles) of occupied or undetermined status sage-grouse leks from March 1 to June 30 to reduce disturbance to lekking or nesting grouse (and/or hens with early broods).*

If monitoring indicates sage-grouse do avoid public lands surrounding the facility due to post-construction operational effects, such as lights and roads, we request AES to determine corrective action or to mitigate the offsite public lands lost to wildlife due to project effects.

Response: *AES has committed to the consideration of all recommendations of the FWS and IDFG (see Section 4.2.7.3 of the EIS), and to working with the FWS, BLM, and IDFG in the development of action levels and/or reporting levels for the ecological monitoring program for the proposed EREF (Section 6.2.2.1). A measure recommending that AES coordinate with IDFG regarding corrective action or mitigation has been added to the NRC-recommended additional mitigation measures in Section 4.2.7.3 and Table 5-4, Section 5.2.*

The NRC's purpose and need statements in its environmental review documents reflect that the NRC is not the implementer or funding entity for the proposed activity. As a result, when the NRC reviews a proposed action, its ability to impose additional requirements and mitigative measures beyond those proposed as part of the application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the facility be built in accordance with the submitted application, including mitigation measures proposed by the applicant that are not specifically required by or directly related to the NRC's regulations. Thus, the NRC does have the ability to hold licensees to key mitigation measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.

Comment: The following comment recommends that the NRC continue to work with the FWS and IDFG as the project is implemented to monitor risks to individual species and identify effective measures to reduce risks and protect the species and their habitat; and to also coordinate with the Idaho National Laboratory (INL) and BLM due to their long term experiences monitoring impacts to the species and associated habitats in and around the proposed project area.

[138-07, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] Sections 4.2.7 discuss the project's impacts to ecological resources, including vegetation and wildlife species. The DEIS indicates that vegetation removal, habitat fragmentation, and ground disturbance would result in moderate impacts on plant communities and wildlife species (p. 4-44). Most impacts to these resources would occur primarily on almost 592-acre area of the ERF footprint. About 185 acres of sagebrush steppe, 136 acres of non-irrigated pastures, and 268 acres of irrigated cropland habitats would be lost. Such habitat loss and alterations would impact a number of species including sage grouse, which is a candidate species for listing under the Endangered Species Act, pygmy rabbits, and nesting migratory birds and other species of concern (p. 4-46). Noting that some of the impacts would be indirect, others would be direct, cumulative and unavoidable.

We appreciate measures to limit the project footprint impacts, including replanting almost 133 acres of that footprint with native species after construction activities and eliminating grazing within the entire project area (4200 acres). Because of an arid environment at the project site, however, planted vegetation would take years to establish or restoration could fail, thus exacerbating loss of cover and habitat for the species. Given the usage of the project area by sage-grouse and other sensitive wildlife species, and limited survey data for the species, it is important that the NRC continue to work with the US Fish and Wildlife Service and the Idaho Department of Fish and Game (IDFG) as the project is implemented to monitor risks to individual species and identify effective measures to reduce risks and protect the species and their habitat, particularly loss, degradation, and fragmentation of the sagebrush steppe habitat due to construction activities, wildfire, and agriculture. Also, we believe that it would be useful for the project to coordinate with the Idaho National Laboratory and Bureau of Land Management due to their long term experiences monitoring impacts to the species and associated habitats in and around the proposed project area.

Response: *AES has committed to ongoing coordination with the FWS, IDFG, and BLM during ecological monitoring program activities for the proposed EREF project (see Section 6.2.2.1 of* *the EIS). A recommended mitigation measure that AES should also coordinate with INL has been added to the NRC-recommended additional mitigation measures in Section 4.2.7.3 and Table 5-4 in Section 5.2.*

The NRC's purpose and need statements in its environmental review documents reflect that the NRC is not the implementer or funding entity for the proposed activity. As a result, when the NRC reviews a proposed action, its ability to impose additional requirements and mitigative measures beyond those proposed as part of the application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the facility be built in accordance with the submitted application, including mitigation measures proposed by the applicant that are not specifically required by or directly related to the NRC's regulations. Thus, the NRC does have the ability to hold licensee's to key mitigation measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.

Comment: The following comment recommends that the Final EIS include a discussion of how issues such as ecological impacts raised by Tribes would be addressed by the project.

[138-08, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] Consultation with Tribal Governments - The draft EIS indicates that there have been contacts with Tribes that may be affected by the proposed project. This is especially important because the DEIS states that the project would result in up to large impacts to resources important to tribes (p. 4-4)**,** including historical and cultural, visual, and ecological resources. Construction activities, for example, would destroy historic and cultural resources at MW004 site, while increased traffic and construction activities and the presence of an industrial complex would significantly alter the visual landscape. Because of these and other impacts that may be discovered during the project operations, we recommend that the final EIS include a discussion of how issues raised by Tribes would be addressed by the project and outcomes of the ongoing work with the Idaho State Historic Preservation Office and affected Tribes on potential effects requiring Section 106 review of the National Historic Preservation Act.

***Response:** Consultation with the affected Federally recognized Shoshone-Bannock Tribes has been ongoing throughout the EIS process. The ecological impacts associated with the project are discussed in Section 4.2.7.*

Comment: The following comment expresses concerns that an historical landmark and expanse of Idaho native habitat will be destroyed to build the proposed plant and that there would be no return to the area's natural state after plant decommissioning

[147-15, Joey Schueler] 11. A historical landmark and a vast expanse of Idaho native habitat will be destroyed to build this plant. After plant decommission, there will be no return to this valuable area of Idaho's beautiful wilderness.

***Response:** There is an estimated 9,013,000 acres of land identified as existing key sage-grouse habitat in Idaho. Approximately 592 acres on the 4200-acre proposed EREF property would be disturbed by construction and operation of the proposed EREF, as discussed in*

Section 4.2.1 of the EIS. The remainder of the 4200-acre property would revert to a more natural state because cultivation and grazing activities on the site would cease, as noted in Section 4.2.1.3. Thus, the land use impacts are considered to be SMALL and the general character of the surrounding land is better preserved. Impacts on habitats are considered and described in Section 4.2.7. Impacts related to decommissioning are discussed in Section 4.2.16.7 and I.5.21. Impacts related to historic and cultural resources are described in Sections 4.2.2 and I.5.9.

Comment: The following comment asks for more serious consideration of the wildlife species that will be affected by construction, operation, and decommissioning of the proposed facility, including the sage-grouse.

[192-17, Lisa Young] Indeed, I hope to see much more serious consideration of the wildlife species that will be affected by all three stages of construction, operation, and decommissioning of this facility, including the fact that the sage grouse, well-known to be a vulnerable species in need of federal protection, makes its home in this region.

Response: *As discussed in comment responses above, additional NRC-recommended mitigation measures for the protection of wildlife have been added to the EIS, in Section 4.2.7.3 and Chapter 5, Table 5-4; and additional information regarding sage-grouse has been added in Section 4.2.7.2.*

Comment: The following comments express concerns about the wildlife in the area.

[122-04, Kathy O'Brien] I am also concerned about the wildlife in the area as well as the Snake River Aquifer. This must be taken into account and given priority.

[153-01, Andrea Shipley; 197-01, Andrea Shipley, on behalf of the Snake River Alliance] AREVA's proposed uranium enrichment factory will…impact sensitive species

[184-07, Kitty Vincent] Areva's proposed Eagle Rock Enrichment Facility (EREF) will store radioactive waste above the sole source aquifer for nearly 300,000 people; impact sensitive species; require the transport of radioactive materials; impair the Hell's Half Acre National Monument; support destruction of the John Leopard homestead, which has been recommended for the National Register of Historic Places; devour billions of dollars in state and federal largess; and obliterate farmland that is potentially protected by the federal government. The Alliance is here to say it is not worth the risk.

Response: *Impacts on wildlife have been assessed and are discussed in Section 4.2.7 of the EIS. Impacts would be SMALL to MODERATE. Mitigation measures for the protection of wildlife are identified in Section 4.2.7 and Chapter 5.*

Comment: The following comments suggest that beneficial ecological impacts could occur at the proposed EREF site outside of the disturbed area footprint.

[067-02, Mike Hart] In terms of ecological impacts of the site, one thing I noticed was again the analysis of the fact that you'll not -- you'll be ceasing grazing on that area, which for sage grouse, the reality is what really causes threatened and endangered species listing of sage grouse is not spoken -- but it's cows.

So, actually, getting cows off that range, and reseeding it with natural native plants, will actually probably improve sage grouse habitat significantly, and I think you list it as a light impact. Actually, I would go so far as to say it might actually be a benefit, of having an area. But when you do reseed, do go with natives rather than reseeding with crested wheat grass or other non-native species that are invasive.

[067-10, Mike Hart] With respect to ecological impacts, sage grass, I think having, and I apologize to the farmers here, but I think getting the cows off the land will help the sage grass, and let's just leave it at that.

Response: *The NRC acknowledges the potential for habitat improvement once grazing is not practiced on the proposed EREF property. This is discussed in Sections 4.2.7.1 and 4.2.7.2 of the EIS.*

Comment: The following comments express concerns about minimizing impacts to affected habitat and wildlife during construction and operation of the proposed EREF.

[027-20, Sara Cohn] Ecological Resources: The draft EIS does not adequately address impacts to ecological resources on site and the preconstruction exemption guarantees the loss of large areas of habitat to sensitive and candidate species such as greater sage-grouse and pygmy rabbit. The US Fish and Wildlife Service determined that greater sage-grouse warrant protection under the Endangered Species Act, but listing is currently precluded by the need to respond to other species at greater risk of extinction. As such, the greater sage-grouse is considered a candidate species for listing and the status will be reviewed annually by the US Fish and Wildlife Service. The BLM and Forest Service currently consider the greater sage-grouse as a Sensitive Species.

The pygmy rabbit (*Brachylagus idahoensis*) is currently considered as a candidate species by the US Fish and Wildlife Service, a Sensitive Species by the Bureau of Land Management, a Species of Special Concern (Category C – Undetermined Status Species) on the Idaho State Sensitive Species List (*Idaho Conservation Data Center, 1994*), and is managed by the Idaho Department Idaho Fish and Game as protected, non-hunted species. As with greater sage-grouse, loss of sagebrush steppe habitat has fragmented habitat and the US Fish and Wildlife Service is conducting a status review to determine whether to propose listing under the Endangered Species Act.

Because listing under the Endangered Species Act (ESA) is a possibility for both species, we suggest the applicant design the project to avoid, minimize and mitigate for any impacts. Furthermore, these steps should be submitted for review in the environmental analysis.

Preconstruction Exemption: It is unclear under what authority NRC may offer exemptions for preconstruction activities when such impacts extend outside of NRC jurisdiction. For example preconstruction activities will impact sensitive and candidate species. Project impacts would normally require NRC to coordinate with the Idaho Department of Fish and Game in order to analyze and release for public comment the environmental and public health impacts of preconstruction clearing, blasting, and grading prior to conducting such activities. According to the draft EIS, such preconstruction activities are expected to take place prior to the licensing of the proposed facility. These efforts undermine the purpose of the EIS process. A mitigation plan must be created to avoid, minimize, and plan for mitigation of affected habitat.…

Habitat, habitat fragmentation, and migration corridors: Portions of the project area contain habitat that is crucial to the sagebrush steppe obligate species such as sage-grouse, pygmy rabbits, sage thrasher, sage sparrow, and others. Such habitat has been severely fragmented and reduced through a variety of land management practices, including road construction and development of rights of way corridors. Although communities cannot be listed under the endangered species act, sagebrush steppe habitat is considered by federal agencies as “imperiled” and an area of primary concern. The project should avoiding areas of critical habitat for species of concern, minimize negative impacts by using seasonal restrictions and other recommendations in the Idaho State Sage-Grouse Plan, and mitigate for any potential impacts by working directly with the Idaho Department of Fish and Game and Local Sage-grouse Working Groups. In addition, the NRC should establish siting criteria to minimize soil disturbance and erosion on steep slopes, utilize visual resource management guidelines, and avoid significant historic and cultural resource sites.…

Additional Wildlife: In addition to sage-grouse, other wildlife including pygmy rabbits, sage thrasher, sage sparrow, and birds of prey, are of concern. New construction and infrastructure will also change crucial habitat for these species and may inhibit the ability of these species to migrate. The project design should avoid construction in any designated areas or lands for special management of these species. There are also elk, mule deer, and pronghorn antelope in the proposed project area. The project should avoid and minimize all impact to big game winter habitat. The project site contains good to excellent antelope and sage-grouse habitat. We are concerned how the proposed project will impact this important habitat and the species that depend on it. We are also greatly concerned the project will impact nesting habitat for migratory birds.

Invasive Weeds: The most cost-effective way to deal with noxious weeds is to protect strongholds of native vegetation from activities that either spread noxious weeds directly or create suitable habitat by removing native vegetation and disturbing the soil. Project activities should limit road construction in areas that contain mineral soils where weeds may become established. Roads serve as a primary route for noxious weed species expansion. Special care should be taken to safeguard ecologically intact areas that are not currently infested. The EIS needs to analyze the effects of noxious weeds and describe management of weeds in the project area. For example, management strategies may include ensuring the tires and undercarriage of access vehicles are hosed down prior to site access to dislodge noxious weeds. Further documentation should analyze the effects of regular weed control activities in previously undisturbed areas. For example, weed treatments may affect non-target species and vehicle access may increase fire hazard and soil disturbance.

[036-05, Christina Cutler, on behalf of the Shoshone-Bannock Tribes] Endangered species may or may not be at the site at the time of survey; however it is known that there are endangered species and sensitive species in the immediate area. How is there habitat and survival going to be addressed, not just during operation of the facility but also and maybe most important during the construction phase.

Response: *Mitigation measures for impacts to ecological resources during preconstruction, construction, and operation of the proposed EREF are included in Section 4.2.7.3 and Chapter 5 of the EIS. In response to other comments in this section, additional NRC recommended mitigation measures have been added to the EIS, in Section 4.2.7.3 and Chapter 5, for protection of sage-grouse, preventing the introduction of invasive plant species, and minimizing indirect effects of weed control activities.*

Impacts and mitigation should be understood in the context that the environment at the site has been degraded by past agricultural and cattle grazing activities and at the ecosystem level provides marginal habitat for sagebrush obligate species. In addition, the sage-grouse habitat in the Upper Snake sage-grouse planning area is about 2.5 million acres in size with approximately 83 percent of this habitat found on State or Federally owned and/or managed lands with associated protections.

As shown in Figure 4-4, much of the project footprint is located outside of the sagebrush steppe habitat, and the site access road avoids sagebrush steppe habitat, being located entirely within nonirrigated pasture. In addition, grazing impacts would be removed from the remaining sagebrush steppe, and the remaining irrigated crop areas would be planted with native species. AES has committed to working with the FWS, IDFG, and BLM in the development of action levels and/or reporting levels for the EREF ecological monitoring program (Section 6.2.2.1). These agencies work with many conservation groups for the protection of sage-grouse and other species. Section 4.2.7 discusses invasive plant species and control measures, acknowledging that nontarget species may be affected.

Comment: The following comments express a concern that the true scale of ecological impacts is larger than that presented in the EIS.

[083-06, Diane Jones] Finally, I'd just like to say the EIS found only small and moderated impacts from this project, this proposed project. One of the things that was looked at is removal of sagebrush steppe and that was regarded as a moderate. I would like to say that when sagebrush steppe is removed, it's removed, and it does not come back for a long time. That's not small or moderate. It's a very large impact.

[086-04, Paula Jull] Antelope, sage grouse, and ferruginous hawks all will likely abandon the Areva site and surrounding areas due to development and human activity. Sage grouse is a candidate species for federal protection. The problem is compounded by construction of the electric transmission line and poles proposed to support the facility, which sage-grouse are known to avoid because they serve as perches for raptors.

[088-08, Stan Kidwell; 095-08, Linda Leeuwrik] Pronghorn antelope, greater sage grouse, and ferruginous hawks all will likely abandon the Areva site and surrounding areas due to development and human activity. Sage grouse is a candidate species for federal protection. The problem is compounded by construction of the electric transmission line and poles proposed to support the facility, which sage-grouse are known to avoid because they serve as perches for raptors.

[153-10, Andrea Shipley] Accidents, fire, air and water quality and the development of on this land will impact several species including raptors and sage-brush obligate species (draft EIS 4.2.7) Pronghorn antelope, greater sage-grouse, and ferruginous haws all will likely abandon the EREF site and area surrounding the EREF due to development and human activity. Sage-grouse is a candidate species for federal ESA protection. USFWS recently concluded that listing under the ESA is warranted, though formal listing is precluded by other agency priorities. The EIS is inaccurate based on the true scale of ecological effects and the problem is compounded by construction of the proposed electric transmission line and poles, which sage-grouse are known to avoid because they serve as perches for raptors.

[197-10, Andrea Shipley, on behalf of the Snake River Alliance] Accidents, fire, air and water quality and the development of on this land will impact several species including raptors and sage-brush obligate species (draft EIS 4.2.7).

[175-08, Ellen Thomas] Pronghorn antelope, greater sage grouse, and ferruginous hawks all will likely abandon the Areva site and surrounding areas due to development and human activity. Sage grouse is a candidate species for federal protection. The problem is compounded by construction of the electric transmission line and poles proposed to support the facility, which sage-grouse are known to avoid because they serve as perches for raptors.

[183-13, James Vincent] I also believe that EIS does not fully take into account the impact on antelope, sage grouse, and birds of prey.

[184-15, Kitty Vincent] Accidents, fire, air and water quality degradation and the development of this land will impact several species including raptors and sage-brush obligate species (draft EIS 4.2.7) Pronghorn antelope, greater sage grouse, and ferruginous hawks all will likely abandon the EREF site and surrounding areas due to development and human activity. Sage grouse is a candidate species for federal protection. The problem is compounded by construction of the proposed electric transmission line and poles, which sage-grouse are known to avoid because they serve as perches for raptors.

[191-15, Liz Woodruff] Ecology. • According to the NRC's own definition of the significance of potential impacts, a large impact is one that "the environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource." According to the draft EIS, the sage-brush steppe located within the proposed EREF would improve due to the elimination of grazing. The NRC must flesh out the connection between claims of potential improvements and the amount of habitat that will be compromised.

• Several species will be impacted by development on this land including sensitive species, raptors, and sage-brush obligate species (draft EIS 4.2.7). Pronghorn antelope, greater sage-grouse, and ferruginous hawks all will likely abandon the EREF site and areas surrounding the EREF due to development and human activity. It is difficult to see how, when an ecosystem is considered as a whole, it be improved if the animals that depend on it can no longer use it. In other words, it is not a healthy sagebrush ecosystem if there are no antelope, grouse, and hawks. The conclusion of small to medium potential ecological/wildlife impacts contained in the draft EIS is inaccurate based on the true scale of ecological effects.

• This problem is compounded by construction of the proposed electric transmission line and poles, which sage-grouse are known to avoid because they serve as perches for raptors.

• Sage-grouse is a candidate species for federal ESA protections. USFWS recently concluded that listing under the ESA is warranted, though formal listing is precluded by other agency priorities. The treatment of the threats to sage grouse is inadequate in the draft EIS.

[193-20, Liz Woodruff, on behalf of the Snake River Alliance] And all of the issues associated with the construction of this facility--accidents, fire, air and water quality degradation, the development of this land will impact several species, including raptors and sagebrush obligate species. This includes the sage grouse. The sage grouse is a candidate species for federal protection, and the only reason it's not listed yet is because of bureaucratic process of listing. There's a delay. But the treatment of this issue is inadequate in the draft EIS.

The impacts to sage grouse from transmission and preconstruction warrant integration into this EIS, or separate EISs, specifically around preconstruction and transmission issues.

[197-14, Andrea Shipley, on behalf of the Snake River Alliance] The EIS in inaccurate based on the true scale of ecological effects, and the problem is compounded by construction of the proposed electric transmission line and poles, which sage grouse are known to avoid because they serve as perches for raptors.

Response: *The EIS acknowledges that many wildlife species would likely avoid the area near the proposed facility during its construction and operation. The above comments do not present information to support the statement that wildlife would avoid the entire 4200-acre proposed EREF property. Other areas of the proposed property would still be usable as habitat, and sagebrush steppe in those areas would be expected to improve over time. For the species that use the sagebrush steppe habitat (including that which is contiguous to and outside the proposed EREF property), such as pronghorn antelope, sage-grouse, and ferruginous hawk, construction of the proposed EREF would noticeably alter that habitat, with a loss of 185 acres plus an area of avoidance; however, this would neither destabilize the habitat used by these species nor the species' populations because extensive sagebrush habitat is available outside the proposed EREF property, as described in Section 4.2.7.1 of the EIS. Text has been added in Section 4.2.7.2 to clarify impacts to sage-grouse during operations.*

The impacts have taken into account that the sage-grouse habitat in the Upper Snake sage-grouse planning area is about 2.5 million acres in size with approximately 83 percent of the habitat found on State or Federally owned and/or managed lands. It should be further noted many species adapt to disturbances and the fact that facilities such as this prohibit hunting as evidenced by extensive areas of surface coal mining and reclamation in similar types of habitats in Montana, Wyoming and Utah.

I.5.15 Noise

No comments were received on the noise section of the Draft EIS.

I.5.16 Transportation

Comment: The following comment acknowledges the adequate safeguards that are in place for shipping containers for radioactive waste materials such as spent nuclear fuel.

[007-03, Arnold Ayers] I've been involved with such things as a first responder from the Three Mile Island reactor, and also was associated with the retrieval, but mostly with the arrival of that fuel here in INL. That puts me in the prospect of knowing what's involved in transportation of spent nuclear fuel. And yes, it is complicated, and yes it is difficult, and yes it has been solved relatively well, quite well, in fact. The adequate safeguards that the NRC has put on materials on shipping containers for that waste material has shown itself, and has proven itself time, and time, and time again.

Response: *No spent nuclear fuel (SNF) would be generated at, or shipped to or from, the proposed EREF. Transportation regulations for the shipment of the uranium materials used and produced at the EREF are discussed in Appendix D of the EIS and are protective of human health and the environment.*

Comment: The following comment contends that the Draft EIS does not consider methods to minimize risks associated with alternative transport route options and transportation modes.

[027-09, Sara Cohn] The documents provided do not consider methods to minimize risks associated with transport routes options. Alternative transportation modes, such as rail, should be analyzed. Transportation routes and modes that present significant risk to public health and natural resources should be avoided.

Response: *Transportation routes are determined by carriers in accordance with U.S. Department of Transportation (DOT) regulations, which attempt to reduce potential hazards by avoiding populous areas and minimizing radiological risks. Route selection is described in Appendix D, Section D.3.1.1, of the EIS.*

As noted in Sections 3.10.2 and 4.2.9.2, AES does not plan to perform any shipping operations via rail because rail access is not readily available at or near the proposed EREF site. To use rail as a transportation mode, shipments to and from the proposed EREF would require truck transport to the nearest intermodal facility, which could incur additional risks to workers and potentially the public at such facilities.

Comment: The following comment emphasizes the opportunity for public comment in each and every community through which radioactive material would be transported, and that the Fort Hall Indian Reservation needs to be a part of this process.

[028-01, David Coney] One thing I'd like to emphasize is public comment in each and every community that any transportation of radioactive material goes through. Specifically because today is World Indigenous Day, I would say that the Fort Hall Indian Reservation needs to be a part of this process. That's huge. And I just returned from an encampment down in New Mexico where I witnessed, firsthand, the desecration of community due to the nuclear military-industrial complex.

Response: *Impacts from transportation of materials to and from the proposed EREF are discussed in Section 4.2.9 of the EIS. These impacts would be SMALL. Residents of the Fort Hall Indian Reservation have had the opportunity to comment on the Draft EIS. In addition, NRC staff met with the Shoshone-Bannock Tribal Council on August 11, 2010, to brief them on the Draft EIS and discuss their concerns.*

Transportation routes are determined by carriers in accordance with DOT regulations, which attempt to reduce potential hazards by avoiding populous areas and minimizing radiological risks. Those routes are also determined based on the origin and destination of shipments and are not presently known. Therefore, holding public comment meetings in every community through which transportation of radioactive material would occur would not be feasible. However, all members of the public, regardless of their location, have had the opportunity to provide comments on the Draft EIS, either in person or by postal mail or email.

Comment: The following comment mentions that permanent impacts associated with the proposed project would include the construction of two access roads from US Highway 20 to the proposed project site.

[027-10, Sara Cohn] Permanent impacts associated with the project include the construction of two access roads from Highway 20 to the project site.

Response: *Traffic impacts associated with construction of the two access roads from US 20 are addressed in Section 4.2.9.1 of the EIS. The associated air quality and noise impacts are addressed in Sections 4.2.4.1 and 4.2.8.1, respectively. In addition, please note that as acknowledged in the response to Comment 142-01 below from Mr. Blake Rindlisbacher of the Idaho Transportation Department (ITD), plans for access to US 20 have not been finalized, and no decision has been made about whether to use two full-time operational connections.*

Comment: The following comment requests that Highway Route Controlled Quantity (HRCQ) routing be written into the AES license as a condition of transportation operations since it was used in the risk analysis.

[066-16, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 14. Appendix D: pp. D-9, Lines 6-14. Under input parameters and route selection, HRCQ routing was used. Again on pp. D-30, Lines 14-15, *"the NRC staff used HRCQ routing for the transportation impact assessment in this EIS".* DEQ would like to see this requirement written into the license as a condition of transportation operations since it was used in the risk analysis.

Response: *The IDEQ preference is noted. However, HRCQ routing is not required for any radioactive material shipments that would take place to or from the proposed EREF, as the quantity of radioactive material within any package would not exceed the HRCQ threshold. HRCQ routing was assumed in the transportation risk analysis because it results in longer routes and a more conservative estimate of population risk.*

Comment: The following comment identifies an error in Appendix D of the Draft EIS regarding the definition of the transport index (TI).

[066-17, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 15. Appendix D: pp. D-21, Lines 15-16. The transport index (TI) is incorrectly defined as the dose rate at 1 meter from the lateral sides of the transport vehicle. The correct definition is the highest measured dose rate at 1 meter from any side of the package surface.

Response: *The text of Section D.3.5 of the EIS has been corrected to state that the TI is measured from the side of the package surface, as opposed to the side of the transport vehicle. By using the TI of the package, without consideration of shielding by a transport vehicle, the most conservative dose rate values have been assumed in the transportation risk assessment.*

Comment: The following comment questions the source of the population density number used in Appendix D of the Draft EIS, and expresses disagreement with Table D-2.

[066-18, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 16. Appendix D: pp. D-23, Line 11 states "... assumed population density of one person per square kilometer (2.6 persons per square mile)." DEQ is not sure where this density number comes from and it is not in agreement with Table D-2 on pp. D-11, where the rural density is listed as 9.5 persons per km^2

Response: *The emission risk factor is a unit risk factor (i.e., per unit area). As noted in Section D.3.6 of the EIS, this (unit) risk factor is multiplied by the average population density along the route and the route distance to obtain the one-way vehicle emission risk for the shipment. The text of Section D.3.6 has been clarified on this matter.*

The average rural population density for the route between the proposed EREF site and the DOE depleted uranium hexafluoride (UF_6) conversion facility in Paducah, Kentucky, was determined using the WebTRAGIS routing model (as were all of the population densities in Table D-2). The value of 9.5 persons/km^2, which accounts for all rural transportation segments in each State between the origin and destination (not just Idaho), has been verified. Table D-2 is correct.

Comment: The following comment addresses the number of truckloads of waste that would be transported over Idaho roads in need of repair.

[070-03, Virginia Hemingway] We will also have approximately 2,000 truckloads of incoming waste being transported over our potholed roads which need fixing, more than we need a $750,000 off-ramp to a spot where there is nothing currently, except sagebrush.

Response: *Waste from operations of the proposed EREF would be transported from the proposed EREF site to licensed treatment, storage, and/or disposal facilities (TSDFs). No waste would be transported into Idaho from out-of-state locations as a result of preconstruction, construction, operation, or decommissioning of the proposed EREF. The only materials transported to the proposed EREF would be raw materials for preconstruction, construction, and operation, including* UF_6 *feed material for the enrichment process.*

Existing state and regional road conditions are not within the scope of the EIS. Road conditions will vary over the lifetime of the proposed facility. However, the text in Section 3.10 of the EIS has been modified to note that the 18-mile stretch of US 20 from Idaho Falls to the Bonneville-Butte county line was resurfaced during the summer of 2010.

Comment: The following comment expresses the commenter's difficulty understanding the transportation issues to and from the proposed EREF.

[078-02, Hon. Wendy Jaquet] 2. I couldn't understand the transportation issues back and forth to the enrichment plant. It seemed to make more sense to co locate.

Response: *All shipments to and from the proposed EREF would occur by truck. The proposed EREF requires natural* UF_6 *feed material, which – as discussed in Section 4.2.9.2 of the EIS – would be shipped to the proposed EREF site from facilities in Illinois and Ontario, Canada, that convert uranium oxide to the fluoride form. The enriched* UF_6 *product from the proposed EREF would be sent to fuel fabrication facilities, such as those located in the States of Washington, North Carolina, and South Carolina (see Section 4.2.9.2), which convert the enriched fluoride product back to an oxide form and incorporate this material into fuel rods for commercial nuclear reactors (i.e., nuclear power plants). Co-location of the proposed EREF with any of these facilities – or with a natural uranium supplier, enriched uranium customer, or waste disposal site – could require significantly increased transport distances for the other materials because of the dispersed locations of these facilities. As discussed in Section 2.3.1, the site selection process also had other requirements necessary for the safe and economic operation of the proposed EREF that would preclude siting it near some of these other facilities.*

Comment: The following comment identified improvements that have been made to US 20 to accommodate existing facilities and future development.

[098-01, Linda Martin] Several comments have been made for the transportation. Due to the potential localized increase in traffic density along Highway 20, we have tried to think ahead, and we have tried to encourage improvements to that highway. These increased road improvements will currently affect and advantageously speed future travelers through INL, Sun Valley, Boise, and other tourist locales. So we think that that's a very important issue, that while it may not appear that anything is there now, there are people that go past those sections, and if you have several hundred people working, moving equipment and going through there, people are going to need increased transportation access.

Response: *The NRC acknowledges this comment and recognizes that road improvements along US 20 have been advocated to support increased tourism and promote general development in the region.*

Comment: The following comment asks if AES will provide the Shoshone-Bannock Tribes with information on shipment of materials to and from the proposed EREF, and if AES will provide the Tribes with emergency response training.

[129-02, Willie Preacher, on behalf of the Shoshone-Bannock Tribes] The Tribes Emergency Management Department questioned the transportation route of product to and from the Eagle Rock Enrichment Facility and will AREVA share information regarding the amount of shipments, hazards of the shipments, and will they provide training to the Tribes Emergency Management and Response staff to identify and respond to a transportation accident on the reservation.

Response: *As noted in Section 4.2.9.2 and Appendix D of the EIS, product destinations include the States of Washington, North Carolina, South Carolina, Virginia, and Maryland. As noted in Section 3.10.1, Interstate 15 (I-15) would serve as the primary route for all incoming and outgoing truck shipments. Information about the number and hazard of shipments is provided in Section 4.2.9. It is the NRC staff's understanding, from discussions with the Shoshone-Bannock Tribes and with AES, that AES has coordinated, and will continue to coordinate, with the tribes regarding various matters of interest to the tribes.*

Comment: The following comment acknowledges that the Draft EIS is accurate with regard to the state highway system and the impacts the proposed project will have on it, and that the mitigation cited for those impacts is appropriate. Also, the comment cautions that it has not yet been decided whether access to US 20 will consist of two full-time, operational connections.

[142-01 and 142-02, Blake Rindlisbacher, on behalf of the Idaho Transportation Department] Thank you for your early and close consultation with the Idaho Transportation Department in the development of this environmental impact statement. We believe the statement as expressed in this draft is accurate with regards to our state highway system and the impacts this project will have on it. The mitigation you cite for those impacts are indeed appropriate and we encourage the NRC to make ride sharing and shifts staggered from those of the Idaho National Laboratory a part of the operating license for AREVA Enrichment Services. We will continue to discuss with them the terms and conditions of their access to US-20, but specific operation behavior that may reduce risk is beyond our authority to require.

With regards to the operational baseline stated in your statement, we offer this caution. We are concerned over the description of their access to our highway as having two full-time, operational connections; one east (the primary) and one west. This has not been decided. If we concentrate resources at the east side of their facility by building a grade-separated interchange, the need for a second, at-grade, access is triggered by phasing and the management of incidents, not full-time operations. As you state, we are in negotiation with the owner over terms and conditions. If the impacts are sensitive to the number and placement of access, please consider this information when making your decision.

Response: *NRC acknowledges that plans for access to US 20 to/from the proposed EREF have not been finalized and that AES continues to consult with the ITD. The impacts described in the EIS are not believed to be sensitive to the number and placement of the access roads. However, the text of Section 4.2.9.1 of the EIS has been modified to clarify that plans for the access road(s) have not been finalized.*

Comment: The following comment calls attention to a number of minor matters in the text of Section 3.10.1 of the Draft EIS.

[142-03, Blake Rindlisbacher, on behalf of the Idaho Transportation Department] With regards to the facts in the draft, we would call your attention to the following minor matters. On page 3-75, line 24, the driving lanes on US-20 is given as 12.5 meter (41-feet): this appears to be a unit conversion error, as the driving lanes are generally 12 to 12.5 feet wide. On page 3-78, line 6, the speed limit is states as 55 mph: it is 65 mph. And finally, on page 7-78, lines 34-37, we are quoted as stating that the intersection of US 20 and I-15 "…may need to be upgraded to handle increased traffic from the proposed EREF…." While this grade-separated intersection is reaching the end of its useful life and presents a number of challenges for our maintenance team, neither the character nor the count of the traffic predicted off this facility will trigger its "need to be upgraded" in and of themselves. Rather, the increased loading (in terms of vehicles and weight of vehicles) will bring sooner the day when the interchange will need to be rebuilt. A secondary and cumulative impact (rather than a primary impact) in our opinion, and we have no funded plans for that construction.

Response: *The following text changes have been made in Section 3.10.1 of the EIS in response to this comment:*

- *The reference to the lane width has been omitted.*
- *The text has been corrected to reflect the 65 mph speed limit.*
- *The text has been modified to clarify that the need for upgrade of the junction of US 20 and I-15 may be accelerated by, but would not be the direct result of, additional traffic to and from the proposed EREF.*
- *Text has been added to note that there are no funded plans for this construction.*

Comment: The following comment addresses the adequate capacity of the road (US 20) to handle the flow of traffic during construction and operation of the proposed EREF.

[152-12, Steven Serr] There were three items in the EIS that I'd like to address. They noted in here, a small to moderate impact on traffic conditions. We have discussed with AREVA the issues on traffic. They've been working with the Transportation Department. The road that is constructed out there has adequate capacity to handle any of the traffic flow, increased traffic flows that would be created by the construction and operations over the long-term operation of the facility. They're well within the traffic design standards, even with that increased traffic flow on it. They are in the process of construction an overpass in their plans to access this site. With that construction, we fell that it would not be a traffic flow impediment with approaching cars coming in or out of the facility, or truck traffic.

Response: *The NRC acknowledges this comment and appreciates the participation in the NEPA process Please note that, as acknowledged in the response to Comment 142-01 from Mr. Blake Rindlisbacher of the ITD, plans for access to US 20 have not been finalized and construction has not yet begun.*

Comment: The following comment discusses the waste classification of depleted uranium by the State of Tennessee and its relation to the handling, storage, and transport of UF_6.

[181-20, Roger Turner] NEPA requires a hard look at environmental impacts even if waste classification system is flawed.…

Because depleted uranium has been evaluated by the State of Tennessee as a “solid waste” as defined by RCRA, and because uranium hexafluoride is toxic, the EIS must examine more closely the handling, storage, and transport of UF6 including the environmental impacts, both cumulative and indirect from the project at Areva, regardless of the “official” classification of it as “Low-Level”, or Low Level Mixed waste.

Response: *Classification of waste by the State of Tennessee has no bearing on the handling, storage, and transport of wastes generated at the proposed EREF. Impacts from the handling, storage, transportation, and disposal of radioactive wastes, including depleted UF_6, are addressed in Sections 4.2.9, 4.2.10, 4.2.11, and Appendix D of the EIS.*

Comment: The following comment asserts that the risks of accidents associated with the transportation of radioactive materials to and from the proposed EREF site should require the NRC to notify all relevant regional offices when radioactive material will be shipped.

[191-16, Liz Woodruff] Accidents. The risks of accidents associated with the transportation of radioactive materials into and out of the site should require the Nuclear Regulatory Commission to notify all relevant regional offices when radioactive material will be shipped to and from the Areva facility.

Response: *Per 10 CFR 71.97, such notifications would not be required for the shipment of UF_6 or other radioactive materials and wastes that would be transported to or from the proposed EREF.*

Comment: The following comment relates to risks associated with radioactive materials.

[191-06, Liz Woodruff] Radioactive Waste Poses an Unacceptable Risk. Radioactive material is inherently dangerous. Just the activities directly connected with uranium enrichment pose risks, as do all other parts of the fuel chain. The NRC should perform a complete analysis of the risks of uranium mining and milling, mixing yellow cake with hexafluoride (itself a dangerous material), enriching UF6 in gas centrifuge plants, storing and deconverting depleted UF6, disposing of depleted uranium and low level waste, fabricating fuel from enriched uranium, and all intermediate transportation steps.

Response: *The public health impacts from the transportation of radioactive and nonradioactive materials to and from the proposed EREF, including radioactive waste and depleted UF_6, are addressed in Section 4.2.9 and Appendix D of the EIS. Public health impacts from incident-free transportation of materials to and from the facility would be SMALL, and public health impacts from transportation accidents would also be SMALL. The risks posed by other activities in the uranium fuel cycle (e.g., mining and milling) are not within the scope of this EIS, which is for the proposed EREF.*

Comment: The following comment relates to the shipment of radioactive materials to and through the State of Idaho and the storage of such materials in Idaho.

[147-05, Joey Schueler] 1. Nuclear compounds will be shipped to Idaho and the byproduct waste of the process as well as enriched Uranium will be either shipped through our state or stored in Idaho.

Response: *As discussed in Section 4.2.11 of the EIS, low level radioactive waste from operation of the proposed EREF would be transported to licensed TSDFs. No radioactive waste would be transported into Idaho as a result of the proposed EREF project. The only radioactive materials transported to the proposed EREF would be UF_6 feed for the enrichment process.*

Comment: The following comments contend that radioactive materials are already transported safely across Idaho.

[133-08, Richard Provencher] Last, the transportation corridor in this area is robust and has been used successfully by other regional nuclear operators to safely transport large amounts of radioactive materials without incident. This existing infrastructure has also prepared local communities along transportation routes to respond to incidents should they occur making them well prepared.

[157-08, Hon. Erik Simpson] Transportation of radioactive materials. Concern was raised in western Idaho over the transportation of uranium hexafluoride and enriched uranium across Idaho's highways. Radioactive materials are already transported across Idaho several times a week. In fact, Idaho National Laboratory contractors have shipped more than 40,000 cubic meters of low-level and transuranic waste safely across Idaho to out-of-state facilities during the last decade.

Response: *The NRC acknowledges these comments.*

Comment: The following comments concern the cleanup costs for transportation accidents.

[049-02, Victoria Everett] And also, in the case of an accident, who plays for the cleanup? Who's responsible for that? The State of Idaho? Or is it AREVA? You know, that wasn't clarified. And in transportation, a truck gets in a wreck, it spills all over the ground. You know, such cases as that. Say there is a fire, and there's a major disaster at the plant. Who pays for that?

[181-08, Roger Turner] It would be opposed because the project would transport approximately 2,000 trucks of radioactive material across the state highways with no financial support dedicated, and provided to this state for safety, or for cleanup.

Response: *In general, cleanup and the costs of cleanup of radioactive material from accidents involving the transportation of materials to and from the proposed EREF, or any other industrial facility in the State of Idaho or elsewhere in the U.S., would be the responsibility of the carrier and potentially the responsible facility (shipper or receiver, as would be pre-determined for each shipment). The IDEQ, in cooperation with the ITD and local authorities (e.g., law enforcement and the fire department), would be involved in emergency response and cleanup oversight.*

Comment: The following comments suggest that transportation risks and accidents, including emergency response, are not covered in the Draft EIS.

[025-02, Hon. Sue Chew] So, you know, when I look at the fact that we have an aquifer, and we have potential waste that would be created upstream, I want to make sure that we have a good plan there when we look at transportation into Idaho and out, that those things are considered.

[027-03, Sara Cohn] And finally, we are concerned with the transportation analysis in the draft EIS, that it does not appropriately account for the hazardous and radioactive materials that will be transported to and from the site. Analyzing traffic impacts alone does not adequately encompass the potential impacts to public health, and the environment, associated with such cargo. Perhaps that will be addressed in the safety analysis. I have not yet seen that. I don't believe it's been out for public comment.

[027-07, Sara Cohn] Transportation: The ICL is very concerned about the transportation of hazardous and toxic materials to and from the project site. Based on the size of the facility and the number of trips expected to transport hazardous and toxic materials, the possibility of accidental spills and subsequent contamination is high. Transportation risk analysis should be provided within the final EIS to ensure that the transport of hazardous materials to and from the site will not result in the pollution of Idaho's waters and air, or endanger public health. More information is needed to understand the size and scale of the enrichment facility, the amount of waste produced and transported from the site, and the amount of hazardous and toxic materials imported and exported from the site. We also request information regarding the methods of transport and the types of containment vessels that will be used to transport materials.

Detailed plans should be prepared to reduce contamination and public health risks in the event of a spill or accident during transport.

[050-02 Joanie Fauci] One of the areas I feel is under-emphasized in the DEIS is the Safety issue.

• There will always be safety issues with transportation, even of non-toxic substances. Nuclear material (uranium) involves additional safety measures for transport and possible emergency response.

[068-03, Anne Hausrath] I am opposed to the transport of radioactive waste. I believe this risk has not been addressed.

[105-04, Eve McConaughey] The most glaring question, not addressed or answered concerned the transportation risks and ultimate unresolved problem of waste disposal.

[136-01, Susan Rainey] No uranium enrichment facility outside Id Falls by AREVA!!! The transport of radioactive material and the storage of nuclear waste are my biggest concerns. There are safety issues! We will be at risk. How will the waste be disposed of? Snake River Alliance did an excellent job explaining. NRC sounded like bureaucratic babble ignoring the real dangers and concerns. How is this really going to help us here in Idaho, USA? Let's look at other options. Not worth the risk.

[153-08, Andrea Shipley; 197-08, Andrea Shipley, on behalf of the Snake River Alliance; 184-11, Kitty Vincent] Accidents happen and there are risks associated with the transportation of radioactive materials. The EIS should fully evaluate the safety threats posed by the transportation of radioactive material into and out of the EREF. The accident scenarios should include an analysis of the potential environmental and public health effects of an accident on roadways in the event of a spill of the various radioactive materials that will be transported to and from the facility.

[169-02, Margaret Stewart] And there has been inadequate addressing in the EIS of wildfire threats, and transportation of nuclear material accidents.

[191-31, Liz Woodruff] Transportation. The EIS should fully evaluate the safety threats posed by the transportation of radioactive material into and out of the EREF. The accident scenarios should include an analysis of the potential environmental and public health effects of an accident on roadways in the event of a spill of the various radioactive materials that will be transported to and from the facility: uranium hexafluoride; enriched uranium, and depleted uranium.

[192-16, Lisa Young] Indeed, I hope to see further examination of accident scenarios involving large wildfires around the facility, as well as accident scenarios involving the transportation of radioactive substances to and from the facility on our roads and highways.

Response: *The public health impacts from the transportation of radioactive and nonradioactive materials, including the release of radioactive materials and other chemicals following a transportation accident severe enough to rupture a cargo container, are addressed in Section 4.2.9 and Appendix D of the EIS. Public health impacts from incident-free transportation of materials to and from the facility would be SMALL, and public health impacts from transportation accidents would also be SMALL.*

The transportation of radioactive cargo is subject to both DOT and NRC shipping regulations as discussed in Section D.3 of the EIS. Safety measures in the regulations include the proper packaging of the material for shipment. Information about the containers that would be used to transport radioactive cargo is included in Section D.3.2.

Emergency response plans for transportation accidents are not within the scope of the EIS, but are addressed in the SER (NRC, 2010b). Cleanup for accidents involving the transportation of materials to and from the proposed EREF, or any other industrial facility in the United States, would be handled by the carrier, the responsible facility (shipper or receiver), and the appropriate Federal, State, and local agencies.

I.5.17 Public and Occupational Health

Comment: The following comment requests information related to the exposure of the public to toxic, radioactive, and/or harmful pollutants from operation of the proposed EREF.

[027-18, Sara Cohn] Public Health. The ICL is concerned that operation of this facility may expose Idahoans to toxic, radioactive, and/or harmful pollutants. Further detail and analysis must investigate risks associated with water and air contamination from enrichment operations. We request detailed information regarding the amounts and types of materials used, produced, and stored onsite. We would like detailed information about how these materials may be released and how releases may endanger public health. Detailed plans to contain releases as well as alert and protect the public will be essential in the final EIS. Additionally, further analysis must ensure no air releases during transportation of both uranium product and waste to and from the site. The health of Idahoans is of primary import and should not be compromised by enrichment product, waste, or transport.

Response: *The NRC staff believes that the EIS presents sufficient detail on the potential impacts of exposures to toxic substances from proposed EREF operations. As reported in Chapter 6 of the SER, NUREG-1951 (NRC, 2010b), UF_6 is the only chemical of concern with regard to potential occupational or public health exposures that will be used at the proposed EREF due to exposures to HF and uranium compounds produced in the interaction of UF_6 with moisture. As shown in Section 4.2.10.2 and Appendix E, the EIS analyzes potential exposures of members of the public to these substances via the air pathway during the proposed EREF operations. The analysis shows that such exposures would be below regulatory limits and would not harm members of the public. There would be no exposures to any toxic substances by way of any water pathway; the facility would have no offsite waterborne effluent streams, as discussed in Sections 2.1.4.2 and 4.2.6.2. Section D.3.2 in Appendix D discusses the packaging requirements which preclude any releases of material during routine transportation operations.*

Comment: The following comment asks why the ALARA (As Low As Reasonably Achievable) constraint on air emissions of radioactive material to the environment is not addressed in the EIS.

[066-08, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 6. Several places in the draft EIS reference the 100 millirem per year dose limit to any member of the public. The draft EIS does not discuss the ALARA constraint on air emissions of radioactive material to the environment of 10 millirem per year as stated in 10 CFR 20.1101(d). Please explain why this is not addressed.

Response: *A comparison of estimated doses associated with air emissions to the limits in 10 CFR 20.1101 has been added to Section 4.2.10.2.*

Comment: The following comment questions the NRC's use of the high-pressure ion chamber (HPIC) exposure in air measurement to derive a hypothetical soil concentration.

[066-09, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 7. Chapter 3: pp. 3-83 Line 12 discusses an average HPIC exposure rate in units of curie per kilogram with micro roentgen per hour in parenthesis and cites IDEQ INL Oversight Program (2008). The IDEQ INL Oversight Program only reports HPIC results in units of exposure per hour (micro roentgen per hour). Activity per unit mass is typical of a soil concentration measurement. If NRC has somehow used the HPIC exposure in air measurement to derive a hypothetical soil concentration, they need to subtract the contribution from cosmic sources from this measurement. Either way, the reference to IDEQ INL Oversight Program should only include the micro roentgen per hour units and any inferences should be clearly stated.

Response: *Section 3.11 of the EIS has been revised. The concentration units have been corrected and changed from curie (Ci) per kilogram to coulomb (C) per kilogram*

Comment: The following comment requests evaluation of potential elevated releases from the proposed EREF that would result in higher impacts than the ground level releases evaluated in the Draft EIS.

[066-19, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 17. Appendix E: pp. E-7, Line 45 through pp. E-8 Line 3 states "Since the exact height layout of the release points was not available and the CAP88-PC computer code does not account for building wake effects, releases were assumed to take place at ground level. Ground-level releases result in larger concentrations of radionuclides in air for receptors near the source than do elevated releases." This statement is true and is more conservative for hypothetical public at the fence, but underestimates the dose to the nearest actual resident which is 8 km (5 mi) away. Additionally, pp. 6-16 lines 14-17 state an approximate elevation of 40 meters (132 feet) for the effluent emission points. This approximation could be used to run the CAP88-PC code. DEQ requests clarification in the EIS and evaluation of this potential impact.

Response: *The CAP-88-PC computer code was run for both ground level and 40-meter (m) releases. For conservatism, the maximum values of the two runs were chosen for the dose estimate. For the nearest resident, the maximum dose was associated with the ground level release, while the maximum population dose was associated with the 40-m release. The text and tables in Section 4.2.10.2 and Appendix E in the EIS have been modified to reflect these changes.*

Comment: The following comment expresses concerns about worker safety at the proposed EREF and the need for safety procedures in general.

[036-02, Christina Cutler, on behalf of the Shoshone-Bannock Tribes] Safety procedures, protecting human health and the environment, for the storage facility as well as the processing facility need to make clear. Including but not limited to worker safety. Worker safety is always a concern and should be thoroughly characterized and described in the proposal.

Response: *The proposed EREF would operate under a facility Health and Safety Plan administered by a Health and Safety Organization that would implement the health and safety requirements of the NRC and U.S. Occupational Safety and Health Administration (OSHA), as specified in the relevant portions of 10 CFR 20 and 29 CFR 1910, respectively, cited in Section 4.2.10 of the EIS. Procedures in the Emergency Plan for the proposed EREF would be designed to protect workers under emergency conditions.*

Comment: The comment suggests that impacts to the public from air releases would be small.

[133-04, Richard Provencher] There appears to be only a small amount of air discharge of radioactivity which results in virtually no impact to the nearest public receptor.

Response: *The NRC acknowledges the comment and appreciates the public participation.*

Comment: The following comment expresses a concern that impacts from fluoride exposure could be underestimated.

[141-03, Peter Rickards] The SENES fluoride documents on underestimating fluoride impact at Oak Ridge was not answered, despite acknowledging “someone” asked about it. The SENES team does work for CDC, and underestimating the fluoride is unacceptable.

Response: *The SENES Oak Ridge Inc. fluoride documents concern releases of tens of thousands of pounds of HF on an annual basis and are not directly applicable to the proposed EREF. This is because HF releases from the proposed EREF are estimated to be less than 4.4 pounds per year, as stated in Section 4.2.10.2 of the EIS, a difference of about 1000 to 10,000 times less than those considered at Oak Ridge, resulting in much lower environmental concentration levels than considered harmful in the SENES documents. Section 4.2.10.2 of the EIS discusses the potential air concentrations of HF for workers and the public as a result of the proposed EREF. For workers, the potential estimated concentrations would all be below OSHA and National Institute for Occupational Safety and Health (NIOSH) standards. For members of the public, estimated concentrations would be about 1000 times below State of Idaho regulations.*

Comment: The following comment expresses concerns regarding risks due to uranium materials due to the preconstruction exemption granted to AES by the NRC.

[147-07, Joey Schueler] 3. Contamination potentials are not being discussed or considered in the environmental impact assessment process due to “exemptions” and were missing from the public comment phase of the assessment and when asked to speak directly to this point by myself, NRC / EIS representatives refused to comment. Yet, the NRC website acknowledges that risks exist for this plant: “Hazards: The primary hazard in gaseous diffusion plants include the chemical and radiological hazard of a UF_6 release and the potential for mishandling the enriched uranium, which could create a criticality accident (inadvertent nuclear chain reaction). Sited source: http://www.nrc.gov/materials/fuel-cycle-fac/ur-enrichment.html

Response: *AES would not be authorized to handle, store, or process uranium materials at the proposed EREF until a license is granted by the NRC. The exemption to which this comment refers allows preconstruction activities to be conducted by AES, such as site preparation activities, before the license is granted, as discussed in Section 1.4.1 of the EIS; however, those activities do not involve uranium materials. Therefore, there are no risks due to uranium compounds associated with the preconstruction exemption. Risks associated with UF_6 at the proposed facility, including those from operations, accidents, and potential terrorist acts, are covered in Sections 4.2.10, 4.2.15, and 4.2.18.*

Comment: The following comment points out that enriched uranium is more hazardous than depleted uranium.

[147-13, Joey Schueler] 9. Enriched Uranium is far more hazardous than the “Depleted Uranium” used in Gulf military operations, even though many Desert Storm veterans fell prey to cancer after their exposure to depleted Uranium in clearing bombed Iraqi vehicles, strongholds and implements of war, deemed “safe” by our military leaders (sound familiar?). http://en.wikipedia.org/wiki/Gulf_War#Effects_of_depleted_uranium

Response: *The EIS evaluates the potential doses to workers and members of the public associated with UF_6 in storage and uranium releases associated with normal operations (see Section 4.2.10), finding that the impacts would be SMALL.*

Comment: The following comment states that the public health risks of temporary storage of depleted uranium should be addressed in the EIS.

[181-11, Roger Turner] Public Health risks of “Temporary” Storage of depleted Uranium should be addressed in EIS. The draft EIS by the NRC significantly errs by minimizing the human health and environmental risks in the risks of the storage of uranium in above-ground pads in eastern Idaho. The EIS is flawed in its apparent assumption that another location will be certified for off-site storage. The EIS fails to acknowledge that these casks may be breached by handling or corrosion. Here is an excerpt of the EIS, under the Public Health section:

> During peak operation, the proposed EREF is expected to generate 1222 cylinders of depleted UF6 annually, which would be temporarily stored on an outdoor cylinder storage pad in approved Type 48Y containers before being transported to a DOE-owned or private conversion facility.

The above paragraph, under the Public Health Section, in fact, does not even discuss public health. The EIS must assume that the casks of depleted Uranium will remain for some time at the site, as the treatment facility to convert UF6 to the more stable oxide is behind in schedules and experiencing budget problems affecting production. Anytime heavy equipment is operated there is a risk that accidents will occur. In fact, casks of UF6 were damaged by heavy equipment at Oak Ridge, so the risk to workers and public health is real. The EIS needs to define "temporary" and fully assess health and worker risks, for longer term storage at the site.…

The characteristics of UF6 pose potential health and environmental risks.DUF6 in cylinders emits low levels of gamma and neutron radiation. Also, when released to the atmosphere, DUF6 reacts with water vapor in the air to form hydrogen fluoride (HF) and uranyl fluoride (UO2F2), both chemically toxic substances. Consequently, spills and air releases of this material is potentially a significant adverse impact on the environment as defined by NEPA.

Response: *The EIS considers the dose to workers and the public associated with stored UF_6 cylinders in Section 4.2.10.2. The cylinder management program to minimize cylinder corrosion is covered in Section 4.2.11.2. Accidents with potential impacts that bound those involving heavy equipment and full cylinders are analyzed in Section 4.2.15. The consequences of the accidents analyzed encompass those of a storage pad cylinder release.*

Comment: The following comment requests that information be added to the EIS regarding certain filtering and ventilation systems and the associated risks that would be part of the proposed EREF.

[181-16, Roger Turner] Inadequate description and risk evaluation of the first step in the process. Sublimation of the solid UF_6 into the gas phase. How is this done? What is the size of facility to accomplish this? What temperatures and pressures are required to sublimate UF6? The EIS describes, on page 2-19 a system of pre-filters before the "cleaned gases would be discharged to the atmosphere via rooftop stacks". The EIS needs to describe this system and how it functions. What systems would be in place to monitor these filters and their integrity? What are the "clean gases" that will be discharged to the atmosphere and how are these gases monitored? Are continuous stack samplers employed for this? Please describe them in the EIS. What is the annual volume of gas produced and what are the safeguards?

The Section on SBM notes that a ventilation system will be in place: "The Gaseous Effluent Ventilation System would be used to remove uranium and other radioactive particles and hydrogen fluoride from the potentially contaminated process gas streams."

The final EIS needs to go into some detail about the ventilation system. If there is a release of UF_6, or HF, how does the ventilation system capture it? Once captured how is it specifically treated and how does it provide protection to the workers and protection from release into the atmosphere, or in the case of liquid or solid phases of it, protection from contact to workers?

Response: *Presentation of detailed information regarding the sublimation process and the ventilation system of the EREF is beyond the scope of this EIS. However, Section 4.2.10.2 of the EIS discusses the doses associated with the potential routine airborne release of uranium from the proposed EREF; Section 4.2.15.2 discusses accident impacts including the rupture of a Centrifuge Test Facility feed vessel; Section 4.2.15.3 discusses mitigation measures in place to prevent this accident; and Section 5.2, Table 5-2, identifies mitigation measures associated with the release of UF_6 and related compounds during operations. Sections 6.1.1 and 6.1.2 discuss ambient air monitoring activities and reporting requirements.*

Comment: The following comments raise the issue of thyroid cancer in Elmore County and state that this risk needs to be addressed in the EIS.

[016-02, Manley Briggs] However, a really interesting thing that I noticed was that Elmore County had a statistically increased rate of thyroid cancer in those born after 1958. That means they weren't affected by the nuclear bomb tests. But why do they have it? And it is pertinent, I think, at least needs to be looked into, that Elmore County is the first county down-river from the discharge of the Snake River aquifer at the Thousand Springs into the Snake River. So I think that at least needs to be addressed by the Environmental Impact Statement.

[016-04, Manley Briggs] One last observation that I would like to point out is the high incidence of thyroid cancer in Elmore County. Elmore is the first county below the Thousand Springs, which is where the Snake River Aquifer empties into the Snake River. This was noted in the 1999 NCI Report regarding the Nuclear-Bomb test fallout. This increased incidence occurred only in individuals born after 1958 and thus could not be attributed to the Bomb fallout. Could it be due to leaching of radioactivity into the aquifer from previously stored nuclear materials? This would certainly have bearing on Areva's proposal, and should be examined by the Areva EIS.

Response: *Increased thyroid cancer rates are associated with exposure to radioactive iodine produced in nuclear fission, the characteristic chain reaction that occurs in a nuclear reactor or a nuclear bomb. Thyroid cancer rates are not an issue related to the proposed EREF because operations at the proposed EREF would not involve nuclear fission and would not produce radioactive iodine. For reasons discussed in Section 4.2.6.2 of the EIS, operation of the proposed EREF would not contaminate the Snake River Aquifer.*

Comment: The following comments express concern regarding the exposure risks as a result of the proposed EREF.

[147-01, Joey Schueler] This is a very serious decision that we've entrusted to a very few people, and I'm not convinced from this meeting -- cause you're convincing us as much as we're trying to convince you tonight, right? I'm not very convinced that this is unbiased.

I'm extremely concerned about that, and the implications just are dire to me. And I have to ask: What is the risk? Not the impact. What is the risk?

I've heard a lot of statements about what the impact is. And the economic impact is, yes, I'm sure tremendous, and I think she put it well, that there's a dollar sign to this. But I'm not here to hear about impact, whether it be pro or against. I want to know what the risk is to me and my family, because that's what this is about. I know there's many environmental factors, but I think if there's one thing we should be concerned about in Idaho, is our safety.

[147-03, Joey Schueler] I do not feel that any summary statement on impact of nuclear enriched uranium plant that does not account for any statement on the potential risk of exposure is a sound or unbiased summation on environmental impact. This concerns me greatly and presents a basic failure on the part of the NRC, whether unintentional or planned.

Response: *In the EIS, the NRC staff analyzes the environmental impacts associated with the construction, operation, and decommissioning of the proposed EREF. As part of its analysis, the staff has considered the impacts – both positive and negative – that the proposed EREF may have on members of the public. Further, the staff has considered how members of the public may be affected by the proposed EREF both during normal operations and as a result of certain abnormal events. The impacts that the staff analyzed in detail are listed in Section 1.4.3 of the EIS. These impacts include impacts related to public and occupational health, as well as a variety of other impacts potentially affecting the quality of life. In Chapter 4 of the EIS, the NRC staff discusses these impacts in detail. In EIS Sections 2.4 and 2.5, the staff provides a summary of its analysis. Applying the impact scale outlined in Council on Environmental Quality regulations, the staff has determined that all impacts related to the long-term safety of the public would be SMALL.*

In addition to analyzing environmental impacts potentially associated with the EREF, the NRC staff conducted a rigorous safety review of AES's application. The staff conducted its safety review to determine whether AES's application meets NRC regulations designed to protect public health and safety. For example, NRC regulations in 10 CFR Part 20 prescribe radiation dose limits for individual members of the public. The staff has determined that AES's application satisfies all applicable safety-related criteria in NRC regulations. The staff's safety findings are presented in its Safety Evaluation Report.

Comment: The following comments discuss increasing radiation from stored depleted UF_6 and the potential for accidental release.

[032-05, Cindy Cottrell] The problem with depleted uranium is that it becomes more radioactive over the course of 1,000,000 years. Where would we store this knowing it will become more radioactive?

[103-05, Karen McCall] Depleted uranium becomes more radioactive as it ages leaving an ever increasing toxic legacy.

[157-02, Hon. Erik Simpson] Another issue related to the production of depleted uranium, that has been overstated, to a great extent, deals with the radioactive level of the material over time. It is true that depleted uranium tails from enrichment become more radioactive. The real question is whether that presents a problem to anyone's future health and safety of the environment. We all know that uranium is a naturally occurring radioactive element as found in nature. Uranium also contains all of the naturally-occurring decay products of the uranium decay chain.

After going through chemical purification and enrichment, the depleted uranium tails are stripped of those other materials that are actually much less radioactive than the form of uranium normally found in nature. So it is the build-up of those normal decay products in the depleted uranium that give reason for the position that it becomes more radioactive, with time. Truth be told, the uranium is actually building back up to its natural balance of uranium and decay products. The ultimate question we need to address was storage and disposal of depleted uranium, is can it be done safely and does this increase in radioactive, back to normal levels, create a future problem for the environment? The answer to that -- uranium can be very -- or it can be very safely stored and disposed.

[168-03, Lon Stewart] What does Idaho get out of this? We get highly radioactive waste that increases in intensity over time, we get a chance to pollute the Eastern Snake River Aquifer, the main source for water for all of Southeast Idaho and then pollute the Snake River which flows through the Southwest portion of the state. We will probably get 350,000 tons of uranium waste over the life of the facility that no one currently knows how to dispose of. And when an accident occurs, which sooner or later it will, how many people will be affected? Doesn't sound good to me.

[171-06, John Tanner] As far as disposal of decayed uranium is concerned, an honest comparison of the radioactivity between depleted uranium and uranium ore would compare equal amounts of uranium, not equal amounts of dirt. And on that basis, ore is far more radioactive than depleted uranium. It's simply that in the depleted uranium, they've concentrated the uranium, and it would make no sense to dilute it by mixing it with dirt just so we can say well now it's ore. It should be buried, as is, and shallow, because some day we're going to need it.

[180-06, Kaye Turner] Is it true that depleted uranium becomes more radioactive over time?

[193-05, Liz Woodruff, on behalf of the Snake River Alliance] So once it is deconverted, after treatment, if they come up with a solution for this, is the problem solved? Well, there is less of it. But the funny thing about depleted uranium is that it becomes more radioactive. Over time, as it decomposes, it exposes radon gas. And it's most radioactive in its millionth year.

[192-13, Lisa Young] The storage of the depleted uranium waste, which will likely not be deconverted in any reasonable timeline, poses a serious risk to our health and safety as Idahoans, and to the residents of any other region where the waste will be stored in the future. Even after proper deconversion of this waste, the remaining waste, which cumulatively becomes more of a radioactive threat over time, has nowhere to go for acceptable long-term storage, and will continue to plague our waste storage sites with more and more barrels of poison, creating more and more of a health and safety risk for the surrounding communities. Producing this waste is irresponsible, and licensing a facility that will do just that is undeniably irresponsible.

Response: *While uranium isotopes in depleted UF_6 continue to decay at a constant rate after the enrichment process is complete, daughter products from their decay build up and increase the total radiation emitted from the material, which would be similar to that associated with naturally-occurring uranium ore. For illustrative purposes, the dose rate at 1 meter from a storage cylinder containing 10,000 kg of solid depleted uranium oxide would be expected to increase from 0.26 mrem/hour in the first year to 1 mrem/hour at 10,000 years and 30 mrem/hour at 1 million years. As noted in Section 3.11.1 of the EIS, the average person in the United States receives approximately 310 mrem per year from natural background radiation sources.*

Accident scenarios involving stored cylinders of depleted UF_6 at the proposed EREF are encompassed by the accident analysis of more severe accidents presented in Section 4.2.15.2 and analyzed in greater detail in the SER (NRC, 2010b). The consequences of the analyzed accidents bound accidents involving stored depleted UF_6 cylinders on the storage pad, including *routine handling scenarios. The NRC staff concludes that through the combination of plant design, engineered controls, and administrative controls, accidents at the facility pose a low risk to workers, the environment, and the public.*

I.5.18 Waste Management

Comment: The following comment expresses support for the project and a desire for more information on the storage and disposal of wastes.

[006-01, Anonymous] I am supportive of the AREVA project but would like to have heard more from the NRC on how waste from the process will be stored and ultimately disposed of.

Response: *Storage and management of waste is discussed in Sections 2.1.4.2, 2.1.4.3, and 4.2.11 of the EIS.*

Comment: The following comment concerns the storage of SNF.

[007-02, Arnold Ayers] You talk about associated with that, another is storage of fuels. People are worried about storage. Well, I've got tell you, we did the testing on the storage for the spent fuels that are actually being stored in power plants today, and found no discharges anywhere. If we can do it for that, I see absolutely no reason why such facilities cannot be developed and built for AREVA to be able to handle the waste products that they have over an indefinite period of time.

Wait a minute, we're talking waste products. The reality is that that fuel has a very strong potential under the right circumstances to become more fuel. It's not a waste product, it is actually a potential energy resource.

Response: *As reflected in the comment, no SNF would be generated or stored at the proposed EREF. Section 4.2.11.2 of the EIS addresses the disposal of waste that will be generated during operations at the proposed EREF.*

Comment: The following comment expresses concern that there would be long term storage of "spent uranium" at the proposed EREF site.

[019-02, George Buehler] I see this as the narrow end of the wedge to create long term storage of spent uranium, since the process of establishing a permanent repository for nuclear waste has been hopelessly grid-locked for decades.

Response: *The United States is still in the process of considering a permanent repository for high-level waste and SNF. Neither of these waste types would be generated by the proposed EREF or stored at the EREF site. Furthermore, AES has stated that depleted UF_6 cylinders would not be stored at the proposed EREF site beyond the licensed lifetime of the facility (AES, 2010a).*

Comment: The following comment asserts that the Draft EIS does not contain adequate information regarding hazardous materials existing or proposed for storage at the proposed EREF site.

[027-19, Sara Cohn] Hazardous Materials: The EIS does not contain adequate information regarding hazardous materials existing onsite. Additionally, it is unclear how hazardous materials will be stored during operation of the proposed project, and as mentioned above, no adequate rules exist for disposal of such materials. The final EIS must provide detailed information with regard to any hazardous materials existing or proposed for storage onsite and any cumulative risk associated with the storage, transport, and use of hazardous materials during project operations. The final EIS must include a Management Plan for Toxic and Hazardous Materials. This document should be available for public comment and should address health and accident risks associated with toxic and hazardous materials onsite as well as accident prevention and management strategies. This information is incredibly important to protect the health and lives of emergency responders and communities such as Idaho Falls, Pocatello, and others that would potentially be harmed by facility operations. The ICL is concerned that a hazardous materials analysis was not included in the draft EIS and that the Safety Report for this facility has yet to be released. The Safety Report- an important document that will evaluate the safety of the proposed facility and potential threats to public health – must be released for public comment and evaluation before the final EIS is approved and the NRC seeks a licensing decision.

Response: *For the purposes of responding to this comment, the NRC staff assumes that the commenter's definition of "hazardous materials" includes hazardous and radioactive raw materials and waste. The public and occupational health impacts of storing radioactive and hazardous materials onsite are addressed in Section 4.2.10.2 of the EIS. The impacts of transportation accidents involving the release of hazardous materials are addressed in Section D.2.2.2, and the impacts of hazardous waste disposal are addressed in Section 4.2.11.2. Specific details about the onsite storage of hazardous materials at the proposed EREF will not be available until the facility design is finalized; and development of plans for management of toxic and hazardous materials and for emergency response is not within the scope of the EIS. The quantities of hazardous materials to be stored onsite are considered sensitive information and were taken into account as part of the safety evaluation in the NRC's SER, NUREG-1951 (NRC, 2010b).*

Comment: The following comment requests additional detail about waste from the Gaseous Effluent Ventilation System (GEVS) at the proposed EREF, including the use and disposal of filters.

[027-14, Sara Cohn] The environmental documents mention the use of Gaseous Effluent Ventilation Systems. We are concerned about the waste associated with the ventilation system and would like more detail with regard to the use and disposal of any filter-like product that may contain pollutants.

Response: *The impacts associated with the waste from the GEVS are addressed in Section 4.2.11.2 of the EIS. Additional information about use and disposal of filter-like products used in the GEVS has been added to that section, including the types of filters and the processing of filters after removal from service.*

Comment: The following comment asks about who will pay for waste storage at the proposed EREF site and eventual removal.

[050-11, Joanie Fauci] Who will pay for waste storage and eventual removal?

Response: *AES is responsible for all costs of preconstruction, construction, operation, and decommissioning of the proposed EREF, including waste storage and removal.*

Comment: The following comment expresses concern that the Draft EIS does not evaluate toxic waste impacts following decommissioning.

[077-03, Larry Hyatt] The most serious flaw in the EIS for Eagle Rock is that the evaluation of impacts end at the decommissioning of the facility where as the toxic contaminants of the enrichment process will be a serious environmental hazard for thousands of generations into the future. Both the depleted Uranium and the centrifuged product are a poison to humans and the proposal shows no assured containment of this material nor a method of rendering it safe. You cannot show adequate stewardship to manage this dangerous byproduct for its life of toxicities.

Response: *Waste management impacts at the proposed EREF site following the conclusion of decommissioning are not addressed in the EIS, because residual environmental hazards are not anticipated. All waste and contaminated materials would be shipped to a licensed disposal facility. The NRC license, as well as the AES Decommissioning Funding Plan, would require the decontamination or removal of all materials from the site which prevent release of the facility and site for unrestricted use as defined in 10 CFR 20.1402 (NRC, 2010b). The NRC staff has found that AES's plans for financial assurance for decommissioning and AES's plan for chemical process safety and controls meet the requirements in 10 CFR Part 70 and provide reasonable assurance that public health and safety and the environment will be protected (NRC 2010b).*

The long-term impacts of the disposed waste are covered under the licenses (and their supporting environmental analyses) that have been, and would in the future be, issued to commercial radioactive waste disposal facilities. These facilities are licensed by the Commission or designated Agreement States according to the requirements specified at 10 CFR Part 61 or compatible Agreement State regulations. Further, the NRC is currently engaged in rulemaking to specify a requirement for a site-specific analysis for the disposal of low-level radioactive wastes, including large quantities of depleted uranium (NRC, 2009). In the interim, compliance with the performance objectives specified in Part 61, Subpart C, continues to provide reasonable assurance that low-level radioactive waste can be safely disposed at licensed facilities. On April 13, 2010, NRC staff summarized existing policy and guidance to assist Agreement States in making informed decisions regarding compliance with the performance objectives for land disposal of significant quantities of depleted uranium until a new regulation is implemented (NRC, 2010a).

Comment: The following comment expresses concern regarding the integrity of storage containers for depleted UF_6.

[125-01, Holly Paquette] Having all that been said, I think the perfect picture for me, that described what my worries are about this, with the storage of the uranium that we saw up there. Now Representative Simpson from Idaho Falls came up and said -- which actually did not make me feel better. I think he hoped that that would -- that those rusted containers are actually highly regulated, checked, and meet all of the standards that are needed to be keeping the people around it safe. For me, that was a shock, that that's considered perfectly regulated, and I think that that brought to mind what's going on in the Gulf right now. We have a lot of trust in our government, that they are regulating things, and that things are perfectly okay. If that means that depleted uranium is being stored in rusted metal containers, that we have no way of getting rid of, that frightens me.

Response: *As noted in Section 4.2.11.2 of the EIS, DOE has stored depleted UF_6 in Type 48Y or similar cylinders outdoors since the mid-1950s, and cylinder leaks due to corrosion led DOE to implement a cylinder management program. Proper and active depleted UF_6 cylinder management, which includes routine inspections and maintaining the anticorrosion layer on the cylinder surface, has been shown to limit exterior corrosion or mechanical damage and provide for safe storage. AES has committed to the implementation of a similar cylinder management program (see Section 4.2.11.3 of the EIS), which would help ensure safe storage of depleted uranium at the proposed EREF site.*

Comment: The following comment concerns the transport of radioactive materials and waste through Idaho and the storage of these materials in the State.

[147-05, Joe Schueler] 1. Nuclear compounds will be shipped to Idaho and the byproduct waste of the process as well as enriched Uranium will be either shipped through our state or stored in Idaho.

Response: *As discussed in Section 4.2.11 of the EIS, low-level radioactive waste from operation of the proposed EREF would be transported from the proposed EREF site to licensed, out-of-state TSDFs. Depleted UF_6 from the enrichment process would be stored at the proposed EREF site until shipment to a DOE-owned or commercial conversion facility. AES has stated that depleted UF_6 cylinders would not be stored at the proposed EREF site beyond the licensed lifetime of the facility (AES, 2010a).*

No radioactive waste would be transported into Idaho as a result of the proposed EREF project. The only radioactive materials transported to the proposed EREF would be UF_6 feed for the enrichment process.

Comment: The following comment discusses potential uses for depleted uranium tails.

[157-04, Hon. Erik Simpson] Lastly, depleted uranium tails themselves are not considered waste. The tails contain residual value in both the remaining uranium and fluorine that it contains. In fact, the Idaho Company, International Isotopes, is in the process of licensing and building a $100 million facility in New Mexico specifically designed for the chemical deconversion of depleted uranium from enrichment. The facility will extract the valuable fluoride and sell that on the commercial market place.

Response: *As stated in the text box in Section 2.1.5 of the EIS, depleted uranium is source material as defined in 10 CFR Part 40, and, if treated as a waste, falls under the definition of low-level radioactive waste per 10 CFR 61.2. After conversion from hexafluoride to a more stable oxide form, the depleted uranium could potentially be used in various materials or products. However, DOE currently plans to dispose of most of the depleted uranium oxide as low-level radioactive waste (DOE, 2009). Should any depleted uranium generated at the proposed EREF be sent to the proposed International Isotopes facility in the future, the fluoride in the depleted UF_6 would be recovered and sold on the commercial market.*

Comment: The following comment ask about depleted uranium generation as a result of enriched uranium production.

[180-05, Kay Turner] Is it true that for every ton of enriched uranium produced there will be seven tons of depleted uranium?

Response: *On an annual basis at full production, the proposed EREF is anticipated to produce approximately 2252 metric tons (2482 tons) of low-enriched UF_6 and 15,270 metric tons (16,832 tons) of depleted UF_6 as stated in Section 2.1.4.2. The resulting ratio between the enriched product and depleted tails is about 1.0 to 6.8 or about 1 to 7.*

Comment: The following comment criticizes the classification system for radioactive wastes and states that the EIS should evaluate risks to the public from radioactive wastes.

[181-19, Roger Turner] NEPA requires a hard look at environmental impacts even if waste classification system is flawed. Classification of radioactive wastes in the U.S. errs because waste categories are based on the origin of the waste, not on the physical, chemical, or radiological properties that determine the hazards of the waste, and hence its safe and proper management. Hence the system does not take into account actual radioactivity levels of waste either overall or per unit volume. Thus, so-called "low-level waste" can contain materials more radioactive than those classified as "high-level waste." However, the NEPA requires that risks to the public be evaluated, in addition to simply repeating the waste classification system employed in the U.S.

Response: *Discussion of the waste classification established by the NRC in 10 CFR Part 61 is not within the scope of the EIS. Section 4.2.10 of the EIS presents the evaluation of the radiological risks to workers and the public as a result of the proposed EREF.*

Comment: The following comment states that the Draft EIS fails to recognize UF_6 as a Resource Conservation and Recovery Act (RCRA)-permitted material, and requests that the permit section of the Draft EIS be revised.

[181-15, Roger Turner] EIS Fails to recognize UF_6 as a RCRA permitted material. Depleted Uranium was determined to be a Solid Waste as defined by RCRA and the EIS in Tennessee, and the EIS fails to recognize the possibility that Idaho DEQ will similarly require a RCRA permit for this material. Please revise Permit Section.

Response: *Classification of waste by the State of Tennessee has no bearing on the handling, storage, and transport of wastes generation at the proposed EREF. To date, no States other than Ohio and Tennessee have expressed interest in regulating UF_6 as a RCRA waste. IDEQ has not indicated that UF_6 will be regulated as a RCRA waste in Idaho. Therefore, no change to Section 1.5.2 in the EIS is necessary.*

Comment: The following comment asks whether solid waste generated at the proposed EREF would require a Toxic Substances Control Act (TSCA) or RCRA permit, and states that the EIS should describe the current status of mixed waste treatment acceptance criteria and shipping requirements.

[181-18, Roger Turner] Also, this section reports that the final solid material would be shipped off-site. This raises the issue of whether it would require a TSCA or RCRA permit. The EIS should describe the current status of mixed waste treatment acceptance criteria, shipping requirements.

Response: *Hazardous waste (RCRA) permits are required for the treatment, storage, or disposal of hazardous wastes, and IDEQ implements RCRA within the State of Idaho. Text has been added to Section 4.2.11.2 of the EIS to clarify that the proposed EREF would not treat, store, or dispose of hazardous or mixed wastes in a manner that requires a RCRA permit. However, as noted in Section 1.5.3, the proposed EREF would request a hazardous waste generator number.*

TSCA is designed to regulate the introduction of new chemical substances or the significant new use of an existing chemical substance. Neither applies to the proposed EREF, so TSCA does not apply.

Section 4.2.11.2 states that hazardous wastes generated at the proposed EREF would be collected at the point of generation, classified, packaged, and shipped offsite to a licensed TSDF in accordance with Federal and State environmental and occupational regulations. Additional text has been added to Section 4.2.9.2 to clarify that the transportation of hazardous wastes is subject to U.S. Environmental Protection Agency (EPA) and DOT regulations. The current status of mixed waste treatment acceptance criteria is not within the scope of the EIS.

Comment: The following comment asks where the perfluoropolyether (PFPE) oil waste will be stored at the proposed EREF site. The comment also asks for the kilowatt rating of each of the four standby diesel generators, and how much diesel fuel will be stored on the site.

[187-01, John Weber] After reviewing the safety analysis report and the EIS, I have a few questions and comments to present to NRC at this time. Because no Bobin (phonetic) oil recovery system will be used, where will the PFPE oil waste be stored?
What is the kilowatt rating of each of the four standby diesel generators, and how much diesel will be stored on the site?

Response: *Specific details about the storage location of PFPE oil waste and diesel fuel at the proposed EREF will not be available until the facility design is finalized. The quantities of hazardous materials stored onsite, including diesel fuel, are considered to be sensitive information.*

However, such information was taken into account during the safety evaluation in the NRC's SER, NUREG-1951 (NRC, 2010b).

As noted in Section 4.2.4.1 of the EIS, the development plan for the proposed EREF states that each of the four diesel-fueled emergency generators will be rated at 2500 watts (i.e., 2.5 kilowatts).

Comment: The following comments note that radioactive waste would remain in the United States.

[032-04, Cindy Cottrell] I'm against a foreign country making the profit from this plant and leaving the contamination in our Country.

[187-04, John Weber] In section 10.1, it states that: "DOE is entitled to take title to and dispose of the waste." So the French citizens take the profits and the U.S. citizens get the waste.

***Response**: To ensure domestic uranium enrichment services, the generation of depleted uranium tails and uranium-contaminated waste that would need disposal in the domestic arena would be expected.*

Comment: The following comments express concern over radioactive waste being left in the State of Idaho.

[014-03, William Blair] Idaho does not need to add to its radioactive waste problem.

[015-07, Beatrice Brailsford] So, that's the proposal to meet the need of a domestic supply of enriched uranium. A uranium factory without any national purpose will produce fuel for everywhere in the world but here in Idaho, send its profits to France, and leave us with the waste.

[061-02, Nancy Greco] I am also worried about the threats to our beautiful environment, not only from the construction and production of this plant, but also from the tons of waste which will be left behind. Idaho is not the armpit of the nation, and should not be seen as the perfect repository for more waste.

[110-01, John and Susan Medlin] As the Snake River Alliance presentation pointed out, there is no current need for this facility, no compelling evidence that a nuclear renaissance is coming (or inevitable), no rationale for a French company building a nuclear facility in Idaho that purports to promote US energy security while importing inputs and exporting outputs, no provision for the deteriorating and dangerous waste that will haunt us for decades or maybe forever, no concern for yet another threat to the Snake River aquifer, the lifeblood of Idaho agriculture.

So how can the NRC conclude that building this facility is vital, and that the most problematic outcome to be evaluated is construction dust?

[104-01, Carolyn McCollum] There's little advantage to us Idahoans when Areva's nuclear fuel would be sent worldwide and its profits back to France while we are left with its radioactive waste, compounding INL's nuclear activities that have plutonium-contaminated the aquifer.

Response: *As discussed in Sections 2.1.3 and 4.2.11.2 of the EIS, all waste from operations at the proposed EREF, including the depleted UF_6 tails cylinders, would be transported out of Idaho for treatment and disposal. Until a depleted UF_6 conversion facility is available, cylinders containing depleted UF_6 would be temporarily stored on an outdoor Cylinder Storage Pad. Storage of depleted UF_6 cylinders at the proposed EREF would occur for the duration of the facility's operating lifetime and before final removal of depleted UF_6 from the proposed EREF site. However, AES has stated that depleted UF_6 cylinders would not be stored at the proposed EREF site beyond the facility's licensed lifetime (AES, 2010a).*

Comment: The following comments are concerned with the costs of waste management and disposal.

[050-11, Joanie Fauci] Who will pay for waste storage and eventual removal?

[083-04, Diane Jones] Assuming that the project goes forward, and the enriched uranium is used in the United States, there's an assertion in the EIS that this would be an economical source of enriched uranium. My question is: Does that economy include the cleanup of the waste that's generated? It seems clear that the NRC has not yet figured out how this waste should be, could be disposed of, and it's the -- who bears the cost?

[096-02, Arjun Makhijani] The cost of -- and I'm not saying do it, or don't do it here -- I'm just commenting on the Environmental Impact Statement, and what will be at risk, and what taxpayers might have to do if a private corporation unloads this DU under the Department of Energy, as it can do by law, and it has said it might do. And the Department of Energy takes it, and you're requiring them to put two or two and a half billion dollars out, and my estimate for what it would cost to dispose of 300,000 metric tons of depleted uranium is closer to eight or ten billion dollars. So, who's going to pay that? It's going to come -- everybody who is complaining about the deficit should at least pay some attention to the potential cost of this.

[171-07, John Tanner] Now, as for who pays for disposal, so far the nuclear industry has been paying for all nuclear waste disposal, not the taxpayer. They certainly haven't been getting their money's worth as the saga at Yucca Mountain shows.

Response: *AES is responsible for all costs of preconstruction, construction, operation, and decommissioning of the proposed EREF, including waste storage, removal, and disposal. In the case of the depleted UF_6, the DOE would be required to take the material from the proposed EREF, but AES would still be responsible for the costs associated with transport, conversion, and disposal. Text has been added to Section 2.1.5.1 of the EIS for clarification.*

Comment: The following comments concern wastewater permitting and regulatory issues.

[066-23, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 21. Subsurface Sewage Disposal Requirements The wastewater system for the Visitor Center was not discussed in the draft EIS. The Visitor Center will be located adjacent to Highway 20 approximately 1.5 miles from the enrichment facility. The exact site location has not been determined. The wastewater system for the Visitor Center will be an onsite subsurface disposal system with a projected flow of approximately 1500 gallons per day (gpd). Subsurface sewage disposal is governed by the subsurface sewage rules (58.01.03) and permitting has been delegated to the local Health District. DEQ participates in plan and specification review for collection systems with more than 2 connections and large soil absorption systems. We expect that AES will comply with all applicable regulations, licensing and operating requirements of both DEQ and the local Health District related to this facility.

[066-22, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 20. Wastewater System Requirements The Proposed Eagle Rock Enrichment Facility wastewater system consists of a collection system, private municipal wastewater treatment plant, and two (2) total containment lined wastewater lagoons. The system will be classified as a Public Wastewater System and subject to the requirements of the Wastewater Rules (IDAPA 58.01.16). DEQ expects that AES will comply with all applicable requirements.

Response: *Approvals and permits, such as those pertaining to municipal wastewater, must be obtained by AES from other regulatory agencies. Table 1-1 in Section 1.5.1 of the EIS lists the applicable requirements, including those for wastewater at the proposed EREF. Table 1-2 in Section 1.5.2 lists the agencies to which AES must submit the appropriate applications.*

A row for IDAPA 58.01.03 has been added to Table 1-1. The regulation is already listed in Table 1-2, but the entry has been modified to note that a permit may be required for the Visitor Center.

Comment: The following comments note that little byproduct waste would be produced by the proposed EREF.

[133-03, Richard Provencher] It includes an enclosed system that has virtually no byproduct waste generated through the flow sheet.

[133-06, Richard Provencher] The facility does not require a large amount of water to operate. This is good from an aquifer conservation and a waste minimization standpoint.

Response: *The NRC acknowledges the comments and appreciates the public participation.*

Comment: The following comments express concern about the operation of the Liquid Effluent Collection and Treatment Systems at the proposed EREF.

[027-15, Sara Cohn] We also concerned that hazardous materials will be concentrated in retention basins prior to and after evaporation of any water. These materials have the potential to settle in sediments and be released into the air with other dust particles.

[100-01, Wendy Matson; 191-17, Liz Woodruff] Are the filtration systems set up to decontaminate water prior to evaporation adequate, to ensure that containments will not be released in the air?

[181-18, Roger Turner] Liquid Effluent Systems needs addressed. This section of the EIS (Page 2-20) describes a process where contaminated liquids would be processed for uranium removal through several precipitation units, filtration units, microfiltration units, and evaporation units. These units need to be described in detail and evaluated with respect to human and ecological risks. How are liquid contaminants collected and what is the risk to workers during these spills? Also, this section reports that the final solid material would be shipped off-site. This raises the issue of whether it would require a TSCA or RCRA permit. The EIS should describe the current status of mixed waste treatment acceptance criteria, shipping requirements.

[184-13, Kitty Vincent] In addition we are concerned that the filtration systems set up to decontaminate water prior to evaporation adequate to ensure that contaminants will not be released in the air?

Response: *The proposed Liquid Effluent Collection and Treatment System is described in Sections 2.1.4.2 and 4.2.6.2 of the EIS. Additional information about these systems has been added to Section 4.2.11.2, including the processes for sampling and treating the various liquid effluent streams.*

As discussed in Sections 2.1.4.2 and 6.1.3 of the EIS, liquid effluent would be routed to collection tanks and treated through a combination of precipitation and filtration to remove radioactive material prior to evaporation.

As described in Sections 4.2.6.2 and 6.1.4, most stormwater runoff would be discharged to a detention basin for evaporation to the atmosphere and ground infiltration. Treated sanitary effluent and stormwater runoff from the cylinder storage areas would be discharged to lined retention basins for evaporation to the atmosphere. Although the retention basins would not receive process-related effluents and would not be expected to contain radioactivity or hazardous constituents from other sources, stormwater and sediment from these basins would be sampled periodically as part of the site environmental measurement and monitoring program (as described in Chapter 6).

The public and occupational health impacts from operations of the proposed EREF are addressed in Section 4.2.10, and the environmental impacts of the proposed Liquid Effluent Treatment Systems are addressed in Section 4.2.6.2. As noted in Section 9.3.1.3 of the SER (NRC, 2010b), the NRC staff has concluded that the proposed controls will ensure that radiation levels to the public remain within regulatory limits and that as low as reasonably achievable (ALARA) liquid effluent goals are met.

Comment: The following comments deal with the safety of long-term storage of depleted UF_6 at the proposed EREF site, the availability of the DOE conversion facilities, and ultimate disposition.

[006-01, Anonymous] I am supportive of the AREVA project but would like to have heard more from the NRC on how waste from the process will be stored and ultimately disposed of.

[014-01, William Blair] Idaho does not need more radioactive waste placed over the Snake Plain Aquifer in an active earthquake area. Until a safe method of handling and storing radioactive waste for thousands of years is devised, NO new facilities should be approved.

[015-05, Beatrice Brailsford] The most domestic part of the proposal is that the waste will, in fact, stay here. The plant would produce 320,000 tons of depleted uranium hexafluoride over its licensed lifetime, and the door is already ajar for the license to be extended. That waste might be stored on outdoor concrete pads above the Snake River aquifer until the plant is decommissioned.

It's worth noting that New Mexico sharply limits how much, and how long waste can stay at the plant there. The waste has to be treated before it can be disposed of. Two government-owned treatment plants are under construction, over budget, and behind schedule. Waste the U.S. has already accumulated will take a combined 43 years to process.

[015-14, Beatrice Brailsford] The EREF will produce more than 350,000 tonnes of depleted uranium hexafluoride (DUF6) over its licensed lifetime, and the door is already ajar for the license to be extended. That waste would be stored in 25,718 cylinders on outdoor concrete pads above the Snake River Aquifer as long as the plant operates. DUF6 is both radioactive and chemically toxic and has to be treated before it can be disposed of. The DOE has built two plants to treat depleted uranium hexafluoride waste the US has already accumulated. That treatment will take a combined 43 years to process. A private US corporation is seeking a license for its own treatment plant. The draft EIS cavalierly dismisses any potential bottlenecks by stating that the waste could simply be sent to the DOE treatment plants before they're ready to process it and then their operating lives extended. But it is at least as likely that the DUF6 will be stored in Idaho for an uncertain length of time above the Snake River Aquifer, a sole source aquifer for nearly 300,000 people. Storage under these conditions must be fully evaluated under NEPA.

[030-04, Kerry Cooke] The nuclear waste quagmire is not going to go away any time soon - not during licensing of this project; not during construction; not during operation; and not during decommissioning. The depleted uranium and low level waste the Areva plant will create will be added to the nuclear waste burden Idaho already carries. This plan should go no further until realistic plans are in place that address the need to take care of nuclear waste for centuries to come.

[032-02, Cindy Cottrell] If Idaho allows this to happen, it will be the storage of all the waste forever, long after the plant has closed. There is no site established for waste to go to and will become the State of Idaho's problem for generations to come.

[045-01, Joan Drake] I write to oppose the construction of the Areva nuclear power plant. I am very concerned that the proposed plant would produce an estimated 320,000 tons of depleted uranium hexafluoride over its licensed lifetime. In view of this, and the fact that its license might well be extended, indications are that this waste would likely be stored in or near Idaho until the plant's decommissioning. Even after its removal and treatment, there is no certain disposal pathway. The Areva plant should not be licensed until regulations are in place for the environmentally safe disposal of large quantities of depleted uranium.

[048-02, Genevieve Emerson] The EIS fails to consider the influence of wild fires in the region and also fails to adequately address the issue of waste storage and disposal, considering that there are no viable methods yet in existence for safely storing hexafluoride and depleted uranium.

[050-03, Joanie Fauci] One of the areas I feel is under-emphasized in the DEIS is the Safety issue…

•The storage of radioactive waste is also a safety concern. There is no current repository for the waste so how long it will stay in Idaho is unknown. Areva says it will get it out once the project is complete, but what guarantee do we have of that. Maybe the NRC can put some rules in as former governor of Idaho, Phil Batt, tried to institute with DOE waste at INL.

[066-03, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 2. Depleted Uranium Hexafluoride (DUF6) Waste Disposal Path Section 2.1.5.

Section 2.1.5 acknowledges that long term storage of DUF6 presents a chemical hazard and that direct disposal is likewise prohibited because of this hazard.

> *The Defense Nuclear Facilities Safety Board (DNFSB) has reported that long-term storage of depleted UF6 in the UF6 form represents a potential chemical hazard if not properly managed (DNFSB, 1995). For this reason, the strategic management of depleted uranium includes the conversion of depleted UF6 stock to a more stable uranium oxide (e-g., triuranium octaoxide [U308]) form for long-term management (OECD, 2001). Also, the DOE evaluated multiple disposition options for depleted UF6 and agreed that conversion to U308 was preferable for long term storage and disposal of the depleted uranium in its oxide form, clue to the chemical stability of 11308 (DOE, 2000). Therefore, the disposal option considered in the EIS is the conversion of the depleted UF6 to U308 at either a DOE-owned or commercial conversion facility followed by disposal as U308. Direct disposal of depleted UF6 was ruled out because of its chemical reactivity (DOE, 1999b).*

For this reason the Draft EIS further acknowledges that DUF6 must be converted at one of two facilities currently under construction.

> *DOE is currently constructing two conversion plants to convert the depleted UF6 now in storage at Portsmouth, Ohio, and Paducah, Kentucky, to US08 and hydrofluoric acid. AES would transport the depleted UF6 generated by the proposed EREF to either of these new facilities and pay DOE to convert and dispose of the material. The proposed EREF would generate approximately 321,235 metric tons (354,101 tons) in total over its operating lifetime (AES, 20IOa). The depleted UF6 would be processed in a DOE operated conversion facility and then shipped off site for disposal.*

Based on estimated capacity for depleted UF6 (DUF6) conversion at the Department of Energy (DOE) facilities in Paducah, Kentucky, and Portsmouth, Ohio, DEQ understands that it may take

DOE approximately 25 years to address the current backlog of DUF6 stored at these facilities. Based on this timetable, it will take additional time to convert the 25,718 cylinders (345,000 tons) of DUF6 projected to be generated during the licensed life of the Eagle Rock enrichment facility (EREF). Accordingly, it can be expected that DUF6 will be stored at the Eagle Rock enrichment facility for a period significantly in excess of the operating life of the facility and potentially for a period of time which creates the “long term storage hazard” identified by DNFSB.

[070-02, Virginia Hemingway] These statistics do not even begin to address the dangerous impact of 350,000 tons of depleted uranium that will be stored in more than three--30,000 cylinders, which will be on cement pads above ground. Idaho is already a dumping ground for nuclear waste, and there is no place for it to go. There will be no place for it to go, because there are no plans for this waste to go anywhere.

[071-05, David Hensel] And I think that the -- once again, forgive me, but I just sort of feel like well, the EIS says something is going to happen, and I don’t think that’s an adequate way to address it. I mean, I think that there should be a more concrete analysis of what’s going to happen to that waste, how long it’s going to be here, and what the likelihood, and what the cost of that’s going to be.

[078-05, Hon. Wendy Jaquet] Disposal of waste which is huge appears to still be a problem and safety concerns loom.

[086-03, Paula Jull] Areva’s plant would produce 320,000 tons of depleted uranium hexafluoride over its licensed lifetime, and its license might well be extended. All this waste might be stored in Idaho until the plant was decommissioned.

[103-04, Karen McCall] This plant would produce 350,000 metric tons of depleted uranium which would be stored above ground. Depleted uranium has to be treated before it can be disposed of. Currently there are two treatment plants being constructed which are over budget and behind schedule with an enormous backlog of waste already needing to be treated.

[111-03, Robert Meikle] And I can tell you that when we see these slides of this nuclear waste being stored, the way it was stored, there’s no question – that’s going to scare “the heck” out of people. But that’s not the way we do it now, folks. It’s much better technology for the storage of nuclear waste, and it’s been proven for many, many years.

[036-01, Christina Cutler, on behalf of the Idaho Department of Environmental Quality] I am still questioning how they plan to dispose of the by-products/waste from the enrichment process. What type of storage facility do they plan to have? How long do they plan to store the waste? And what are they going to do with it eventually, long term storage at the facility or move it somewhere else?

[128-06, Bob Poyser] Fourth. AREVA has a safe plan to temporarily store depleted uranium material during the life of the facility and safely transport that material, as stipulated by law, to a facility for deconversion.

While shipments of depleted uranium to a deconversion facility may occur throughout the life of the project to reduce the total inventory, there will be no -- I say again -- no depleted uranium left at the site when enrichment activities are completed and the NRC license is terminated.

[133-07, Richard Provencher] The byproduct that is generated as a result of the operation-depleted uranium-is solid and stable and can be stored safely for a long period of time without incident.

[136-01, Susan Rainey] No uranium enrichment facility outside Id Falls by AREVA!!! The transport of radioactive material and the storage of nuclear waste are my biggest concerns. There are safety issues! We will be at risk. How will the waste be disposed of? Snake River Alliance did an excellent job explaining. NRC sounded like bureaucratic babble ignoring the real dangers and concerns. How is this really going to help us here in Idaho, USA? Let's look at other options. Not worth the risk

[147-02, Joey Schueler] And so I want you to address that, and look at that more seriously, because I hear your statements and they didn't really speak to me about nuclear waste. And you all know that's why we're here. It's not -- and the sagebrush is important, and the dust is important, and economy is important. But we wouldn't be having public meetings if it weren't for the fact that you're going to put something that's highly toxic into our state, and there is no real solution. You've not given me one that I feel merits that choice.

So my real--what seems like the follow-up question, ends up being after we talk about risk, is: What is your price? And I don't think there's a price for putting my family at risk. And I want you to recognize that. And I want you -- can you -- I know this is public comment.

Can you answer me? Do you — can you tell me there is no risk to placing depleted uranium in Idaho? Can any of you answer that in the affirmative or negative? Is there no risk? Or maybe are you not at liberty to answer?…

Yes. And based on your statement, I'm not convinced that you can answer to me that there's no risk. And if that is the answer that I'm to take away from this meeting, then the meeting should not be about a process. To me, it should involve some element of outrage, to me, at the audacity of non-Idahoans, whether they be French, or otherwise -- and in fact, now that I've this testimony, Idahoans themselves, putting me, my family, my little nephews who are two and five, at risk, cause you haven't -- you haven't really proven to me that isn't risk.

So I'm going to have to go with that, because that's a safety issue to me. So tell me the pros of putting my family at risk, and why in Idaho, if there is risk, because I think we all know there is? Is it because there's low population here? Is it a lesser target for terrorism, which is an issue, hasn't been discussed? These mitigations, which I keep hearing, we're mitigating things, left and right here, do they make my family less safe, and all of these people's families more or less safe? Yeah. So your environmental requirements. You know, high -- we've had -- we've always mitigated environmental consequences since the dawn of this country, and, you know, like we see it in high obesity rates and things.

The FDA can write off whatever they want; it doesn't make it right, or okay. And so we're not talking about impact. We're talking about what's right. We're not talking about what's in our best interest, financially. We're talking about what's right.

So I hope you make a decision with that element in mind, knowing that people in Idaho are aware of that, and are watching that.

[147-11, Joey Schueler] 7. I know this sounds obtuse, but enriched Uranium and the byproduct of creating enriched Uranium (spent fuel) is extremely hazardous and brings a level of instability to the area, especially considering the storing methods (see link): http://www.nrc.gov/waste/spent - fuel - storage.html

[157-03, Hon. Erik Simpson] Now in the photograph that was showed, you saw the uranium safely stored. I must confess, a little rust on the container is not a problem, and what isn't stated is that that material is regularly monitored and inspected per federal guidelines. That was not stated.

[157-07, Hon. Erik Simpson] Second, waste. In the Sun Valley area, a claim was made uranium will be stored in Idaho, or depleted uranium will be stored in Idaho indefinitely, and the storage of the material is a danger. Not true. Depleted uranium is stored safely daily throughout the United States without incident. In fact, companies that store this product are required to regularly monitor and inspect the waste containers. Depleted uranium can be deconverted to remove the fluoride for use by a multitude of industries. International Isotopes, an Idaho Falls-based company, is planning to construct a deconversion facility in New Mexico. And it was announced today, Uranium Disposition Services, LLC was recently selected to conduct hot functional testing of a conversion plant at Paducah, Kentucky, so there are plans for the waste that will be generated by this facility.

[168-06, Lon Stewart] The Areva plant is not needed in the United States or the world. We would be adding to a waste that we currently have more than we know what to do with, do not know how to safely store it, and have no idea if what we think will work will actually work for 1 million years. This doesn't sound good to me.

[181-03, Roger Turner] The Draft EIS by the NRC significantly errs by minimizing the human health and environmental risks in the long-term and short-term storage of uranium. The EIS is flawed in its apparent assumption that another location will be certified for offsite storage, and that the waste is categorized as low-level.

Here is an excerpt of the EIS that is directed under the title of "Public Health." "During the peak operation, the proposed EREF is expected to generate 1,222 cylinders of depleted uranium hexafluoride annually, which would be temporarily stored on an outdoor cylinder storage pad in 26 approved type 48-wide containers before being transported to a DOE-owned or private conversion facility." That's their public health assessment of the project. But what facility are they referring to?

In fact, this is not an EIS that carefully weighs the likelihood of another state stepping up to accept this waste, especially if there are problems in treating the uranium. This is an EIS that fails to follow the NEPA requirement to analyze realistic cumulative impacts.

We've seen these types of examples in this, and the fact that no state wants a certified spent nuclear fuel site to accept commercial fuel. So, for now, all of these sites that create the waste temporarily store this waste at their locations. And this was the -- this was an enabled legislation that the Nuclear Waste Policy Act established in 1982, but they're still being stored temporarily.

[181-05, Roger Turner] The EIS is also fatally flawed in its assumption that a treatment facility will be available to convert the depleted uranium. The depleted uranium must be treated before stored.

[181-11, Roger Turner] Public Health risks of “Temporary” Storage of depleted Uranium should be addressed in EIS. The draft EIS by the NRC significantly errs by minimizing the human health and environmental risks in the risks of the storage of uranium in above-ground pads in eastern Idaho. The EIS is flawed in its apparent assumption that another location will be certified for off-site storage. The EIS fails to acknowledge that these casks may be breached by handling or corrosion. Here is an excerpt of the EIS, under the Public Health section:

> During peak operation, the proposed EREF is expected to generate 1222 cylinders of depleted UF6 annually, which would be temporarily stored on an outdoor cylinder storage pad in 26 approved Type 48Y containers before being transported to a DOE-owned or private conversion 27 facility.

The above paragraph, under the Public Health Section, in fact, does not even discuss public health. The EIS must assume that the casks of depleted Uranium will remain for some time at the site, as the treatment facility to convert UF6 to the more stable oxide is behind in schedules and experiencing budget problems affecting production. Anytime heavy equipment is operated there is a risk that accidents will occur. In fact, casks of UF6 were damaged by heavy equipment at Oak Ridge, so the risk to workers and public health is real. The EIS needs to define “temporary” and fully assess health and worker risks, for longer term storage at the site.

[181-21, Roger Turner] As mentioned above, the temporary storing of depleted and enriched uranium and at the Areva facility, is not a good idea, and the NRC should, if this project is approved, evaluate an alternative that limits the inventory of it to a bare minimum, immediately shipping it to the facilities to convert it to the more stable oxide, or for fuel fabrication.

[180-07, Kaye Turner] Is it true that depleted uranium has to be treated before it can be disposed of?

Is it true the U.S. is building two treatment plants and both are behind schedule, over budget and will have decades of already stored waste to treat?
Is it true Areva’s waste will stay in Idaho as long as Areva operates here?

[183-01, James Vincent] Since the two US de-conversion facilities are not operational, and if they do become operational they will first process already existing depleted uranium waste for 60 plus years of existing waste, from the 100 plus nuclear energy producing plants here in the US, the timeline for the removal of the on site storage of Uranium hexafluoride DUF6 from Idaho is in doubt. I have a problem with storing this waste above ground and possible leaching of contaminants into the aquifer for our state

Their figures are that these are increasing to 2,000 metric tons per year. And, in addition, there’s like 12 million cubic feet of low-level waste from these plants. Supposedly, we have around 60,000 metric tons of waste in this country that we have to get rid of one way or another.

[183-07, James Vincent] Since the two US de-conversion facilities are not operational, and if they do become operational they will first process already existing depleted uranium waste for 60 plus years of existing waste, from the 100 plus nuclear energy producing plants here in the US, the timeline for the removal of the on site storage of Uranium hexafluoride DUF6 from Idaho is in doubt. I have a problem with storing this waste above ground and possible leaching of contaminants into the aquifer for our state.

[191-12, Liz Woodruff] • The draft EIS assumes that depleted uranium hexafluoride will not be stored on site beyond the licensed life of the facility. But the draft EIS also acknowledges that Areva may well apply for a license extension. The NRC must discuss the length of a potential extension and whether or not cumulative waste storage would be allowed.…

• Any newly operating deconversion facilities in the US will first process already existing depleted uranium waste, the time-line for the removal of DUF6 from Idaho is therefore uncertain and verifiably in excess of the time-line specified by Areva in the draft EIS.

[193-04, Liz Woodruff, on behalf of the Snake River Alliance] So once again the waste, rusty cylinders. The U.S. already stores nearly 700,000 metric tons of depleted uranium. That's in Paducah, Kentucky, Portsmouth, Ohio, and Oak Ridge, Tennessee. And all of that waste has to be disposed of first, before the waste produced by a commercial, new commercial reactor -- or excuse me -- new commercial enrichment factory, like AREVA, could be disposed of. So we are behind, we're back in line behind these other wastes.

So why is that waste just sitting there? Why has it been sitting there for so long? Well, hexafluoride is highly reactive with water. So none of this waste can be disposed of until it's treated in deconversion plants.

Those plants are under construction, over budget, and behind schedule. So this waste has nowhere to go, nowhere to be deconverted before it can be disposed of, and it's the concern of the Snake River Alliance, that that means this depleted uranium waste will be stored above the aquifer for 300,000 people, the sole source aquifer in Idaho, for decades.

[192-03 and 192-09, Lisa Young] Also, it is not likely that the waste will be deconverted in a timely manner, as the U.S. has no operational deconversion facilities, and even with those that are up-and-coming, the current stockpile of around 704,000 tons of depleted uranium waste will take several decades at least to fully deconvert, with our current capabilities. This facility is estimated to produce an additional 320,000 tons of depleted uranium waste over the course of its lifetime. When it comes time to decommission this facility, all of this waste will need to be relocated, and, as the deconversion process looks limited, it will likely be transported elsewhere for further storage.

[192-04 and 192-10, Lisa Young] The storage of the depleted uranium hexafluoride, which reacts with water, water vapor, to produce two dangerous, corrosive, and soluble compounds, UO_2F_2 and HF, is extremely unstable. The production of these compounds presents huge risks in the storage timeline, as the corrosion of storage cylinders and the possibility for leaks is a very real reality. Even *after* proper deconversion of this waste, the remaining waste, which cumulatively becomes *more* of a radioactive threat over time, has nowhere to go for acceptable long-term storage, and will continue to plague our waste storage sites with more and more barrels of poison, creating more and more of a health and safety risk for the surrounding communities. *Producing this waste is irresponsible*, and licensing a facility that will do *just that* is undeniably irresponsible.

Response: *The onsite management of depleted UF_6 generated by the proposed EREF, including details and impacts of temporary onsite storage, is addressed in the EIS, in Sections 2.1.3 (facility description), 2.1.5 (depleted uranium management), 4.2.10.2 (radiological exposures), and 4.2.11 (waste management) of the EIS. It was determined that all impacts would be SMALL.*

The management of other (non-UF_6) wastes generated by the proposed EREF is addressed in Section 4.2.11. Temporary storage of non-UF_6 wastes at the proposed EREF would be conducted in accordance with license conditions.

As discussed in Section 2.1.5.1, the DOE has completed construction of two depleted uranium conversion plants. The Portsmouth conversion plant is expected to begin full operations in summer 2011, and the Paducah plant is expected to begin operation later in the year. As noted in Section 4.2.11.2, the conversion of the existing DOE inventory of depleted uranium hexafluoride to depleted uranium oxide is expected to consume the first 18–25 years of operation at these two facilities. Depending on the timing of shipment to a conversion plant (DOE or private), depleted UF_6 generated by the proposed EREF may continue to be stored in a safe manner until conversion is possible.

The inventory of depleted UF_6 for conversion does not include any other form of LLRW or SNF from commercial nuclear power plants. SNF from commercial nuclear power plants requires a permanent high-level waste repository and would not be treated or processed at a depleted uranium conversion plant. Similarly, LLRW that does not require conversion is eligible for disposal at licensed disposal facilities.

Under the USEC Privatization Act, DOE is obligated to accept depleted UF_6 waste from the proposed EREF (see Section 2.1.5.1). Depleted UF_6 from the proposed EREF would be stored in steel containers and would not require treatment at the proposed EREF prior to shipment to a conversion facility.

As noted in Section 4.2.11.2, proper and active depleted UF_6 cylinder management, including routine inspections and maintaining the anticorrosion layer on the cylinder surface, has been shown to limit exterior corrosion or mechanical damage and provide for safe and long-term storage of depleted UF_6. AES has committed to the implementation of such a cylinder management program as discussed in Section 4.2.11.3.

While awaiting shipment to a conversion facility, some amount of depleted UF_6 will be stored at the proposed EREF for the operating life of the facility. If DOE is not able to take possession of the depleted UF_6 as it is generated, the potential exists that some of the depleted UF_6 generated over the facility lifetime will be stored onsite until license termination. However, AES has stated that depleted UF_6 cylinders would not be stored at the proposed EREF site beyond the licensed lifetime of the proposed facility (AES, 2010a).

DOE intends to reuse the conversion product to the maximum extent possible or package it for disposal at an appropriate disposal facility (DOE, 2004a; DOE, 2004b; DOE, 2007a; DOE, 2007b; 72 FR 15870).

Comment: The following comments express concern that disposal of depleted uranium is currently not a viable option because NRC is in the midst of rulemaking on the disposal of large quantities of depleted uranium.

[012-01, Janice Berndt] The Areva factory would produce 320,000 tons of waste materials (depleted uranium hexafluoride) over its licensed lifetime. This waste could be stored in Idaho until the plant is decommissioned. Even if it is removed and treated, there is no certain disposal pathway. The draft EIS essentially ignores the fact that the U.S. does not have guidelines on how the treated waste will be disposed. Areva's factory should not be licensed until regulations are in place for disposal of large quantities of depleted uranium.

[014-01, William Blair] Idaho does not need more radioactive waste placed over the Snake Plain Aquifer in an active earthquake area. Until a safe method of handling and storing radioactive waste for thousands of years is devised, NO new facilities should be approved.

[015-06, Beatrice Brailsford] The draft EIS essentially ignores the fact that the U.S. does not have guidelines on how large quantities of the treated waste will be disposed of, but it will most certainly be disposed of in the United States.

[015-15, Beatrice Brailsford] The draft EIS essentially ignores the fact that the U.S. does not have guidelines on how the treated waste will be disposed of. This failure is egregious. The NRC is in the midst of a multi-year rulemaking process to establish guidelines for depleted uranium disposal. The NRC is aware that the rulemaking has already stirred some controversy, and the outcome is not certain. The NRC must fully discuss the disposal options under NEPA and must not issue a record of decision or a license until the disposal rules are in place.

[022-01, Judy Carroll] I am strongly opposed to Areva's plan to build a plant here because I do not believe that the radioactive waste will be handled appropriately and taken out of Idaho. Areva is taking advantage of Idaho in the fact that the unemployed and poor need jobs. What they don't say is that Areva will also be bringing sickness and death to Idaho. We may seem like a simple people but we do know in this state how important clean water and land are to our way of life. Idahoans are the ones who are able to enjoy beautiful wilderness, rivers and wildlife. If Areva needs uranium enriched, let them enrich it in France!

[027-01, Sara Cohn] As the Federal Register announcement for this proposed rulemaking suggests, NRC does not currently provide adequate guidance for the type of waste streams that will be created by the proposed Eagle Rock facility and stored on site. Until regulations are in place governing disposal of depleted uranium, and disposal facilities have implemented those regulations, ICL believes it is inappropriate to license any new uranium enrichment facility. NRC should consider the creation of adequate rules to guide the safe disposal of depleted uranium as paramount to permitting individual facilities.

[027-06, Sara Cohn] Waste Storage: ICL has provided public comments on the scoping analysis for the proposed AREVA Enrichment facility in Idaho Falls, Idaho (see Attachment A) and provided comments on the Potential Rulemaking for the Safe Disposal of Unique Waste Streams Including Significant Quantities of Depleted Uranium (see Attachment B). As the Federal Register announcement for the potential rulemaking states, NRC does not currently provide adequate guidance for disposal of the type of waste streams that will be created by the proposed Eagle Rock enrichment facility and stored onsite. We are very concerned the lack of appropriate regulations for the safe disposal of depleted uranium will facilitate unsafe storage of such materials within the project site and above a sole source aquifer. Until rules are in place to govern the disposal of depleted uranium and existing disposal facilities have implemented those regulations, ICL believes it is inappropriate to license any new uranium enrichment facility in Idaho. NRC should consider the creation of adequate rules to guide the safe disposal of depleted uranium as paramount to permitting individual facilities.

From Attachment B:
• More clarity is needed with regard to the scope of the potential rulemaking.
• Until regulations are in place governing disposal of depleted uranium and disposal facilities have implemented those regulations, it is inappropriate to license any new uranium enrichment facility.
• The NRC should coordinate with appropriate federal agencies, such as the U.S. Environmental Protection Agency (EPA) and others, to ensure comprehensive analysis of potential disposal sites and to protect natural resource, human health, ICL Comments on NRC public workshops and proposed rulemaking – depleted uranium and national security.

[030-02, Kerry Cooke] Depleted uranium is adding to a waste burden that Idaho already suffers with, and I believe that you owe it to the people of the United States to not license any facility that is going to increase, make any more depleted uranium, until this question is thoroughly solved, not proposed, not suggested, not theoretical, but solved. Just needs to stop.

[032-05, Cindy Cottrell] For ever ton of uranium enriched enough for use in a nuclear power reactor creates 7 tons of depleted uranium waste. No Country that enriches uranium has figured out how to dispose of this waste. The problem with depleted uranium is that it becomes more radioactive over the course of 1,000,000 years. Where would we store this knowing it will become more radioactive?

[045-01, Joan Drake] I write to oppose the construction of the Areva nuclear power plant. I am very concerned that the proposed plant would produce an estimated 320,000 tons of depleted uranium hexafluoride over its licensed lifetime. In view of this, and the fact that its license might well be extended, indications are that this waste would likely be stored in or near Idaho until the plant's decommissioning. Even after its removal and treatment, there is no certain disposal pathway. The Areva plant should not be licensed until regulations are in place for the environmentally safe disposal of large quantities of depleted uranium.

[066-04, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality]
Moreover, the PEIS assumes that once converted the low-level radioactive waste would be disposed of at a commercial low level waste disposal facility:

The Commission has stated that depleted uranium in any form (e.g., UF6, U308) is considered a form of low-level radioactive waste (NRC, 2 005a). However, the chemical reactivity of depleted UF6 precludes it from being a stable waste form, and thus makes it unsuitable for direct disposal without conversion (DOE, 19996). As discussed in Section 2.1.5.1, AES has requested the DOE to accept all depleted UF6 generated at the proposed EREF for conversion to the oxide form for disposal (AES, 2010a) After conversion of depleted uranium tails (depleted UF6) to U308, disposal of this U308 at a commercial low-level waste disposal facility would be a viable option if the disposal facility meets the requirements of 10 CFR Part 61.

However, because this waste will be generated in Idaho it must be shipped to the Northwest Compact facility at Hanford Washington. It is Idaho understands that the Hanford facility is nearing its source term limit and would need an expansion license to accept the ERAES waste. It is possible that this license might not be granted or that the facility might otherwise be unavailable at the time waste is ready for disposal. Moreover Idaho understands that the Energy Solutions facility in Clive Utah, which might otherwise accept the waste, currently will not do so

In light of the current situation at DOE facilities and the potential unavailability of licensed low level radioactive waste disposal facilities, DEQ requests NRC provide more clarity on the environmental risks associated with long term storage and further explain in detail how AES/NRC plans to meet this commitment for DUF6 off site treatment/disposal.

[070-02, Virginia Hemingway] These statistics do not even begin to address the dangerous impact of 350,000 tons of depleted uranium that will be stored in more than three -- 30,000 cylinders, which will be on cement pads above ground. Idaho is already a dumping ground for nuclear waste, and there is no place for it to go. There will be no place for it to go, because there are no plans for this waste to go anywhere.

[078-05, Hon. Wendy Jaquet] Disposal of waste which is huge appears to still be a problem and safety concerns loom.

[083-05, Diane Jones] How can we expect the company to -- whose financial future is uncertain, to be able to guarantee that they will bear the cost of treating all that waste and disposing of all that waste, when the process for disposing of the waste is not even known? This seems highly reckless to me, and not a very sound economical calculation.

[083-07, Diane Jones] And then I think, myself, along with, I think, many members of this audience, wonder how the generation of 350 metric tons of waste, of depleted uranium, for which no known disposal route has been proposed, accepted, whatever, can be regarded as a small impact.

[086-04, Paula Jull] Areva's plant should not be licensed until regulations are in place for disposal of large quantities of depleted uranium.

[088-05, Stan Kidwell] Areva's plant should not be licensed until regulations are in place for disposal of large quantities of depleted uranium.

[095-05, Linda Leeuwrik] Areva's plant would produce 320,000 tonnes of depleted uranium hexafluoride over its licensed lifetime, and its license might well be extended. All this waste would likely be stored in Idaho until the plant was decommissioned. Even after it is removed and treated, there is no certain disposal pathway.

[096-01, Arjun Makhijani] Depleted uranium in large amounts from enrichment plants is not covered by any U.S. environmental rule. The NRC has ruled, as stated in the EIS, that depleted uranium from enrichment plants is low-level waste. However, the low-level waste rule itself, the impacts of large amounts of depleted uranium have not been considered under the low-level waste rule. According to the rule itself, and now according to the U.S. Nuclear Regulatory Commission, which has admitted in October of 2005, and in 2009 started a process of rulemaking as to how and under what conditions disposal of depleted uranium in large amounts from enrichment plants should be carried out.

What does large amounts mean? Large means more than small, and small has been defined as a few metric tons. This facility will produce 300,000 metric tons, approximately, I did a rough addition from the EIS. That is definitely very large amounts of depleted uranium.

I want to read to you what the U.S. National Academy has said about depleted uranium, and its concentrations of radioactivity, which are much, much higher than uranium ore. In fact, they're quite a bit like the transuranic waste you have here in Idaho that the state government has insisted be sent to the Waste Isolation Pilot Plant, and the National Academy, in considering the question of depleted uranium, also shares my own opinion of quite longstanding, which has been presented to the NRC in expert testimony on more than one occasion, that depleted uranium is like the transuranic waste you have here in Idaho, that you don't want in this state, and that you're sending to New Mexico because it is more than 100 nanocuries per gram of alpha emitting long-lived radionuclides that grow in radioactivity over time, because you get Thorium-230 and radium-226. And it's many, many times more radioactive than uranium ore, including its radium and thorium that is present in uranium ore.

The Environmental Impact Statement does not consider the impacts of depleted uranium disposal. And, in my opinion, it does not conform to the NRC regulations, 10 CFR Part 51.71, and it does not conform to the regulations of the Council on Environmental Quality, and it does not conform with the National Environmental Policy Act. And I will read it, but you can find on page 224 that they, essentially, say, if the licensing requirements for land disposal of depleted uranium can be met, then it be disposed of. However, every calculation of disposal of large amounts of depleted uranium but one that has been done has shown that disposal of large amounts in shallow land burial would grossly violate existing regulations by as much as 1,000 times over the radiation dose limit or more, including official calculations, except one done by the NRC in 2009, which did not calculate doses according to the regulation; that is, it did not calculate organ doses.

I won't detain you for long. I am going to submit for the record the comments I have already given the NRC, as an invitee of the NRC to the deliberations on the rulemaking. And I will observe that this particular EIS, the drafters of it have not talked to their counterparts, or appear not to have talked to their counterparts in the section of the NRC that are actually currently engaged in making the rule as to how the depleted uranium should be disposed of. And the author of that paper, SECY 0187, by coincidence, himself, said that calculating doses the way he did for a million years in shallow land burial was "silliness." And then the NRC moderator, like you, said the other day that silliness is perhaps not an appropriate regulatory term, but I take it in that spirit. We could invent some other regulatory equivalent of silliness, but NRC's own invited geochemist agreed that even calculating shallow land burial doses for 10,000 years is not appropriate. This stuff needs to be disposed of in deep disposal. The cost of -- and I'm not saying do it, or don't do it here -- I'm just commenting on the Environmental Impact Statement, and what will be at risk, and what taxpayers might have to do if a private corporation unloads this DU under the Department of Energy, as it can do by law, and it has said it might do. And the Department of Energy takes it, and you're requiring them to put two or two and a half billion dollars out, and my estimate for what it would cost to dispose of 300,000 metric tons of depleted uranium is closer to eight or ten billion dollars. So, who's going to pay that? It's going to come -- everybody who is complaining about the deficit should at least pay some attention to the potential cost of this.…

[105-04, Eve McConaughey] The most glaring question, not addressed or answered concerned the transportation risks and ultimate unresolved problem of waste disposal.

[122-01, Kathy O'Brien] I do not want the waste from this plant here in Idaho or anywhere. It is not clean energy because of the waste both from this plant and from nuclear power plants. Areva's plant would produce 320,000 tonnes of depleted uranium hexafluoride over its licensed lifetime, and its license might well be extended. All this waste might be stored in Idaho until the plant was decommissioned. Even after it's removed and treated, there is no good way to dispose of it.

[150-02, Katie Seevers] The draft EIS assumes that the depleted uranium hexafluoride will not be stored on the site past the license life of the facility. However, it also acknowledges that Areva may apply for a license extension. I find the lack of a fully developed rule on disposal of depleted uranium problematic, especially when coupled with the prospect of seismic activity in the area and the potentiality for a license extension.

[174-01, Christopher Thomas; 198-01, Vanessa Pierce] The classification of depleted uranium for disposal purposes has been a contentious issue that the State of Utah, the Nuclear Regulatory Commission, and other key-stakeholders have worked on for years, and relevant rule-making to govern the disposal of this unique waste is still underway. As such, the assumption in the draft EIS that there will be a disposal pathway for the depleted tails from the AES facility is unfounded.

The draft EIS states that "[t]he depleted UF_6 would be sent to a DOE conversion facility, and then shipped offsite for disposal" (2-25). Given the current NRC rule-making to develop a site-specific analysis for the disposal of large quantities of depleted uranium, and the State of Utah's own requirement for a site-specific analysis for DU disposal, it is premature to assume that depleted uranium will be found suitable for disposal at EnergySolutions' Clive facility or any other facility. Indeed, the standards by which any site could be found "suitable" for the safe, long-term disposal of DU have yet to be codified.

The draft EIS does not explicitly identify any specific site for the final disposal of the converted DU waste. We believe this is in part because no disposal site will currently accept depleted uranium waste for disposal. For instance, note that DU oxide waste from DOE's Savannah River Site (SRS) currently has no disposal pathway

Although there has been some effort to move this waste from South Carolina to the Waste Control Specialists site in Texas, the waste would only be stored there on a temporary basis rather than permanently disposed. Furthermore, the single trainload of SRS DU waste that made its way to the Clive site is also being held in temporary storage until the completion of a site specific analysis in accordance with Utah Rule R313-25-8 - Technical Analyses.

If disposal at a DOE site were indeed a “plausible strategy” as noted in the EIS (2-25), the DOE would simply send this DU waste to one of its other disposal sites. The fact that DOE has been forced to look at temporary storage options for the SRS DU appears to be prima facie evidence that DOE has no disposal option. In light of recent events, the NRC Commission’s decision that disposal of DU waste at a DOE site is a “plausible strategy” must be re-evaluated.

We believe the Draft EIS is deficient because it assumes that converted DU tails will have a disposal pathway, when in reality the most recent evidence indicates that this waste could indeed become an orphan waste stream, similar to the SRS DU. We believe that the final EIS should assess what would happen if there is not a disposal pathway for the converted DU tails. This assessment should address at least the following issues: how the DU tails would be managed, the health and environmental risks of such management, who would manage them, and at what cost. We believe these are critical issues that must be considered and addressed, given that DU disposal is not currently feasible, and may not be feasible for the next many years, especially if most or all near-surface disposal sites are eventually found to not be protective of human health and the environment in the long-term.

[136-01, Susan Rainey] No uranium enrichment facility outside Id Falls by AREVA!!! The transport of radioactive material and the storage of nuclear waste are my biggest concerns. There are safety issues! We will be at risk. How will the waste be disposed of? Snake River Alliance did an excellent job explaining. NRC sounded like bureaucratic babble ignoring the real dangers and concerns. How is this really going to help us here in Idaho, USA? Let’s look at other options. Not worth the risk.

[148-01, Eric Schuler] Taken as a whole, the EIS suggests that this facility will have a relatively low impact on the environment. Of course several aspects of this, of the — have been overlooked in making this conclusion. For instance, as others have already noted, it does not consider the impact of the exempted preconstruction activities, the high risk of wildfires in the area, or the lack of an appropriate disposal pathway for depleted uranium. Accordingly, the true impact of this facility is certainly larger than the DEIS suggests.

[150-03, Katie Seevers] I find the lack of a fully developed rule on disposal of depleted uranium problematic, especially when coupled with the prospect of seismic activity in the area and the potentiality for a license extension.

[153-07, Andrea Shipley; 197-07, Andrea Shipley, on behalf of the Snake River Alliance] This is not to mention the lack of a fully developed rule on disposal of depleted uranium in the US, leaving no pathway for disposal of this waste, and a line of already existing depleted uranium hexafluoride waiting for deconversion.

[169-01, Margaret Stewart] And aside from AREVA’s greed, grim, and very, very devastating global environmental and human rights record around the world, particularly in Africa, I vehemently oppose the NRC licensing of this facility on grounds that the facility has not been proven necessary, a huge amount of dangerous radioactive waste that would be created has no disposal place, the nuclear reactors that the EIS says will need AREVA's product more than likely will never be built.

[168-03, Lon Stewart] …We will probably get 350,000 tons of uranium waste over the life of the facility that no one currently knows how to dispose of….

[168-06, Lon Stewart] The Areva plant is not needed in the United States or the world. We would be adding to a waste that we currently have more than we know what to do with, do not know how to safely store it, and have no idea if what we think will work will actually work for 1 million years. This doesn't sound good to me.

[171-05, John Tanner] The question of disposal of depleted uranium I suppose was left out of the Environmental Impact Statement because that's not really going to be an AREVA, or an Idaho problem. The depleted uranium that we produce will not be in the form that's suitable for disposal; that is, if the nation wants it disposed of, it will have to be shipped out of state to a conversion plant to convert the fluoride form to the oxide form, which, by the way, is the form that it is when it's an ore. And then it will be a problem for the Department of Energy, and possibly for the conversion plant which will be out of state.

[175-04, Ellen Thomas] Areva's plant would produce 320,000 tonnes of depleted uranium hexafluoride over its licensed lifetime, and its license might well be extended. There is no certain disposal pathway.

[180-08, Kaye Turner] Is it true the NRC has stated a whole new regulatory scheme has to be developed to guide in the disposal of depleted uranium?
Is it true that no country on earth that enriches uranium knows how to dispose of the depleted uranium?

[181-01, Roger Turner] So now comes a proposal to create and store 350,000 tons of uranium compounds at eastern Idaho. Setting aside the radiation risk, uranium compounds exhibit a similar heavy metal toxic characteristics as does mercury. So, why now is there support for uranium enrichment project, for which there is no repository outside of Idaho?

[191-13, Liz Woodruff] The lack of a fully developed rule on disposal of depleted uranium creates great uncertainty about the disposal pathway for this waste

[192-13, Lisa Young] The storage of the depleted uranium waste, which will likely not be deconverted in any reasonable timeline, poses a serious risk to our health and safety as Idahoans, and to the residents of any other region where the waste will be stored in the future. Even after proper deconversion of this waste, the remaining waste, which cumulatively becomes more of a radioactive threat over time, has nowhere to go for acceptable long-term storage, and will continue to plague our waste storage sites with more and more barrels of poison, creating more and more of a health and safety risk for the surrounding communities. *Producing this waste is irresponsible, and licensing a facility that will do just that is undeniably irresponsible.*

[193-03, Liz Woodruff, on behalf of the Snake River Alliance] And we believe that the storage of this radioactive waste, on site, in Idaho, poses an insurmountable risk to the licensing of this facility. The enriched uranium then travels to a conversion facility, once again transported, and then it's transported again to a reactor, where high-level radioactive waste in the form of spent fuel is the result.

So how much waste is produced in the enrichment of uranium? Well, for one ton of enriched uranium, seven tons of depleted uranium waste are produced, and this is a picture of depleted uranium hexafluoride waste stored in Piketon, Ohio. You can see in the rusty cylinders on concrete slabs. It's been sitting there for decades because the NRC has not established an adequate disposal pathway for depleted uranium….

And the NRC has recently acknowledged this fact, and started a rule making process around the disposal of depleted uranium meant to reclassify it, essentially, and find an adequate disposal pathway.

So what have they decided? The NRC still wants to dispose of depleted uranium in shallow dumps designed for a few hundred years. This is an inadequate disposal pathway. It has not yet been an established rule it's a waste stream that becomes more radioactive, over time. There are no deconversion facilities, and thus, it will be sitting above the Snake River aquifer for decades.

Areva would add 320,000 metric tons of DUF6 to the current amount.

Response: *As discussed in Sections 4.2.11 and 4.13.4 of the EIS, AES intends to transport depleted UF_6 to DOE facilities after temporary onsite storage for conversion and disposition by the DOE (AES, 2010a), pursuant to Section 3113 of the 1996 USEC Privatization Act, 42 U.S.C. 2297h-11. On January 18, 2005, the NRC stated that, pursuant to Section 3113 of the USEC Privatization Act, disposal at a DOE facility represents a plausible strategy for the disposition of depleted uranium tails (NRC, 2005).*

As stated in Section 4.13.3.5, DOE intends to reuse the conversion product to the maximum extent possible or package it for disposal at an appropriate disposal facility (DOE, 2004a; DOE, 2004b; DOE, 2007a; DOE, 2007b; 72 FR 15870). DOE wastes disposed at DOE owned and operated facilities are not subject to NRC or Agreement State licensing authority.

According to DOE Directive 435.1-1, if a non-DOE facility (e.g., a commercial facility) is used for disposal of low-level radioactive waste, an exemption from DOE's policy of using only DOE disposal facilities to manage radioactive wastes must be obtained (DOE, 2001). To obtain the exemption, it must be shown that the non-DOE disposal facility complies with applicable Federal, State, and local requirements, and has the necessary permits, licenses, and approvals for the specific wastes to be disposed.

Commercial radioactive waste disposal facilities, in contrast to DOE disposal facilities, are licensed by the NRC or designated Agreement State according to the requirements specified at 10 CFR Part 61 or compatible Agreement State regulations. Currently, the NRC is engaged in rulemaking to specify a requirement for a site-specific analysis for the disposal of low-level radioactive wastes, including large quantities of depleted uranium (NRC, 2009). In the interim, *compliance with the performance objectives specified in 10 CFR Part 61, Subpart C, continues to provide reasonable assurance that low-level radioactive waste, including depleted uranium, can be safely disposed at licensed facilities. On April 13, 2010, NRC staff summarized existing policy and guidance to assist Agreement States in making informed decisions regarding compliance with the performance objectives for land disposal of significant quantities of depleted uranium until a new regulation is implemented (NRC, 2010a).*

I.5.19 Socioeconomics

Comment: The following comment asserts that economic risk should be given a higher priority in the EIS.

[050-13, Joanie Fauci] The economic risk should be given a higher priority in the EIS.

Response: *The extent of the analysis of each resource area considered in the EIS is dependent on its overall impact. As shown in Section 4.2.12 of the EIS, the NRC staff has determined that the socioeconomic impacts of the proposed action would be SMALL. Therefore, additional review is not warranted.*

Comment: The following comment outlines AES's position on the funding of the EREF project.

[128-08, Bob Poyser] Finally, let it be made clear. The Eagle Rock enrichment facility is being fully funded through direct investment by AREVA, and like any major capital project, the balance will be financed through a loan accompanied by interest charges, repayment schedules, and certain protections for the lender.

AREVA will bear the full cost of construction and operation of the Eagle Rock enrichment facility. Even the removal of depleted uranium from the site is accompanied by a payment to the deconversion facility for its services.

In the final analysis, AREVA will bear the full cost of construction and operation.

Response: *The NRC acknowledges the comment.*

Comment: The following comment expresses EPA's interest in any information on how Tribes' economic conditions would be enhanced because of the project.

[138-09, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] Since the project would result in economically beneficial impacts to the region, EPA would be interested in any information on how Tribes' economic conditions would be enhanced because of the project.

Response: *The socioeconomic impacts, beneficial or otherwise, on the Shoshone-Bannock Tribes was included with the socioeconomic benefits to the citizens of Bannock, Bingham, Caribou, and Power Counties, in which the tribes' reservation is located and most of the tribal members in the region are believed to reside. It would be difficult to predict the specific benefits* *to, or enhancement of economic conditions of, the Tribes because of the difficulty in predicting such factors as the number of tribal members who might be employed in some capacity by the project.*

Comment: The following comment asserts that the Socioeconomics part of the EIS has not been given enough weight.

[146-02, Doug Sayer] So I want to point out in your EIS, when it comes to the socioeconomical portion, that there is a piece that I don't think carried enough weight. You know, in the history of nuclear energy in the last few years in the United States, the supply chain has broken down. As we haven't had construction projects, it's deteriorated. I want to assure you, that's not the case in Idaho. That network of suppliers is accredited, that understands the Code of Federal Regulations, that understands safety significance, is alive and well. We encourage you to pursue this license and approve it, so that we can get back to work and build these nuclear projects like our country needs them.

Response: *The NRC staff acknowledges this comment and the technical expertise located in the project area. The site selection process used by AES, as discussed in Section 2.3.1.3 of the EIS, took the available construction and operations workforces into consideration as well as the available technical resources. The analysis of the socioeconomic impacts took into account the occupations likely to be required during construction and operation of the facility, and compared them to the number of workers present in these occupations in the 11-county Region of Influence (ROI) surrounding the site of the proposed facility. This information was then used to estimate the number of in-migrating workers and their families likely to reside in this ROI, and the potential impact in-migrants may have on housing, and on public and educational services. The relatively small number of in-migrants likely to move into the ROI during these phases of the project, and the likelihood that most in-migrants and their families are likely to live in urban areas in this ROI, where there are good housing and educational choices and adequate existing public service provision, will likely mean that the incremental impact of worker in-migration on the provision of these resources in the ROI would be SMALL.*

Comment: The following comment expresses disagreement with the conclusions in the Draft EIS on the socioeconomic effects of the proposed project.

[150-08, Katie Seevers] This concerns me, as does the prospect of an artificial local economy supported by an unsustainable factory. In reference to table 2-6 of the draft EIS, I would like to contest the conclusions drawn on the socioeconomic effects of the facility. Once it is decommissioned, this area could very well resemble, economically speaking, so many of Idaho's logging towns once the mill has been closed down. Tax dollars will be long gone, the local area will quite probably be left with waste from the facility, and jobs that supported local residents will be nonexistent.

Response: *In-migration of workers and their families associated with preconstruction, construction, and operation of the proposed facility may require more teachers and other local public service employees. However, the relatively small number of in-migrants likely to move into the 11-county ROI during these phases of the project, and the likelihood that most in-*

migrants and their families are likely to live in urban areas in this ROI, where there are good housing and educational choices and adequate existing public service provision, will likely mean that the incremental impact of worker in-migration on the provision of these resources in the ROI would be SMALL, and unlikely to create "boom-bust" conditions. These impacts are described in Section 4.2.12 of the EIS.

Comment: The following comment questions the science and environmental research supporting the analysis of impacts in the Draft EIS, including socioeconomic impacts.

[181-02, Roger Turner] And what is the science and environmental research behind the endorsement of the AREVA project? Well, science and environmental risks are being downplayed on this proposed project, because of job creation, and economic development.

Response: *The NRC staff believes it has provided an objective analysis in the EIS for all resource areas, based on the requirements of NEPA and the NRC regulations for implementing NEPA in 10 CFR Part 51. In the case of job creation and economic development, the socioeconomic impacts, beneficial and adverse, were found to be SMALL as presented in Section 4.2.12 of the EIS. Such a finding does not downplay the adverse impacts found in other resource areas with SMALL-to-MODERATE or MODERATE impacts.*

Comment: The following comment expresses concern about the negative impact of the proposed project on opportunities for hunting and fishing, due to the influx of people into the area.

[183-05 and 183-12, James Vincent] My other main concern is personal. I live to hunt and fish in Idaho. It is the main reason I love this state. I believe my opportunities to hunt and fish will be severely limited if 1000 new residents are brought into Idaho Falls to work at this facility. There will be many less opportunities to successfully apply for big game permits, and my favorite rivers will be impacted with crowding. Already, there is talk of limiting the number of boats on the South Fork of the Snake River. I am not the only resident who values Idaho outdoor activities, and sustained controlled growth for the quality of Idaho life. I believe many of my neighbors also live in Idaho Falls for the same reason.

Response: *Two hundred and sixty-six new temporary residents are expected in the 2-county ROI, consisting of Bonneville and Bingham Counties, during the construction and 199 permanent residents are expected during operation of the proposed EREF, as discussed in Sections 4.2.12.2 and 4.2.12.3 of the EIS. In general, the resulting impacts from the additional residents would be SMALL, and the impact of these residents on the total number of big game licenses issued by the State would also likely be SMALL.*

Comment: The following comments suggest that jobs and economic impacts should not be considered in the EIS.

[008-01, Carol Bachelder] I know that this was an attempt to limit the discussion to the environmental impact, but we have strayed, haven't we? Into jobs and economic projection.

[087-04, Dennis Kasnicki] Comment 3: This was a meeting on the Draft EIS…. I think ALL of the attendees who commented in favor of this facility (perhaps in particular the “dignitaries” or their representatives who commented) spoke from the standpoint of the potential economic benefits of this plant to the area. Those comments were “off subject” and therefore distracting and very inappropriate. I suppose this was a forum where anyone is free to say mostly anything, but that IS a serious distraction and therefore a problem.

[106-05, Ted McConaughey] I think -- and as for jobs, I feel this is a fallacious argument that should not be entertained in the environmental review process, because this is not a hearing on jobs. As far as jobs goes, I think that any time we dedicate ourselves to building one facility, especially something as massively expensive as this, we deprive ourselves of the opportunities to build alternative facilities. That money is not going into research, and wind, or solar, or biomass, or whatever. It’s going into a single source, and we don’t have that money back, so -- and any one of those sources would produce jobs. So I really would like to take the jobs issue off the table. That’s not to say it’s unimportant, but it is to say that whatever we do, we will be creating those jobs, and they will not be lost.

Response: *The economic impacts, including any benefits such as job creation, of the proposed EREF are considered in the EIS analysis as presented in Section 4.2.12. While it is true that other endeavors may produce jobs, the creation (or loss) of jobs is an integral part of the socioeconomic impact analysis, as required under NEPA and the NRC’s NEPA-implementing regulations in 10 CFR Part 51, and is not “off subject.”*

Comment: The following comments address the issue of the influence of the proposed EREF on future economic activity.

[147-16, Joey Schueler] 12. Even if one cannot accept that nuclear waste in Idaho could prove hazardous, the sheer notion that a nuclear plant exists and nuclear waste resides and is transported in our borders is a deterrent to other commercial interests and could hamper other major industries from choosing Idaho as a site to locate their business, due to poor “livability” incentives for their employee base.

[184-04, Kitty Vincent] They say the project will create jobs. Well, what might be lacking are creative entrepreneurs who can help the Idaho Falls job market as my husband and I did when we moved a fly line company to the city in the late 1990s. Idaho Falls has the potential to be a major center for green energy products and projects. I have heard that most of the supposed 1000 jobs will actually be for people who are brought in to work on the project whose qualifications meet the unique technical level of skill needed. Also, I truly believe property values will be damaged by the presence of this facility as will the influx of new business. Who in their right mind would come to a city that has a nuclear facility eighteen miles to the West at the foot of one of the most active seismic areas in the country? Especially a facility that is owned and managed by a company that has a history of problems?

Response: *In addition to the 590 direct jobs created at the proposed facility during the peak year of construction, and the 550 direct jobs created during operations, the proposed EREF is expected to produce 1097 indirect jobs in the 11-county ROI during the peak year of construction and 2739 indirect jobs in this ROI during operations. On the other hand, while* *there is no clear evidence to suggest that industrial and commercial plants and facilities are averse to locating in areas with existing or proposed nuclear facilities, there is some evidence to suggest that the perception of nuclear facilities may affect local property values, providing an incentive for entrepreneurs and employees in some companies to look elsewhere for locations for new plants and facilities. Text has been added to the EIS in Section 4.2.12 to summarize these findings.*

Comment: The following comments express concern that the economic boost given to the region is only temporary and that long-term impacts to the citizens of Idaho could be adverse.

[032-06, Cindy Cottrell] The jobs that this plant will produce will be few in comparison to the cost of allowing it here. Maybe 300 people will get jobs that will not last forever, but only for the lifetime of the plant. Right now it will cost tax payers would have to loan Areva $2 billion. Other types of energy would be much more worth the taxpayer's money. That's a lot of money for 300 jobs and waste to manage forever. Other kinds of energy that is less risky would be better to invest in.

[050-05, Joanie Fauci] Another area I am very concerned about is economics.

• Many testifiers at the hearing were from the Idaho Falls area. They want jobs. They want jobs now. They don't care about the future and their children's future in that area. Bringing nuclear material to that area, with unknown future removal of it, is very short sighted. We should not be sacrificing jobs now for a ruined environment for the rest of human life.

[184-06, Kitty Vincent] The idea that this will boost the economy of Idaho is short sighted. Affected could be the lives of the future citizens in Idaho and the West.

[189-01, Josh Well] These jobs are temporary and nuclear waste is forever.

Response: *In addition to the 590 direct jobs created at the proposed facility during the peak year of construction and the 550 direct jobs created during operations, the proposed EREF is expected to produce 1097 indirect jobs in the 11-county ROI during the peak year of construction and 2739 indirect jobs in the 11-county ROI during operations. On the other hand, in Section 4.2.10 of the EIS, the NRC staff determined that impacts on human health from preconstruction, construction, and operation of the proposed EREF would be SMALL. It was determined in Section 4.2.11 that impacts from waste management, including the removal of all radioactive material and waste from the proposed EREF by the end of the license period, would also be SMALL.*

Comment: The following comments address the magnitude of the impact of employment, income, and tax revenues, suggesting that the positive impacts are larger than those presented in the EIS.

[041-02, Hon. Tammy de Weerd; 156-02, Robert Simison, on behalf of Hon. Tammy de Weerd] We do feel that taking the "no action alternative" is not a viable option for the State of Idaho, and believe, just by looking at the socioeconomic impacts, as others have stated, is valid reasons why we should move this project forward. I just want to specifically point out that, you know, while the draft EIS does list it as a small impact, due to the criteria that was used, in the State of Idaho, that part of the region, the 11 counties over there, it is really not a small impact. It has a tremendous impact, here, in the state, and we believe, as a city, that this will also impact this side of the state, here, in the Treasure Valley, as we try to work more and more with the products and services that are coming out of INL, and hope that there will be partnerships that will come from the private industry as well as the research that's currently being done at INL, that may answer questions that many people still might have about nuclear energy and depleted uranium in the future. I think this could be a good partnership for the area.

[098-03, Linda Martin] The Regional Development Alliance has done several impact studies, which have been noted in previous instances, and the positive local impact of diversifying the tax base in Bonneville County is significant. Whereas the current annual tax rolls may reflect an annual property tax income of a few hundred dollars, the Eagle Rock Enrichment Facility would bring in approximately $4 million.

We are looking forward to the thousands of jobs during the various phases. While all human jobs and endeavors are subject to risk, this risk outweighs, by far -- I mean, this risk is outweighed, by far, by the benefits of this project.

As an economic development agency, we are already receiving inquiries from projects interested in this project, seeking to open new offices, and train and hire new employees.

This is a great thing for the economic health of our community and the State of Idaho. Quoting testimony from the December 08 hearing in Idaho Falls: “We don't need a bailout. We need AREVA.”

[098-10, Linda Martin] The Regional Development Alliance conducted an IMPLAN economic impact study regarding AREVA's Eagle Rock Enrichment Facility decision to locate in eastern Idaho. The combined phases, for the purposes of this analysis, are expected to cover a multiyear period (30-35 years) across three phases of development (design, construction, operation) and would number in excess of $5 Billion in total output.

The positive local impact of diversifying the tax base in Bonneville County, is significant. Whereas the current annual tax rolls may reflect an annual property tax income of a few hundred dollars, the Eagle Rock Enrichment Facility would bring in approximately $4 Million.

As an economic development agency, we are already receiving inquiries from companies interested in this project, seeking to open new offices, and train and hire new employees. This is a great thing for the economic health of our community, and the state of Idaho. We are looking forward to the thousands of jobs during the various phases of the project. And while all human jobs and endeavors are subject to risk, this risk is outweighed by the benefits of the project.

Quoting previous testimony in December, 2008 from Rich Cartney “We don't need a bailout, we need AREVA!”

[124-02, Lane Packwood] There is one -- I'd like to echo the comments of some of the other speakers here tonight. We are somewhat surprised that the EIS finds that the economic and fiscal benefits associated with the project to be small, and I think I just -- we -- we disagree that it's small. It is, in fact, enormous. And just to put some perspective on the impact of this project, just taking the numbers from peak facility construction alone, direct employment, 590 jobs, that would decrease unemployment in the two county ROI by 10 percent. There's only 5100 unemployed workers in Bonneville and Bingham County. 590 jobs is an enormous impact. In fact, the roll-up of all the jobs of the four phases examined nearly 3300 jobs. Just this project alone would move Idaho unemployment by one-half a percent. So that is non-negligible impact on employment in this state. The same with income generated by the project.… So, for example, just the income generated by the 11 years leading up to full operation, just the construction phases, is half a billion dollars, and that's almost five and a half times what the estimate here, in Table 4-27, lists. The same with property taxes. Just a tremendous impact on the economy. 2.8 million in income taxes generated, 6 million in sales and use taxes, 5.3 million in property taxes. When the facility is operational, it'll be paying something like 3.5 million in property taxes. Now Bonneville County only collects 23.8 million now, and just put that in some perspective. What does that mean to a local economy? You know, 3.5 million is 58 teachers, each year, year after year, just the average -- and that's the average salary, that's not starting salary of teachers in Idaho. Fifty-eight. So I guess our point here tonight is just to encourage the NRC to take a look at the economic impact, and to understand what a -- what a -- the scale of the project, and we've heard various estimates of the overall cost, the capital expenditures, 2, 3, 4 million. Let's just say it's 3.5 billion. Let's just say that's the cap X of the project. Well, the economy of the State of Idaho, the GDP is only 52 billion. That's 6.6 percent of our state GDP. On a federal level, if we were to compare that to what size federal project would represent 6.6 percent of federal GDP, AREVA is to Idaho what a $947 billion project out be to the national economy. And that's bigger than the stimulus. So certainly not small in its impact.

[164-01, Timothy Solomon] The Regional Development Alliance is experienced in doing economic impact analysis, and I want to congratulate you on the socioeconomics portion of the EIS, which I'm going to address throughout my comments. We subsequently ran an additional analysis based upon your numbers in the EIS, to see how those came out, and those job numbers are "right on" in our estimation.

The job creation numbers for a region of this size are quite substantial. They are not an insignificant impact on the state and on our region. 308 preconstruction jobs and 1,687 construction jobs will impact Idaho, in a very positive way, over the years in which those activities take place. 3,289 direct, indirect, and induced jobs are also very, very significant throughout the operational period.

The direct output effects of more than 315 million in the first full year of operations is not a small impact, and provides a substantial base of potential business for local suppliers, service providers, and sole proprietors, a very important part of our economy. Even if the output remains static over a 20 year period, using the numbers in the EIS, the region would have a base of 6.3 billion in total direct East Coast activity from which to draw for those business opportunities over that operational period.

We do urge the NRC to take another look at your labor income numbers. We think they may be slightly less than a project of this size, and a region of this size merits. However, if you just take the 92.4 million that is outlined in the EIS, if you take that out over a 20 year operating history, assuming no year-to-year change, we estimate nearly $2 billion of labor income along on that side of it.

The economic impact of AREVA's $2 billion investment in Idaho is driven by capital investment that leads to job creation. The Eagle Rock enrichment facility location in eastern Idaho is absolutely critical to the economic vitality of the region. Real property has improved and begins yielding tax revenues at a much higher level. New investments are made in tangible personal property that keeps our manufacturing and processing capabilities and our job infrastructure on the leading edge. Jobs are created; dollars are spent in the local economy. Business to business and business to consumer transactions increase, real per capita income increase, tax revenues throughout the area of impact, both direct and indirect, to the investment, increase, and the general economy of the entire state is strengthened. And with that, we highly encourage you strongly support the issuance of a license.

[165-01, Hon. Lee Staker] I won't get into a lot of details, other than to say the tax base of Bonneville County is about $5.9 billion, and you start looking at this as a tax base. Even though the full taxes won't be from that, it is significant to Bonneville County.

Response: *Although the employment, income, and tax revenues created by the preconstruction, construction and operation of the proposed facility may appear to be large, when compared to the size of the economic and fiscal baseline of the 11-county ROI, the employment impacts are SMALL. As discussed in Section 4.2.12 of the EIS, changes in total (direct and indirect) employment during the peak year of construction would amount to less than 1 percent of total employment in the 11-county ROI. While the commenter is correct that impacts are presented for discrete intervals for construction, preconstruction impacts occur only in one year (2012), and operations impacts would be the same in each year beginning in 2022. Chapter 7 of the EIS (Benefit-Cost Analysis) provides the total (i.e., summed over all years of the project) employment, income, and fiscal impacts of the project. Labor income data and assumptions used in the analysis of impacts have been verified.*

Comment: The following comments address the issues of financial incentives, including tax breaks and the highway overpass grant, provided by the State of Idaho.

[050-08, Joanie Fauci] The State of Idaho has had to cut budgets everywhere. Yet somehow they found money to loan to Areva and also provide tax breaks. This is wrong! I am mad that my tax dollars have already been given to this project.

[180-02, Kaye Turner] Is it true the state of Idaho, i.e., the taxpayers are giving this company huge tax breaks to build this nuclear plant?

[098-02, Linda Martin] Under economic impacts, there are no Idaho taxes directly going to support the construction of this facility. As a group which encouraged the grassroots statewide support of the legislation, it should be noted that it not only applies to AREVA, but to any other new capital investment of similar magnitude. These are earned benefits to any company which chooses to invest in Idaho, of similar monetary amounts. The DOE issued a federal loan guarantee, not a federal loan. This was based on the technical ability and the creditworthiness of AREVA, currently a U.S. corporation.

[098-09, Linda Martin] Economic Impacts: There are NO Idaho taxes directly going to support the construction of this facility. As a group which encouraged the grassroots statewide support of the legislation, it should be noted that it not only applies to AREVA, but to any other new capital investment of similar magnitude. These are *earned* benefits to companies choosing to invest in Idaho. The DOE issued a federal loan guarantee – not a federal loan. This was based on technical ability and financial credit worthiness from AES, and American corporation.

[106-03, Ted McConaughey] Another concern I have here is this idea that government should subsidize these industries, and we have Bob Poyser from AREVA saying, in quotes here: "AREVA will bear full costs." And so far, they have not. So far, the state throws in money for the 'interchange for nowhere' and there's other subsidies that come, right and left. And I think that even the Tea Party people ought to be upset about these government facilities for this construction here. We all ought to say no--AREVA should be funding this stuff, not the government.

[150-06, Katie Seevers] My final concern I would like to address tonight are the economic implications associated with this facility. The company who is creating this facility is French, and its production of enriched uranium in the United States does not result in domestic control of that product as addressed in the draft EIS, section 2-17. In spite of this, the State of Idaho has "bent over backwards," awarding tax exemptions funded by Idaho taxpayers. Additionally, the Department of Energy has provided a $2 billion loan guarantee with more of our tax dollars, and then, to top all of this off, Idaho Department of Labor and Commerce granted $750,000 towards an overpass. Perhaps we could just write everybody in Bonneville County a check. All the same, a substantial portion of our state and federal tax dollars are being allocated towards a facility which will be decommissioned within 30 years.

[182-03, Brianna Ursenbach] Assuming that the U.S. uranium fuel supply is insecure, it is clear that the EREF will not fix it, and although it is not specifically related to the EIS, it is worth noting that the federal and state tax dollars are being used to subsidize this project. Thus EREF provides no tangible security improvements to the American people, but it does lay a financial burden on them.

[183-04, James Vincent] My other issue is about estimates of uranium throughout the world. The research I have done shows that there's somewhere between 50 years at the low end, and 100 years on the optimistic side. Why would we utilize a technology that costs literally billions of dollars to implement, with public tax dollars for a loan guarantee, and I realize that it is a guarantee, and Idaho tax incentives for a limited time technology? Even 100 years is not very long, as far as reserves.

[183-11, James Vincent] My research has found known estimates world wide of uranium somewhere between 50 years on the low end and 100 years on the optimistic side. Why would we utilize a technology that costs literally billions of dollars to implement with public tax dollars for a loan guarantee and Idaho tax incentives for a limited time technology, Even 100 years is not very long as far as reserves.

[184-07, Kitty Vincent] Areva's proposed Eagle Rock Enrichment Facility (EREF) will store radioactive waste above the sole source aquifer for nearly 300,000 people; impact sensitive species; require the transport of radioactive materials; impair the Hell's Half Acre National

Monument; support destruction of the John Leopard homestead, which has been recommended for the National Register of Historic Places; devour billions of dollars in state and federal largess; and obliterate farmland that is potentially protected by the federal government. The Alliance is here to say it is not worth the risk.

[191-25, Liz Woodruff] State and federal largess. • In 2008, the state of Idaho showered Areva with huge tax breaks funded by Idaho taxpayers, including a cap on property tax valuation at $400 million and unnecessary sales tax exemptions….

• Not convinced the state had already done enough, the state Departments of Labor and Commerce gave Areva $750,000 to help offset the cost of a highway interchange at its site, even though the project hadn't been approved by the NRC and sidestepping traditional Idaho Transportation Department review.

Response: *The NRC staff acknowledges these comments. However, the tax issues discussed in the comment above are not issues in which the NRC is involved.*

Comment: The following comments concern the DOE loan guarantee.

[032-06, Cindy Cottrell] The jobs that this plant will produce will be few in comparison to the cost of allowing it here. Maybe 300 people will get jobs that will not last forever, but only for the lifetime of the plant. Right now it will cost tax payers would have to loan Areva $2 billion. Other types of energy would be much more worth the taxpayer's money. That's a lot of money for 300 jobs and waste to manage forever. Other kinds of energy that is less risky would be better to invest in.

[050-07, Joanie Fauci] • The State of Idaho has had to cut budgets everywhere. Yet somehow they found money to loan to Areva and also provide tax breaks. This is wrong! I am mad that my tax dollars have already been given to this project.

• I have read that loan guarantees are frequently defaulted on. With the existing track record of these, the US government/NRC, should not be offering any to Areva or any other company.

[098-02, Linda Martin] Under economic impacts, there are no Idaho taxes directly going to support the construction of this facility. As a group which encouraged the grassroots statewide support of the legislation, it should be noted that it not only applies to AREVA, but to any other new capital investment of similar magnitude. These are earned benefits to any company which chooses to invest in Idaho, of similar monetary amounts. The DOE issued a federal loan guarantee, not a federal loan. This was based on the technical ability and the creditworthiness of AREVA, currently a U.S. corporation.

[098-09, Linda Martin] Economic Impacts: There are NO Idaho taxes directly going to support the construction of this facility. As a group which encouraged the grassroots statewide support of the legislation, it should be noted that it not only applies to AREVA, but to any other new capital investment of similar magnitude. These are *earned* benefits to companies choosing to invest in Idaho. The DOE issued a federal loan guarantee – not a federal loan. This was based on technical ability and financial credit worthiness from AES, and American corporation.

[103-06, Karen McCall] Areva wants US Federal loan guarantees in the amount of $2 billion dollars. US taxpayers would get far more energy for that money spent on renewables. An analysis by Idaho Power shows that nuclear power would cost significantly more per megawatt hour than wind, geothermal and biomass.

[145-02, Ann Rydalch] I urge the NRC to continue to listen to scientific facts and to disregard untruthful or scare tactic statements, statements such as DOE is giving $2 billion loan guarantee, a misleading statement, because no money exchanges hands. DOE is not giving AREVA the 2 billion dollars. However, by it being included in the Loan Guarantee program, AREVA and other companies in that program will be able to possibly receive lower interest rates. It's like the Good Housekeeping Seal of Approval.

[154-03, Diana Shipley] They are asking for loan guarantees from the United States government and I wonder who will be left to clean up the waste and pay the bills if they bail out?

[157-06, Hon. Erik Simpson] I'd like to address some misconceptions I've read in Idaho's newspapers, and read on the internet about this project. First, financing. AREVA was recently awarded a $2 billion loan guarantee by the Department of Energy. First, a federal loan guarantee is not a taxpayer loan. It is not a bailout. A federal loan guarantee allows a company like AREVA to secure a loan from a lender with the credit backing of the United States Government. This arrangement allows a company to secure a better interest rate.

[168-02, Lon Stewart] Areva, a French government owned company, should not be subsidized by the United States to build and operate a plant in the United States. What logical business person would loan a foreign company $2 billion dollars to build a plant that WILL have cost overruns while under construction, where similar projects have a loan default rate of 50%, where the company can declare bankruptcy and just leave the US., and the company does not pay any royalties to the US? Doesn't sound good to me.

[180-01, Kaye Turner] I have nothing but questions that I hope will be answered honestly and accurately before Areva is given permission to build their plant. Is it true the U.S. government, is giving this company a $2 billion loan guarantee to build this nuclear plant? And if Areva fails, we the tax payers pick up the tab?

[182-03, Brianna Ursenbach] Assuming that the U.S. uranium fuel supply is insecure, it is clear that the EREF will not fix it, and although it is not specifically related to the EIS, it is worth noting that the federal and state tax dollars are being used to subsidize this project. Thus EREF provides no tangible security improvements to the American people, but it does lay a financial burden on them.

[183-04, James Vincent] My other issue is about estimates of uranium throughout the world. The research I have done shows that there's somewhere between 50 years on the low end and 100 years on the optimistic side. Why would we utilize a technology that costs literally billions of dollars to implement, with public tax dollars for a loan guarantee, and I realize that it is a guarantee, and Idaho tax incentives for a limited time technology? Even 100 years is not very long, as far as reserves.

[183-11, James Vincent] My research has found known estimates world wide of uranium somewhere between 50 years on the low end and 100 years on the optimistic side. Why would we utilize a technology that costs literally billions of dollars to implement with public tax dollars for a loan guarantee and Idaho tax incentives for a limited time technology, Even 100 years is not very long as far as reserves.

[184-07, Kitty Vincent] Areva's proposed Eagle Rock Enrichment Facility (EREF) will store radioactive waste above the sole source aquifer for nearly 300,000 people; impact sensitive species; require the transport of radioactive materials; impair the Hell's Half Acre National Monument; support destruction of the John Leopard homestead, which has been recommended for the National Register of Historic Places; devour billions of dollars in state and federal largess; and obliterate farmland that is potentially protected by the federal government. The Alliance is here to say it is not worth the risk.

[187-05, John Weber] Also, the US citizens bear most of the risk by giving the French company multiple tax benefits and loan guarantees. Is it true the estimated cost of decommissioning the plant is 3.5 billion U.S. dollars?

[191-26, Liz Woodruff] Warned by Areva that it probably wouldn't build the enrichment factory without US taxpayer support, the Department of Energy reached into your pockets to grant the French-owned company a $2 billion loan guarantee.

Response: *Section 1703 of Title XVII of the Energy Policy Act of 2005 authorizes the DOE to support innovative clean energy technologies that are typically unable to obtain conventional private financing due to high technology risks. In addition, the technologies must avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases. Technologies considered include: biomass, hydrogen, solar, wind/hydropower, nuclear, advanced fossil energy coal, carbon sequestration practices/technologies, electricity delivery and energy reliability, alternative fuel vehicles, industrial energy efficiency projects, and pollution control equipment. DOE's mission is to accelerate the domestic commercial deployment of innovative and advanced clean energy technologies at a scale sufficient to contribute meaningfully to the achievement of national clean energy objectives. A loan guarantee is a contractual obligation that the Federal Government will cover the debt obligation in the event of a default. In May 2010, the DOE issued a conditional commitment for a Federal loan guarantee to AES for the proposed EREF. The award of the loan guarantee is contingent on a number of conditions being met prior to loan closure, including issuance of the NRC license for the EREF. More information on the DOE loan guarantee program is available at http://lpo.energy.gov/?page_id=29.*

Comment: The following comments stress the importance of the economic boost that the proposed EREF would have on the Idaho Falls area and the region.

[026-02, Rob Chiles] Over the last few years, the business community, and members of the Chamber of Commerce, have shown tremendous support for this important economic development project. The positive impacts are obvious. With so many America manufacturing jobs going out of the country, we welcome AREVA's investment and the creation of jobs for U.S. workers.

[026-03, Robb Chiles] I appreciate your time and the opportunity to speak to you on this truly important project. We support your recommendation to grant a license for this project. As Mr. Packwood so eloquently put in his -- regarding economic benefits, it just makes good business sense.

[034-07, Greg Crockett] We do, however, disagree on the scoring of the socioeconomic impacts. We believe that when you combine the four phases of the project over 30-35 years of prospective operations, the total economic benefit to the region and state will be much higher than stated in the Draft EIS.

[038-01, Brian Davidson] That plant will help Idaho stay on the forefront of nuclear power technology and add as well as attract badly-needed good-paying jobs to our area of the state.

[039-03 and 039-06, Kreg Davis] Second, the Areva project is good for the economy, both in the short and long run. In the short run, it will create many Idaho jobs, both in Idaho Falls and Boise. A modest estimate of jobs created will number in the thousands. In addition, many more jobs will be saved. In my industry—my company, my customers, my suppliers, my competitors even the State of Idaho's DBS — I am aware of many Treasure Valley jobs that depend on Areva's success.

I ask every Boise/Treasure Valley elected official to speak directly with your business community and especially with anyone in the construction business. We have been among the hardest hit during these difficult economic times. Ask these businesses and their employees — your constituents — if Areva's project will save and create Boise jobs. If you have doubts, call me. I can introduce you to many Boise/Treasure Valley based businesses and employees who hope this Areva project is a success.

[041-02, Hon. Tammy de Weerd; 156-02, Robert Simison, on behalf of Hon. Tammy de Weerd] We do feel that taking the "no action alternative" is not a viable option for the State of Idaho, and believe, just by looking at the socioeconomic impacts, as others have stated, is valid reasons why we should move this project forward..

I just want to specifically point out that, you know, while the draft EIS does list it as a small impact, due to the criteria that was used, in the State of Idaho, that part of the region, the 11 counties over there, it is really not a small impact. It has a tremendous impact, here, in the state, and we believe, as a city, that this will also impact this side of the state, here, in the Treasure Valley, as we try to work more and more with the products and services that are coming out of INL, and hope that there will be partnerships that will come from the private industry as well as the research that's currently being done at INL, that may answer questions that many people still might have about nuclear energy and depleted uranium in the future.

[043-01, Rocky Deschamps] I am going to speak just a little bit, and I won't take much time. I'm going to talk a little bit about, I spent six years on the Bingham County Planning and Zoning Commission, the last two years as chairman of that Commission, and there's one area here on the Environmental Impact Statement that I'd just like to maybe touch just a little bit of base on, and it talks about, it's anticipated the number of workers moving into the area during each phase of the proposed project they call them migration workers, that might have some impact on the schools, health care, law enforcement, availability, cost of public utilities, such as electric, water, sanitary, road, number of migrating workers expected during the construction and operations might impact the housing.

My time on the Bingham County Planning and Zoning, we encourage businesses because our schools are crying out, we need more students. We're actually declining in our number of youth in our schools. Our roads are very adequate. Our schools are adequate. We have an infrastructure here in southeast Idaho because we are so used to having INL, we have the colleges here that can train the workers. We have the high schools that are there that are ready to accept anything new that we might have in this area in the schools. We have multiple, multiple infrastructure in place because of the INL, and the experience we have with the INL out there.

Also, I've been involved with the supply side. We have contractors in this area that are so familiar with the requirements to build a facility like this, that it's just -- you don't find that in a lot of areas. We also have suppliers that are used to supplying the specifications, the ASTM specifications that are required on a nuclear facility to do that, so we are very able to take on a facility like this, and take care of it, and do what we need to do.

[047-01, Mark Dunham] I'm excited about the positive impact of the AREVA project. We believe this will be a major boost to Idaho's employment base, and my members are ready to be a part of this project, and to assist in any way that we can.

I have 840 member companies in Idaho, with close to 200 in Eastern Idaho alone. Idaho's contractors are ready to help with the construction of necessary infrastructure and facilities for this important project.

On Saturday, Ken Simonson, who's the chief economist of the Associated General Contractors of America, was in Idaho speaking to my members about the dismal state of the economy. He told my members that Idaho's construction employment rate is at the same level as it was in December of 1994. In my industry, it is about jobs, and it is about money, because that translates into helping your families stay in Idaho, raise their future generations in Idaho. So we think this will be helpful.

As a result, the importance of projects like the AREVA Eagle Rock enrichment plant cannot be underestimated. Not only will the plant help with our nation's energy situation; it will have a significant impact on Idaho's economy in terms of jobs.

Analysis of this project shows that the project will have economic benefits such as creating almost 5000 direct, and indirect, jobs through the life of the project. It will also result in billions of dollars in additional investment into Idaho's economy, and families, at a time the state would benefit from increased economic development.

A George Mason University study commissioned by the AGC of America about infrastructure investment, in general, says, indicates the construction jobs created would have significant other impacts on the economy.

There would be indirect jobs from supplying construction materials and services. Most jobs would be in the State of Idaho. There would also be additional jobs created when the construction and supplier workers, and owners, spend their additional incomes throughout the state's economy.

[054-01, Paul Fullmer] Areva is good for the community and economy just because for the simple fact that it is cheaper on the electricity and it produces more jobs for Idaho.

[062-01, Trevor Grigg] And, you know, I want the same opportunity of prosperity that my parents have had, and I know that these acquaintances and these friends, they want the same opportunity of prosperity, and I think that this economic benefit that comes to our state through this project is huge, and it gives us that opportunity.

[065-02, Hon. Ida Hardcastle] I spend a large amount of time in the city among the residents and it is exciting to feel the enthusiasm most have for this project coming to Idaho Falls. Of course the main interest is the economic impact it will have on the area, in other words - jobs. Also the community supports the fact that there will be a very small environmental impact from this facility. We thank the NRC again for their efforts in this particular concern. We have a top notch workforce here which was recognized by AREVA in the beginning. The community as a whole supports energy being produced by nuclear power. We simply have to address our independence on foreign oil.

[073-02, Mark Holzmer] The Areva project has the potential to significantly improve the economic base in southeast Idaho – impacts which are not small to moderate, but will have immediate positive effects on our economy.

[080-01, Don Johnson] And I would just have to say that I represent a lot of people that this job would really help. I've lived here all my life. I've raised my family. I've got five grandkids, and I hope that this would help them in the future find employment, because God knows that we all need more jobs in this state. So, I would highly recommend that you accept this application.

[098-03, Linda Martin] The Regional Development Alliance has done several impact studies, which have been noted in previous instances, and the positive local impact of diversifying the tax base in Bonneville County is significant. Whereas the current annual tax rolls may reflect an annual property tax income of a few hundred dollars, the Eagle Rock Enrichment Facility would bring in approximately $4 million.

We are looking forward to the thousands of jobs during the various phases. While all human jobs and endeavors are subject to risk, this risk outweighs, by far -- I mean, this risk is outweighed, by far, by the benefits of this project.

As an economic development agency, we are already receiving inquiries from projects interested in this project, seeking to open new offices, and train and hire new employees.

This is a great thing for the economic health of our community and the State of Idaho. Quoting testimony from the December 08 hearing in Idaho Falls: "We don't need a bailout. We need AREVA."

[123-03, Hon. Butch Otter; 090-03, Paul Kjellander, on behalf of Hon. Butch Otter; 195-03, Hon. Jeff Thompson, on behalf of Hon. Butch Otter] First, the Eagle Rock project will provide a much-needed stabilizing economic force in Idaho Falls, and the southeastern Idaho region. Second, the facility will create much-needed high-quality jobs for the dedicated workforce in the area. Eagle Rock will create thousands of construction and contractor jobs, and in 30 years of operation, hundreds of long-term, high-end positions.

[128-01, Bob Poyser] We welcome this opportunity to provide factual information about our project to Boise and the surrounding communities. Assuming we are granted a license next year, those in Boise, who make the trip to Idaho Falls by way of Highway 20, will see the beginning of an important step towards our nation's energy independence, the development of a significant investment in Idaho, and construction of an American facility which will provide jobs to American workers, and strength to the local economy.

[128-07, Bob Poyser] Eagle Rock will have a significant impact on the local and regional economy. This facility will create much-needed jobs for Idaho workers. During construction, we'll create about a thousand jobs locally, and support thousands more regionally. This is a construction effort that will run for nearly seven years. Within two years from today, AREVA will begin to hire and train a workforce that will eventually exceed 400 people, to operate and maintain the Eagle Rock facility over the next 30 years of operating life.

We believe this is a positive, is positive news to the many hard-working people in Idaho who are struggling with difficult economic conditions.

[133-10, Richard Provencher] For the community of Idaho Falls, the pursuit of this facility will help bring jobs to the area, and potentially help with workers being displaced from the highly successful Idaho Cleanup Project as it completes cleanup work. Studies have been performed on jobs in the area which shows for every new job there is a secondary benefit of 1.8 to the surrounding community-this will result in even more benefit to the community.

[135-02, Hon. Dave Radford] We're happy with the prospects. We're optimistic about the jobs. Serving my third term, and recently running for re-election for my fourth term, the people that I talked to on the street, it was all about jobs, jobs, jobs. That's what they were interested in, and how can we promote that, how can we keep the quality of life that we have here in eastern Idaho, but still further enhance our energy independence?

[137-01, Ralph Reeves] 1. This plant will add to our exports, which is desperately needed.

[137-03, Ralph Reeves] 3. This plant will result (in time) in a well trained work force with skills that can be transferred to other jobs.

[137-04, Ralph Reeves] 4. This plant will likely foster support establishments which will likely result in exports and well trained workers.

[155-02, Jerry Shivly] It was going to help Idaho Falls, because it was going to produce jobs. And at that time, even in 2008 jobs were starting to fall off. And it's going to energize Idaho Falls because every time new people come, they bring some of themselves. And we get together and find out that we are better, and that we have a better product amongst us. The arts thrive, the schools thrive, and we all thrive. And I am very much in favor of AREVA coming to Idaho Falls.

[185-01, Wade Virgin] What would AREVA do? My understanding is, and I hope my figures are correct, it would bring 800 to 1,000 jobs to this area for construction, with several hundred other jobs coming afterwards. I spent some time not long ago on the internet, and looked at some of their jobs, and how well they pay. There would not only be jobs, there would be secondary jobs that would be brought to this area.

I guess I can only say, and be brief in saying it, but I fully support, in fact, I strongly encourage the application be approved for AREVA located here in the Idaho Falls area.

[163-01, Cindy Smith-Putnam] On behalf of Grow Idaho Falls, and although you and others have already done a good job capturing it in the process leading up to the Draft EIS, I simply cannot overstate the positive socioeconomic impacts this project would bring. Even now in this very early stage, we are already seeing transportation improvements easing the flow of current traffic along U.S. Highway 20 corridor, and that's because we've asked our officials to anticipate, plan for, and assess these future needs, and to address them in advance. But when it comes to economic development, this project's significance reaches far beyond the obvious direct impact of jobs creation, dramatic expansion of tax revenues for our cash strapped state, infrastructure development, and the multiplier effect of all of those dollars.

[164-01, Timothy Solomon] The Regional Development Alliance is experienced in doing economic impact analysis, and I want to congratulate you on the socioeconomics portion of the EIS, which I'm going to address throughout my comments.

We subsequently ran an additional analysis based upon your numbers in the EIS, to see how those came out, and those job numbers are "right on" in our estimation.

The job creation numbers for a region of this size are quite substantial. They are not an insignificant impact on the state and on our region. 308 preconstruction jobs and 1,687 construction jobs will impact Idaho, in a very positive way, over the years in which those activities take place. 3,289 direct, indirect, and induced jobs are also very, very significant throughout the operational period.

The direct output effects of more than 315 million in the first full year of operations is not a small impact, and provides a substantial base of potential business for local suppliers, service providers, and sole proprietors, a very important part of our economy.

Even if the output remains static over a 20 year period, using the numbers in the EIS, the region would have a base of 6.3 billion in total direct East Coast activity from which to draw for those business opportunities over that operational period.

We do urge the NRC to take another look at your labor income numbers. We think they may be slightly less than a project of this size, and a region of this size merits. However, if you just take the 92.4 million that is outlined in the EIS, if you take that out over a 20 year operating history, assuming no year-to-year change, we estimate nearly $2 billion of labor income along on that side of it.

The economic impact of AREVA's $2 billion investment in Idaho is driven by capital investment that leads to job creation. The Eagle Rock enrichment facility location in eastern Idaho is absolutely critical to the economic vitality of the region.

Real property has improved and begins yielding tax revenues at a much higher level. New investments are made in tangible personal property that keeps our manufacturing and processing capabilities and our job infrastructure on the leading edge.

Jobs are created; dollars are spent in the local economy. Business to business and business to consumer transactions increase, real per capita income increase, tax revenues throughout the area of impact, both direct and indirect, to the investment, increase, and the general economy of the entire state is strengthened.

And with that, we highly encourage you strongly support the issuance of a license, and I thank you, once again.

[176-03, Hon. Jeff Thompson] It is estimated the local region will see more than $5 billion in economic impact, and 5,000 in direct and indirect jobs will be created throughout the United States for this contract.

[178-02, Randy Trane] This is a project that will serve two purposes. It will allow nuclear power to serve the world and it will help the economy in the Eastern Idaho area with much needed employment. I have several friends who are experts in the nuclear power industry and they are telling me that this project will not have any negative impact on the environment in this area.

[190-01, Dave Whaley] The Idaho State AFL-CIO, representing approximately 24,000 affiliates across the State of Idaho, would like to go on record in support of the AREVA Enrichment Service's proposed gas centrifuge uranium enrichment plant being built in Eagle Rock, Idaho.

Idaho, like the rest of the United States, is experiencing record high unemployment. The jobs this site will provide for-the construction industry as well as future operation jobs when the facility is complete will be instrumental in Idaho's economic recovery

Response: *The NRC acknowledges these comments and appreciates the public participation.*

I.5.20 Environmental Justice

No comments were received on the Environmental Justice section of the Draft EIS.

I.5.21 Accidents

Comment: The following comment expresses concern regarding worker safety associated with accidents at the proposed EREF.

[049-01, Victoria Everett] But I'm concerned about the workers. It says you're providing jobs. How safe are these jobs? You know, coal mines provide jobs, but they're not very safe jobs, and, you know, it wasn't addressed, on the safety of the workers. If there is an accident, how safe are these workers? Who pays for, you know, the damage done to them, and taking care of their families?

Response: *The proposed EREF will be designed with a number of features that would protect workers and mitigate the effects of accidents, as described in Section 4.2.15.3 of the EIS. In addition to physical design features such as barriers, ventilation systems, and alarms, an Emergency Plan would be implemented to minimize the consequences of accidents to workers. Liability for payment for damages to workers would depend on the particular circumstances of an accident. AES would be liable for cleanup costs for accident consequences at the proposed EREF.*

Comment: The following comment asks if AES's Integrated Safety Assessment (ISA) addresses all credible accident scenarios whereby depleted uranium (or other contamination) could get into the Snake River Aquifer.

[087-02, Dennis Kasnicki] Comment 2a: Many attendees expressed concern regarding contamination, especially depleted uranium, getting into the Snake River Aquifer; *that*, by far, seemed to be the biggest concern, and rightfully so. Does AREVA's Integrated Safety Assessment address ALL CREDIBLE accident scenarios whereby depleted uranium (or other contamination) could get into the Snake River Aquifer? Are the "probabilities" of all such scenarios deemed at least "highly unlikely", or otherwise meet the requirements of 10 CFR 70? If so, or if not, this should be loudly and clearly "called out" in the Draft EIS.

Response: *AES's ISA (AES, 2010b) considered all credible accidents at the proposed EREF. The analysis considered the consequences and the likelihood of each accident sequence. Consequences included offsite impacts on the public and on the environment from airborne releases of* UF_6 *and other forms of uranium resulting from an accident. Only accidents involving an airborne release can conceivably result in significant quantities of uranium being released because of the physical properties of the uranium materials used in the process. The environmental consequences of* UF_6 *releases are analyzed in more detail in Section 4.2.18.2 of the EIS. This section analyzes the consequences of a* UF_6 *release resulting from a terrorism event and concludes that areas contaminated by deposition of airborne plumes of uranium would be cleaned up to levels that would be protective of human health. Cleanup levels would be determined though a risk analysis that would include analysis of a groundwater exposure pathway. Cleanup of surface contamination would minimize possible migration of uranium to the Eastern Snake River Plain Aquifer. Even in the absence of cleanup, it is unlikely that uranium at levels of health concern could reach the aquifer from the surface in the vicinity of the proposed EREF due to adsorption of uranium by soils of greater than 200 m (660 ft) thick overlying the aquifer (see EIS Section 3.7.2.2).*

Comment: The following comment states that sensitive population exposure scenarios need to be developed and addressed, not just from a worker standpoint but also from a member of the public standpoint.

[036-04, Christina Cutler, on behalf of the Shoshone-Bannock Tribes] Sensitive population exposure scenarios need to be developed and addressed, not just from a worker stand point but also from a member of the public stand point.

Response: *As presented in Section 4.2.15 of the EIS, doses to members of the public are evaluated ranging from a person at the site boundary to the entire collective population within 80 kilometers (50 miles) of the proposed EREF site. Health effects from potential exposures were evaluated using State of Idaho or NRC reference values. These values included Idaho's ambient air quality standard for HF (for routine emissions) and radiological exposure limits from 10 CFR Part 20. For accidents, the NRC staff used threshold consequence levels for exposure to uranium and HF given in 10 CFR 70.61 and EPA's Acute Exposure Guideline Levels (AEGLs). The NRC staff believes that the reference values used are appropriate for evaluating potential health impacts from operation of EREF on potentially impacted populations, including workers, members of the public, and sensitive subpopulations.*

Comment: The following comment asks about how AES will respond to accident scenarios on the proposed EREF site and how the public will be informed.

[129-01, Willie Preacher, on behalf of the Shoshone-Bannock Tribes] A question arose on safety issues, how AREVA will respond internally to accident scenarios on the proposed site, and how the public will be informed.

Response: *AES would respond to an accident in accordance with the EREF Emergency Plan implemented by the EREF Emergency Management Organization. The public would be informed through alert and notification procedures employed by local emergency management organizations, such as fire and police departments, after these organizations are notified of an emergency by the facility.*

Comment: The following comment is about the SER not being included in the Draft EIS.

[141-03, Peter Rickards] In addition...

1) We are not able to double check the downplaying of accidents and terrorism dose to the public. The Safety Analysis Report (SER) is NOT included in the DEIS! Instead vague summaries were used touting they would meet legal requirements.

In my history of 23 years of being lied to in EIS's, specifics are needed to demonstrate where you are misinforming the public to the potential REAL environmental impacts of the proposed plant. It is unacceptable to have an official draft comment period while withholding the MOST important details!

What the DEIS says on webpage 66 of 430 is:
"As noted in Section 1.4, some of these issues are analyzed in detail in the NRC's SER and are only summarized in the EIS. For example, within the area of safety and security, the SER analyzes the probabilities and consequences of various accidents at the proposed EREF, as well as measures to prevent those accidents and mitigate their effects. This EIS does not go

into the same level of detail, but provides, in Section 4.2.15, an accident analysis for the purpose of assessing the potential environmental impacts of accidents."

Response: *The SER (NRC, 2010b) documents the NRC's safety review of the proposed EREF. Most of the issues addressed in the SER are not within the scope of the EIS. As pointed out in the comment, the safety review, as opposed to the environmental review covered in the EIS, goes into much more detail on safety-related matters, including potential accidents, as discussed in Section 1.4 of the EIS. Section 4.15 of the EIS provides a summary of the accident analysis in the SER.*

Comment: The following comment pertains to certain information in the Draft EIS regarding doses due to accidents.

[141-05, Peter Rickards] 3) While assuming the HEPA filters contain most of an accident nuclear criticality, the DEIS does admit that a citizen at the fenceline could receive a 570 mrem dose, way above the 10 mrem annual limit! (Table 4-30, p 372/430). This dose seems not used when dismissing transport accidents in metropolitan areas.

Response: *The 10 mrem/yr dose constraint is only applicable to routine facility operations. It is not applicable to accident scenarios. In addition, the criticality event analyzed in Section 4.2.15 of this EIS is not applicable to the impacts of transportation of* UF_6 *or low level waste analyzed in the EIS.*

Comment: The following comment requests certain information on accidents and problems at the Metropolis, Illinois, Honeywell facility.

[141-07, Peter Rickards] 5) While I have found some great contradicting documents on the NRC website, I was unable to find details on accidents and problems at current uranium enrichment plants, including the Metropolis, Illinois Honeywell facility.

Please address the statement of Hydrogen explosions recently at the Honeywell uranium enrichment facility from the article pasted below. Page 370/430 lists only 5 accident types analyzed, which all seem to qualify for ignoring by probability math tricks. However, this article mentions locals hospitalized from inhalation problems from Dec 2003. While NRC likes to dwell on estimated death rates, the public needs to know ALL the potential impacts on their health, including these scenarios. The article mentions a long problem with compliance at Honeywell, which appears unaddressed as a potential REAL AND PROBABLE health impact. (See red highlights) On the NRC website I could see references to Honeywell problems, but the searches lead to long lists that obscured me finding the details.

Response: *The Metropolis, Illinois, Honeywell facility is a uranium conversion facility and not a uranium enrichment facility. As such, the processes and events at the Honeywell facility may not be applicable to the processes at the proposed EREF; a hydrogen fire is specifically not relevant to the proposed EREF enrichment process. Hydrogen use would occur only in laboratories at the proposed EREF where it would be used in small quantities under controlled conditions. The NRC review focused on the processes at the proposed EREF.*

The NRC reviewed potential accident sequences that the applicant evaluated as part of the facility ISA. The ISA is performed by the applicant to identify those accident sequences which may have notable consequences (see the performance requirements in 10 CFR 70.61) including long-lasting health effects resulting from exposure to those chemicals associated with NRC-licensed materials. In addition, the NRC independently evaluated certain accident analyses to both verify the adequacy of the evaluations performed by the applicant and to determine the potential impact to the public as pertinent to the EIS. A summary of the ISA was submitted to the NRC as part of the license application and reviewed by staff to provide reasonable assurance that the proposed operations will be conducted in a manner that assures public health and safety and protects the environment. That review is not part of the EIS, but was performed as part of the application review and documented in the Safety Evaluation Report (NUREG-1951) (NRC, 2010b).

Comment: The following comment asserts that there are certain issues that the criticality analysis does not address.

[141-02, Peter Rickards] Specifically, the criticality analysis does not address the microscopic particle size problem from criticalities, nor the “alpha recoil” problem with HEPA filters for normal operations, nor the fire problems with HEPA filters.

Response: *With regard to the criticality analysis, as reported in Chapter 5 of the SER (NRC, 2010b), NRC staff used dose conversion factors for particulates consistent with both 10 CFR Part 20 and International Commission on Radiological Protection (ICRP) Publication 30. ICRP 30 recommends use of a 1 micron activity median aerodynamic diameter (AMAD) particle size when the particle size is unknown. Dispersion modeling of releases is consistent with NUREG/CR-6410 and previous evaluations.*

With regard to alpha recoil problems, the staff recognizes that enriched uranium is a low specific activity material and there have been no apparent issues with alpha recoil for uranium materials.

Fire hazards and the potential consequence of fires are addressed in the facility ISA. NRC staff reviewed the ISA summary and found the risks to be adequately controlled. The NRC staff concluded that there is reasonable assurance that the proposed operations will be conducted in a manner that ensures public health and safety and protects the environment, as reported in Chapter 7 of the SER (NRC, 2010b).

Comment: The following comment expresses concern about the threat to air quality in the event of an accidental release of radioactive material.

[100-02, Wendy Matson; **184-12, Kitty Vincent; 191-18, Liz Woodruff]** The amount of radioactive material that will be present on the proposed site represents an implicit severe threat to air quality in the event of an accidental release of radioactive toxins.

Response: *The human health consequences of representative accidents that involve releases of UF_6 to the atmosphere are analyzed in Section 4.2.15.2 of the EIS. Releases from high-*

consequence accidents, which involve the greatest releases of UF_6 to the atmosphere, were analyzed. The analysis concludes that operation of the proposed EREF would pose an acceptably low risk to workers, the environment, and the public from accidents. Air concentrations of uranium and HF would subside quickly after an accident and would not produce lasting effects on air quality.

Comment: The following comments express concern about the cleanup costs following an accident at the proposed EREF.

[049-02, Victoria Everett] And also, in the case of an accident, who plays for the cleanup? Who's responsible for that? The State of Idaho? Or is it AREVA? You know, that wasn't clarified. And in transportation, a truck gets in a wreck, it spills all over the ground. You know, such cases as that. Say there is a fire, and there's a major disaster at the plant. Who pays for that? And who pays the doctor bills of the families that have cancer?

[050-10, Joanie Fauci] Who will pay for all accidents which occur?

Response: *AES would be liable for cleanup costs for accidents at the proposed EREF. Liability for payment for damages to workers or members of the public, such as cancer-related claims, would depend on the particular circumstances of an accident.*

Comment: The following comments note the hazardous nature of uranium hexafluoride and the potential risk from breached containers.

[181-14, Roger Turner] EIS fails to realistically evaluate container breaches. Moving, stacking and unstacking cylinders has breached the containers, at the Oak Ridge Facility. The EIS needs to be realistic about risks, where heavy equipment is in use because accidents and spills will happen. Inspections are subject to human error and constrained by budgets. Inconsistent pressure levels in containers are well known. Excess pressure in containers may make them more susceptible to breaching or corrosion. Corrosion has been found on these containers at Oak Ridge. The combination of problems were not adequately considered in the draft EIS.

The EIS fails to acknowledge toxicity of Uranium (both enriched and depleted) and the risks to workers and the public when released. As mentioned above, the EIS also failed to consider extended storage of containers, with additional risk of breached containers, as a result.

[192-04 and 192-10, Lisa Young] The storage of depleted uranium hexafluoride, which reacts with water (gas or liquid) to produce two dangerous, corrosive, and soluble compounds, UO_2F_2 and HF, is extremely unstable. The production of these compounds presents huge risks in the storage timeline, as the corrosion of storage cylinders and the possibility for leaks is a very real reality.

Response: *The cylinder management program to minimize cylinder corrosion is described in Section 4.2.11.2 of the EIS. Risks to workers and the public of exposure to breached cylinders are encompassed by the accident scenarios considered in the accident analysis in Section 4.2.15 of the EIS. The accident analysis considers all credible accidents at the* *proposed EREF. The EIS evaluates several representative accident scenarios with intermediate to high consequences. The scenarios analyzed in the EIS encompass the consequences of cylinder handling accidents and releases due to cylinder corrosion and over-pressurization. Regarding the toxicity of uranium, health effects from radiological exposure are presented in Section 3.11.3.2 and from chemical exposure in Section 3.11.3.3.*

Comment: The following comments are concerned with wildfires in the vicinity of the proposed EREF. Some commenters believe wildfires could have a major impact while others note the conditions that would mitigate any major impacts.

[004-01, Anonymous] I am astonished you are not considering fire in the EIS review. I suggest you revise your hurried considerations! http://www.aolnews.com/world/article/thinking-the-unthinkable-russian-fires-fan-nuclear-fears/19589710?sms_ss=email.

[015-21, Beatrice Brailsford; 088-09, Stan Kidwell; 122-05, Kathy O'Brien; 127-02, Sheila Plowman] The NRC should address both Areva's failure to comply with the Federal Farmland Protection Act and its own failure to fully analyze the environmental effects of a large range fire at the Areva site.

[027-04, Sara Cohn] Similarly, we are concerned that fire is not addressed as a potential threat, when fuels exist on site and fires have recently been burning in the region.

[048-02, Genevieve Emerson] The EIS fails to consider the influence of wild fires in the region and also fails to adequately address the issue of waste storage and disposal, considering that there are no viable methods yet in existence for safely storing hexafluoride and depleted uranium.

[066-05, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 3. Wildfires on the Snake River Plain and specifically the Idaho National Laboratory (INL) occur with surprising regularity and typically burn tens of thousands of acres before being extinguished (two such fires in 2010). Wildfires have threatened DOE facilities and caused facility shutdowns due to particulate clogged air exchange filters; low visibility and destruction of overhead power lines. The EIS should discuss the risk, potential environmental impacts from wildfires, and safety procedures to be implemented to guard against potential releases as they relate to the enrichment facility and the depleted UF6 storage cylinders.

[067-09,Mike Hart] With respect to the half-acre lava field, I think it actually protects this facility's location from fires, because fires, typically, are drawn by wind, the wind pushes fire down wind, with a big, huge lava barrier, there's less likelihood of a fire hitting the grounds because it has to go through the lava first.

[070-04, Virginia Hemingway] As has been mentioned, we just escaped a fire that could have totally decimated the INL, which is just almost right next to your facility, that you're -- that the AREVA is planning. And in Russia, they are currently trying to control a fire that is coming very close to where Chernobyl melted down, and, in fact, their emergency minister had this to say about it.

He said that the heat from the fires in the region, which already has nuclear contamination from the Chernobyl disaster, more than 20 years ago, could release harmful radioactive particles into the atmosphere. In the event of a fire there, radionuclides could rise into the air, together with combustion particles, resulting in a new pollution zone. And he said this on state television in Russia.

[152-04, Steven Serr] We have--we've reviewed the issues as far as fire code protection. We expressed concern over the safety on site, have they the ability to fight fires? AREVA has opted to petition in to the fire district. We've had planning meetings with the fire district. We have another planning meeting, this week, to work out responses in case of wildland fires coming in. We've addressed safety setback issues to protect the facility. We don't have any real concerns to be able to protect this facility from wildland fires with the implementation measures that they are planning on putting in place, along with the expansion of the fire service facilities, and staff, and buildings and equipment, to be able to provide that fire protection.

[152-10, Steven Serr] Some of these issues we brought up were regarding fire risk. We had a meeting just yesterday with the fire department to discuss fire safety issues out there, response time, what could be done for defensible space surrounding the operation. We felt we have addressed the needs for making that site very safe, and protected from any fire hazard that might occur from a wildfire issue. And, also, the fire district is addressing the potential increased demand for fire needs, and that they have already acquired land on the west side of Idaho Falls to construction additional fire stations, to provide additional equipment and support facilities for this type -- for this plant.

[148-01, Eric Schuler] Taken as a whole, the EIS suggests that this facility will have a relatively low impact on the environment. Of course several aspects of this, of the — have been overlooked in making this conclusion. For instance, as others have already noted, it does not consider the impact of the exempted preconstruction activities, the high risk of wildfires in the area, or the lack of an appropriate disposal pathway for depleted uranium. Accordingly, the true impact of this facility is certainly larger than the DEIS suggests.

[157-09, Hon. Erik Simpson] Fire. It is my understanding that AREVA is currently securing an agreement for fire protection at the Eagle Rock Enrichment Facility. Although a wildfire is something you have to plan for, it is by no means a showstopper for this project.

[169-02, Margaret Stewart] And there has been inadequate addressing in the EIS of wildfire threats, and transportation of nuclear material accidents.

[184-10, Kitty Vincent] This waste and the facility will be threatened by wildfires at the proposed site. The recent Jefferson Fire at the INL is but the latest example of such threats and the EIS does not provide a detailed analysis of the threats posed by fire.

[191-14, Liz Woodruff] Threat Posed by Fire. The draft EIS fails to even consider the threats associated with wildfires at the proposed site. While the draft EIS looks specifically at the geology and weather patterns at the site, it does not provide a detailed analysis of the threats posed by fire, claiming that fires do not occur east of the Idaho National Lab (INL). *The recent example of the Jefferson Fire at and stretching east of the INL (and within 10 miles of the proposed EREF) demonstrates this is a real hazard which warrants specific analysis.*

[193-22, Liz Woodruff, on behalf of the Snake River Alliance] And my final point before I reach my conclusions are around fire. Fire poses an unacceptable risk to this facility. This radioactive waste, and the facility as a whole, will be threatened by wildfires at the proposed site, yet it is never addressed as an impact relevant to that specific geography in the EIS. The DEIS does not provide a detailed analysis of the threats posed by fire, and some of you might recall that just about, oh, three weeks ago, there was a huge fire over at the lab. The draft EIS specifically says fires often don't occur east of the lab. Well, whoops -- let's go back.

Here's the lab and this is east, and that's the fire. So I'm pretty sure that fires occur east of the lab. 150,000 acres just burned there over Superfund sites. This is the proposed facility. Actually, if you looked at their map, it might even be a little closer. But this is about 10 miles. The EIS evaluates earthquake risk specific to this geography. It evaluates flood risk specific to this geography. It evaluates weather risks specific to this geography. It does not evaluate wildfires specific to this geography. And it absolutely must.

[192-16, Lisa Young] Indeed, I hope to see further examination of accident scenarios involving large wildfires around the facility, as well as accident scenarios involving the transportation of radioactive substances to and from the facility on our roads and highways.

Response: *All credible accidents at the proposed EREF, including those initiated by natural events, were considered in the accident analysis. Although wildfires can occur in areas surrounding the facility, an accident associated with a wildfire was not considered a credible risk to the facility due to the nature of the surrounding topography and vegetation (low density, low height), vegetation management measures used onsite, the distance to the controlled area boundary, and the resistance of* UF_6 *storage cylinders and process structures to fire by their design and materials.*

I.5.22 Decontamination and Decommissioning

Comment: The following comment expresses concern regarding the future decommissioning of the proposed EREF.

[008-02, Carol Bachelder] And it's interesting to me, that we're already talking about decommission, and this isn't even "off the ground" yet. I mean, the plant is set for 30 years, that's all a nuclear plant can operate, is 30 years, and then you have to take it down, and it sits there, being radioactive, for how many generations? I don't even know.

Response: *The proposed EREF is not a nuclear power plant. The proposed EREF site would be returned to free release conditions following the decommissioning process, as discussed in Section 4.2.16 of the EIS.*

Comment: The following comments relate to the source and adequacy of funding for the cleanup of the EREF site following cessation of operations of the proposed EREF.

[050-09, Joanie Fauci] Who will pay for the cleanup of this site?

[066-02, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 1. Financial Assurance - a. Section 2.1.4.3. states:

Decontamination and decommissioning of the proposed EREF would be funded in accordance with the Decommissioning Funding Plan (DFP) for the proposed EREF (AES, 201Ob). The DFP, prepared by AES in accordance with 10 CFR 70.25(a) and the guidance in NUREG-/757 (NRC, 2006), would provide information required by 10 CFR 70.25(e) regarding AES's plans for funding the decommissioning of the proposed EREF and the disposal of depleted uranium tails generated as a result of plant operations. Funding would be provided by AES by means of a Letter of Credit in accordance with NRC regulations in 10 CFR Part 70 and guidance in NUREG-1757 (NRC, 2006).

However, Section 2.1.4.3 further states:

A complete estimate of the wastes and effluent to be produced during decommissioning would be provided in the Decommissioning Plan that AES would submit prior to the start of the decommissioning.

Please explain how an adequate cost estimate for the Decommission Funding Plan can be prepared in the absence of a complete inventory/estimate of decommissioning wastes.

b. Due to NRC's approval of pre licensing construction activities at the site, DEQ requests NRC explain in this EIS whether Financial Assurance Mechanisms similar to a "Decommissioning Funding Plan" and associated financial assurance mechanisms have been required of the Applicant concerning decommissioning and restoration to unrestricted use should the facility not receive a license or initiate a business based withdrawal of the license application.

[147-10, Joey Schueler] 6. The term of this plant is 30 years, after which time the plant will be decommissioned. This means 30 years of revenues and 50 to 100 to into perpetuity years of cost and impact on Idaho's wilderness and economy. Will Areva still be paying for this cost? No, the cost will fall to Idaho taxpayers.

Response: *AES is required by the NRC's regulations under 10 CFR 20.1402 to fund the cleanup of the proposed EREF site during decommissioning, as discussed in Section 2.1.4.3 of the EIS. A summary breakdown of the estimated decommissioning costs is provided in Chapter 10 of the SAR. The majority of the costs (excluding tails disposal) are associated with the dismantlement, decontamination, processing, and disposal of centrifuges and other equipment in the Separations Building Modules. These estimates are based on the centrifuge manufacturer's prior decommissioning experience and current practices for decontamination and disposal. The DFP must be adjusted periodically at intervals not to exceed three years as required by the NRC's regulations under 10 CFR 70.25(e), thereby ensuring that the funding plan is up-to-date using the latest available information.*

Should the license application be withdrawn or the license not be granted, no nuclear material would have been present onsite. Thus, the site would have always been available for unrestricted use, and no decontamination or decommissioning would be necessary.

Comment: The following comment states that NRC license holders are required to provide financial assurance for decommissioning.

[157-01, Hon. Erik Simpson] Historically, nuclear projects being discussed in eastern Idaho are DOE actions. I just want to remind people, this is not a DOE action. NRC license holders are required to provide financial assurance for decommissioning. They must prove to the NRC that funds will be adequate for decommissioning. They must fund it before operations start. The licensees are required to periodically review and update this funding, and with this license requirement, there is no chance waste will be left behind, or that Idaho will be left with cleanup responsibility for the AREVA facility.

Response: *The information in this comment is accurate.*

Comment: The following comment asks about the location(s) to which equipment that is to be removed from, or replaced in, the proposed EREF would be stored or transported.

[129-05, Willie Preacher, on behalf of the Shoshone-Bannock Tribes] The AREVA Enrichment Project will be in existence for a number of years, how many shutdowns, equipment upgrades, or modifications will be anticipated during the life cycle of this process? Where will equipment that is to be removed or replaced be stored or transported to, will it be left within the facility or will it be transported out of state?

Response: *Shutdowns, upgrades, and modifications would be dependent on equipment performance and future design improvements and cannot be accurately determined at this time. Any equipment with radioactive contamination that is not decontaminated for free release after use would necessarily be transported to, and disposed of, at an appropriately licensed LLRW disposal facility. The locations of such facilities would depend on which facilities are licensed at the times of disposal. Information on anticipated wastes generated during operation of the proposed EREF is presented in Section 4.2.11 of the EIS.*

Comment: The following comments express concern about NRC accepting a letter of credit from AES as the method of assuring funds for decommissioning of the proposed EREF.

[015-16, Beatrice Brailsford] The entire conundrum of storage, treatment, and disposal goes hand in hand with the eventual challenges of decommissioning the EREF. The costs of those activities are pegged at $3.5 billion. The NRC, an agency charged with protecting the interests of US citizens, must not settle for a letter of credit from Areva to cover these costs. At the very least, the NRC must require a surety bond.

[187-03, John Weber] In section 10.0, one difference between the AREVA plant and the National Enrichment Facility is -- this is quoted: “AES will utilize a letter of credit to provide reasonable assurance of decommissioning funding, rather than a surety bond.” Why is that? We all currently know, after the last financial crisis, that a letter of credit is basically a worthless piece of paper. They have many risks a couple of them, including insolvency of the Applicant and insolvency of the bank issuing the letter of credit.

Response: *A letter of credit to assure funds for decommissioning is an acceptable financial assurance method, as indicated in the NRC's regulations in 10 CFR 70.25(e).*

Comment: The following comments express concern that restoring the proposed EREF site to unrestricted use after the end of the license period might not occur because of funding issues.

[083-05, Diane Jones] How can we expect the company to -- whose financial future is uncertain, to be able to guarantee that they will bear the cost of treating all that waste and disposing of all that waste, when the process for disposing of the waste is not even known? This seems highly reckless to me, and not a very sound economical calculation.

[129-04, Willie Preacher, on behalf of the Shoshone-Bannock Tribes] Will the cost amount that has been set aside for the D&D of the facility after the mission is complete be enough and is there a guarantee that it will have be done and not a facility left standing in the desert west of Idaho falls.

[154-03, Diana Shipley] They are asking for loan guarantees from the United States government and I wonder who will be left to clean up the waste and pay the bills if they bail out?

Response: *As part of its license conditions, AES would be required to restore the proposed EREF site to unrestricted use. Funding for decontamination and decommissioning would be provided by AES in accordance with the NRC's regulations in 10 CFR 70.25(e), as discussed in Section 2.1.4.3 of the EIS.*

I.5.23 Greenhouse Gas Emissions

Comment: The comment discusses the importance of enriched uranium in reducing greenhouse gas (GHG) emissions.

[067-06, Mike Hart] Also, they took exception with the cause and need for action. I think there's most definitely a need for this, because there's a need for carbon-free energy. Throughout the world, I think we've seen that global warming is a significant problem that we need to be paying attention to, and there's also a demand for growth in nuclear energy. There's a couple of facts I want to point out why we need nuclear energy, why we need this particular enrichment plant.

Carbon dioxide reflects, or absorbs, infrared energy that does not go back out to space. It makes the planet warmer. That's simply a fact. Carbon dioxide is a greenhouse gas. Levels of carbon dioxide have gone from 288 parts per million in 1850 to 369 parts per million in the year 2000. It doesn't matter where it comes from. That is a greenhouse gas that is increasing in concentration. But I'll give you a hint as to where it's coming from: fossil energy. In 1990s, we annually contribute 6.3 gigatons of carbon dioxide into the atmosphere through fossil combustion. That's annual, 6.3 gigatons. The concern about 300,000 metric tons, 300,000 tons of total waste versus 6.3 gigatons in a single year, I view the problem with carbon as much more significant than the problem with depleted uranium.

So, what is a gigaton? Why is that a concern? Well, 2.3 gigatons is one part per million of carbon dioxide in the atmosphere. So, every year we are steadily increasing carbon dioxide. So, yes, global warming is occurring. Yes, it's our fault. Yes, carbon puts more of that in the atmosphere, and I think nuclear energy is a stopgap that will – is worth pursuing. So, yes, there is a need.

Energy demands are increasing worldwide. Currently, the population of the planet is about 4.5 billion. By 2050, that will double, and people are not less energy consumptive. Populations like China and India used to be in the Third World. They have bought the second world, and they've placed a firm down payment on the first one. So, energy consumption will go up as the population goes up, so even if nuclear energy just holds its own at 15 percent, there will be a need for more nuclear plants, and that means there will be a need for more enriched uranium.

Response: *The NRC acknowledges the comment and appreciates the public participation.*

Comment: The following comment asks about the cumulative impact of greenhouse gas emissions associated with the operation of the proposed facility on air quality and climate change over the 30-year period of the license.

[140-08, Wendy Reynolds, on behalf of the Bureau of Land Management, Upper Snake Field Office] What would be the cumulative impact of greenhouse gases emissions associated with the operation of the facility on air quality and climate change over the thirty year period?

Response: *GHG impacts associated with the proposed EREF are discussed in Section 4.2.17 of the EIS. Impacts from preconstruction and construction are addressed separately from impacts associated with operation. Workforce commuting, truck shipments of feedstocks, finished enriched product and wastes, and onsite fossil fuel consumption in support of operations are all considered for their contributions to GHG emissions during facility operation. Conservative assumptions were applied wherever possible (e.g., it was assumed that the majority of the workforce commuted from Idaho Falls and that no carpools or vanpools would be used) to ensure that a maximum possible GHG emission (i.e., a bounding condition) was calculated. However, for simplicity, all GHG emissions were represented as carbon dioxide (CO_2) equivalents (CO_2-e).*

Tables 4-35 and 4-36 display the estimated annual emissions of carbon dioxide equivalents (CO_2-e) (emissions of all of the GHGs produced, represented as CO_2) associated with workforce commuting and deliveries to and from the proposed facility during operation, respectively. Annual values were calculated, based on the assumptions specified in Section 4.2.17.4. However, although those assumptions collectively represent a feasible condition of operation, the NRC has no basis for assuming that those operational conditions will remain unchanged throughout the life of the facility. Likewise, although the points of origin and destinations of shipments associated with facility operation are feasible for the purpose of defining a bounding condition, the NRC notes that alternative sources of feedstocks as well as alternative destinations for enriched product and wastes also exist. Thus, the NRC staff believes that calculating the cumulative impact of 30 years of operation on the basis of the bounding scenario would be highly speculative and would not yield reliable estimates of cumulative impacts. Further, simply multiplying the values contained in Tables 4-35 and 4-36 *by 30 would be an overly simplistic way of estimating lifetime GHG emissions because it would ignore alternative sources of feedstock, alternative customers for enriched product, and the use of alternative waste disposal facilities, as well as operational changes due to changing market conditions over the proposed facility's lifetime. However, because the assumptions used to define the bounding condition were all intentionally conservative, GHG emissions over the proposed facility's lifetime would be no greater than 30 times the values represented in Tables 4-35 and 4-36.*

Comment: The following comments raise concerns about the adequacy of the GHG emissions section of the Draft EIS (Section 4.2.17).

[015-22, Beatrice Brailsford] With regard to assertions about EREF's role in reducing greenhouse gas emissions and the claim that EREF will serve as a greenhouse gas "sink," such reasoning omits the environmental and public health threats caused by EREF's operations, from uranium mining to disposal of reactor waste and reactor decommissioning. If the EIS takes the illogical leap of crediting EREF for reducing greenhouse gas emissions, the NRC is compelled to likewise credit EREF for the documented threats posed by the nuclear power industry throughout its fuel and waste cycles.

[113-13, Ken Miller] With regard to assertions about EREF's role in reducing greenhouse gas emissions and the outlandish claim at Draft 4- 136 that EREF will serve as a greenhouse gas "sink," such a tertiary benefit (theoretically reducing the operation of traditional coal plants and as a result their emissions), such reasoning omits the environmental and public health threats caused by EREF's operations, from uranium mining to disposal of reactor waste and reactor decommissioning. If the EIS takes the illogical leap of crediting EREF for reducing greenhouse gas emissions, the NRC is compelled to likewise credit EREF for the documented threats posed by the nuclear energy industry throughout its fuel and waste cycles.

[153-09, Andrea Shipley; 197-09, Andrea Shipley, on behalf of the Snake River Alliance] The draft EIS (4-136) stretches credulity in attaching "Green House Gas sink" attributes to EREF. The reasoning in the EIS is that the project should be considered a greenhouse sink because it would produce enriched uranium for use in nuclear reactors that might replace traditional coal and other fossil fuel plants. By this logic, my car is a GHG sink when I am not driving it. This tertiary GHG benefit is improper particularly in light of the EIS's failure to acknowledge the secondary and tertiary environmental and public health threats created by EREF and its operations, from uranium mining to disposal of reactor waste and reactor decommissioning. If the EIS credits EREF for such greenhouse gas emission reductions due to its contribution to nuclear reactors, it must also credit EREF for the known environmental and health threats that are also attributed to the same nuclear reactors.

[184-14, Kitty Vincent] The draft EIS (4-136) stretches credulity in attaching "greenhouse gas sink" attributes to EREF. The reasoning is that the project should be considered a greenhouse gas sink because it would produce fuel for use in nuclear reactors that *might* replace fossil fuel plants. This tertiary GHG claim is improper particularly in light of the EIS's failure to acknowledge the secondary and tertiary environmental and health threats created by EREF and its operations and the operations of nuclear reactors, from uranium mining to transportation, disposal of reactor waste and reactor decommissioning.

[191-22, Liz Woodruff] The draft EIS (4-136) stretches credulity in attaching "GHG sink" attributes to EREF. The reasoning in the EIS is that the project should be considered a greenhouse sink because it would produce enriched uranium for use in nuclear reactors that might replace traditional coal and other fossil fuel plants. This tertiary GHG benefit is improper particularly in light of the EIS's failure to acknowledge the secondary and tertiary environmental and public health threats created by EREF and its operations, from uranium mining to disposal of reactor waste and reactor decommissioning. If the EIS credits EREF for such greenhouse gas emission reductions due to its contribution to nuclear reactors, it must also credit EREF for the known environmental and health threats that are also attributed to the same nuclear reactors.

Response: *The NRC's analysis of GHG impacts was performed in a manner consistent with the draft Council on Environmental Quality (CEQ) guidance (CEQ, 2010) and addressed only GHG emissions associated directly with production of baseload power. The hypothetical scenario that the NRC staff selected was intended to represent a bounding condition, but is nevertheless feasible because it represents a situation where the entire potential annual output of enriched uranium from the proposed EREF is used to fabricate fuel that is deployed in U.S. reactors. Coal was chosen for comparison because coal currently provides a large percentage of baseload power (in fact, coal combustion for power generation is the largest single source of GHG emissions in the country) and, among the fossil fuels presently used for baseload power production, coal has the greatest GHG footprint (in terms of amount of GHG emitted per kWh of power produced).*

However, the NRC acknowledges here that use of the term "GHG sink" in the EIS was imprecise and a source of confusion. A GHG sink is capable of removing GHGs from the atmosphere and sequestering it indefinitely and not something that prevents the release of GHG. Although objections to the use of the term "GHG sink" may be well founded, the argument clearly made in the EIS text is that use of a nuclear reactor instead of a coal-fired power plant to generate baseload power will avoid the release of GHGs to the atmosphere. Since the NRC cannot control the transmission system operator's use of the generator dispatch queue, the idea that a nuclear reactor would always be selected in deference to a coal-fired plant must remain hypothetical. However, when such a selection of generating source is made, avoidance of GHG emissions will result.

With respect to suggestions that other environmental impacts of the nuclear fuel cycle must be introduced into the analysis, these were not considered because the analysis was not intended to be a complete life-cycle assessment. To expand the argument to a full life-cycle assessment would have obligated the NRC to also introduce other environmental impacts across the entirety of the coal fuel cycle. Instead, the analysis was intended to focus only on the matter of GHG emissions related directly to electricity production in a manner consistent with the CEQ guidance.

To avoid any confusion, NRC has amended the text in Section 4.2.17 to clarify the parameters of its analysis and to focus on a nuclear reactor's ability to avoid the release of GHG rather than its ability to act as a GHG sink.

I.5.24 Terrorism

Comment: The following comment states the Draft EIS did not estimate the probability of terrorism.

[141-04, Peter Rickards] 2) While the DEIS does not address disgruntled employee sabotage, it at least acknowledges that terrorism could happen, during transport and at the facility. On page 396/430 the DEIS actually admits that terrorism would equal the full release of a severe transportation accident. However, the DEIS refuses to estimate the probability of terrorism, allowing licensing by the usual trick of pretending a severe transport accident will never happen, using probability math. By hiding behind probability math, the high doses the public can receive are dismissed as acceptable risk.

While the public decides which energy policy is better for their families safety, windmills/solar/geothermal vs. nuclear power, hiding the profound devastating impacts of these accidents and terrorism is misleading and unacceptable.

Response: *The NRC considered a number of potential terrorist scenarios, including those involving disgruntled employees, in its review. The impacts evaluated are representative of a range of what could occur, as presented in Section 4.2.18.2 of the EIS.*

The consideration of terrorism in the EIS does not include an estimate of probability because, as discussed in Section 4.2.18.2, the likelihood of occurrence of any terrorist scenario is speculative and cannot be determined. Thus, there is no discussion of risk, only the presentation of potential impacts should a terrorist attack occur. Section 4.2.18.3 presents a number of potential mitigation measures, to be imposed by the NRC, which would either help avoid or lessen the consequence of such an event.

Comment: The following comment questions statements in the Draft EIS regarding the public health effects of an HF plume at the proposed EREF.

[141-06, Peter Rickards] 4) Pages 397&8/430 claims an HF plume at the facility may affect 1,900 members of the public, but also claims no fatalities, which seems untrue without detailed explanation to justify the dismissal of severe impact, including death.

Response: *As stated in Section 4.2.18.2 of the EIS, the referred 1900 members of the public is for a different DOE facility used as a reference point in the analysis for the proposed EREF, where up to three irreversible health effects were estimated, of which about 1 percent, or fewer than one (0.03), would result in fatality. The text in Section 4.2.18.2 notes that "it is expected that much fewer than 1900 members of the public could be affected in the vicinity of the proposed EREF because the DOE analysis was for a location with a higher population density (>34,000 people within 16 kilometers [10 miles]) than that of the proposed EREF location, which has no appreciable population within 16 kilometers (10 miles)." The risk of fatality would also be correspondingly lower than this already low level.*

Exposure to HF produces a wide range of health effects ranging from irritation of the eye, nose, and skin to possible death depending on the HF concentration in air and duration of exposure. Low-level exposures produce reversible health effects, as described in Section 3.11.3.3 of the

EIS. The estimated concentrations in HF plumes produced in release scenarios are at sublethal concentrations beyond the proposed EREF site boundary.

I.5.25 Cumulative Impacts

Comment: The following comment points out the need to address impacts from the proposed EREF project in the distant future.

[077-02, Larry Hyatt] I just want to make one point in addition to what I said briefly in Boise, was -- that is, the issue of stewardship. As you all know, human activity has results that we have to live with for years, potentially hundreds, and maybe even thousands of years. But it is critical in an evaluation like this in terms of its environmental impact that we seriously consider the year 5010.

***Response:** As required under NEPA, in the EIS, the NRC staff has assessed all reasonably foreseeable activities and impacts associated with the preconstruction, construction, operation, and decommissioning of the proposed EREF project.*

Comment: The following comment asks if a redundant source of electrical power is a requirement for operation of the proposed EREF, if AES has future plans to route a redundant transmission line, and if a redundant source of electrical power is a reasonably foreseeable future action that should be addressed in the cumulative impacts section of the EIS.

[140-01, Wendy Reynolds, on behalf of the Bureau of Land Management, Upper Snake Field Office] 1) A reading of the draft document makes clear that one criterion used to select the enrichment facility site was the presence of a redundant electrical power supply. It is further presented in Table 2-3 that the Bonneville County site passed Phase I screening indicating that there is a redundant power source available for the plant. However, the potential environmental impacts of the construction and use of a redundant power supply is not discussed under Utilities (2.1.3.2) (under the Proposed Action), nor is it discussed in the Environmental Impacts section of the document. The construction and use of a redundant power source is not considered as a reasonably foreseeable future action under the cumulative impacts section either.

These facts lead the BLM to ask: Is a redundant source of electrical power a requirement of the plants operation? If so, where would the redundant source come from? As you know, areas to the west of the plant (where a potential source of redundant power is available) are managed by the Idaho National Laboratory (INL; Department of Energy). Non-mission essential rights-of way (ROWs) on these lands are administered by the BLM, Upper Snake Field Office. Does AES have future plans to route a redundant transmission line across INL and BLM-administered lands?

***Response:** The NRC does not require that the proposed EREF have a redundant source of electrical power, and the absence of a redundant source does not raise a safety issue, as determined by the NRC's safety review. The NRC is unaware of future plans that AES may have regarding a redundant source of electrical power.*

Comment: The following comment expresses concerns regarding the cumulative impacts section of the Draft EIS, in particular with regard to the definition of the ROIs for each resource; the limited discussion of past, present, and reasonably foreseeable future actions that may contribute to cumulative impacts (particularly for past actions); and the cumulative impact analysis for the no-action alternative.

[140-05, Wendy Reynolds, on behalf of the Bureau of Land Management, Upper Snake Field Office] 4) The BLM would also like to express some concerns with the cumulative impact analysis section of the document. The NRC is correct in citing the regulations at 40 CFR§ 1508.7 for the definition of what a cumulative impact is and in discussing the fact that ROI's (we assume this is equivalent to a cumulative impact assessment area) can, and most likely, would be different for each resource affected.

The primary concerns from the BLM's point of view is that the ROI's are not defined for each resource, a cumulative impact baseline is not established for each ROI, and there is relatively little discussion of past, present and reasonably foreseeable future actions that may contribute to cumulative impacts (particularly for past actions). Although in some cases past and present actions and their impacts are discussed (although the intensity of the impact is not), the emphasis seems to be on the reiteration of the direct and indirect impact presentation. Further, a cumulative impact analysis should be conducted for each resource affected by the proposed action and no action alternative, which is not evident in this section (for additional guidance, please refer to the Council on Environmental Quality's [CEQ's] 1997 publication, Considering Cumulative Effects Under the National Environment Policy Act).

Response: *Section 4.3 of the EIS defines the ROI radius of the proposed EREF for cumulative impacts for each resource area analyzed as 16 kilometers (10 miles), except for socioeconomics, for which the ROI is defined as 80 kilometers (50 miles). Impacts on resources from* past, present and reasonably foreseeable future *actions within these distances are analyzed if the actions would affect the resource. Effects on the entire resource are analyzed, even if the resource extends beyond 10 miles, for example, an ecoregion, in the case of the 10-mile ROI. Within the 10-mile ROI, the actual geographic extent of effects may be less than 10 miles for a given resource. Cumulative impacts are analyzed accordingly within the resource area discussions. The 10-mile and 50-mile ROIs thus represent threshold distances for identifying actions that could contribute to cumulative impacts on resources.*

The cumulative impacts analysis in Section 4.3 considers the impacts of past actions mainly on resources that have been significantly impacted in the past and that will incur additional impacts from future actions, such as soils and ecological resources. For resources with relatively low past impacts, such as air quality, the analysis focuses on incremental impacts from foreseeable actions. A brief summary of major past actions, namely agriculture and the INL, has been added to the introduction of Section 4.3.

Section 4.3 of the EIS also notes that cumulative impacts associated with the no-action alternative would be generally less than those for the proposed action, with the exception of socioeconomic impacts. Within the 10-mile ROI for all other resources, the no-action alternative would have no impacts, as no other foreseeable actions occur within this distance, and the site would be expected to continue to be used for agriculture. A statement to this effect has been *added to the introduction of Section 4.3. The revised cumulative impacts analysis takes into account CEQ's guidance (CEQ, 1997) and BLM's NEPA handbook (BLM, 2008).*

Comment: The following comment asks about the cumulative impact to sage grouse from the implementation of the proposed action and the no-action alternative, and how long the effects would last.

[140-06, Wendy Reynolds, on behalf of the Bureau of Land Management, Upper Snake Field Office] What would be the cumulative impact to sage grouse from the implementation of the Proposed Action and the No Action alternative? How long would the effects last?

Response: *As discussed in Section 4.3.7 of the EIS, the contribution to cumulative impacts from the proposed EREF project on ecological resources would be SMALL. Text has been added to Section 4.3.7 to include sage-grouse. The effects would last for the life of the proposed transmission line and EREF site facilities that would affect sage-grouse. The no-action alternative would have no impacts beyond current site use for agriculture because no other foreseeable actions occur within the 10-mile ROI.*

Comment: The following comment asks about the incremental impact on air quality, soil resources, vegetation, wildlife, and grazing livestock from the periodic releases of small amounts of uranium hexafluoride (UF_6) over the 30-year life of the facility.

[140-07, Wendy Reynolds, on behalf of the Bureau of Land Management, Upper Snake Field Office] What would be the incremental impact on air quality, soil resources, vegetation, wildlife and grazing livestock from the periodic release of small amounts of UF6 over the thirty year life of the facility?

Response: *As discussed in Section 4.3.10 of the EIS, offsite air concentrations of uranium compounds would be below detection limits and would be expected to have a SMALL impact over the life of the facility. No measurable incremental impacts of any resource outside of the proposed EREF security fence would be expected due to the low anticipated emission rate of uranium from the proposed facility.*

A conservative calculation estimates that existing (background) uranium soil concentrations, as listed in Table 3-16 of the EIS, would increase approximately 2 percent (less than the standard deviation of the soil measurements) immediately outside the proposed EREF security fence if 30 years of uranium emissions from the proposed EREF were considered. If 527 microcuries of uranium were released on an annual basis, as discussed in Section 4.2.10.2 (AES estimates actual releases will be about 3 percent of that value), a total of about 15,810 microcuries would be released over the 30-year life of the facility. Considering a release of that amount, an increase of about 34 pCi/kg of uranium in the soil would be expected using the atmospheric dispersion factor in Table 4-17 (1.80×10^{-5} s/m^3), the deposition velocity of 1.8×10^{-3} m/s in Table E-6, an estimated soil density of 1.5 g/cm^3, and a mixing depth of 1 cm. For comparison with Table 3-16, the value of 34 pCi/kg is approximately 2 percent of the combined uranium isotope values and less than the standard deviation of the soil concentration measurements. Moving further away from the proposed EREF, the corresponding soil concentrations at the *nearest proposed site boundary where grazing could occur would be 20 percent less than the value at the security fence. Thus, the impacts to soil and dependent resources such as vegetation, wildlife, and grazing livestock would be SMALL and immeasurable.*

Comment: The following comment states that the EIS should provide cumulative risk analysis regarding the amount of hazardous or toxic materials to be imported and exported across state lines.

[027-08, Sara Cohn] The draft EIS should provide cumulative risk analysis regarding the amount of hazardous or toxic materials to be imported and exported across state lines.

Response: *Such a cumulative impact analysis is beyond the scope of the EIS, as the ROI for cumulative impacts (i.e., 10 miles) does not extend to the State borders. The risks of transporting materials to and from the EREF and the impacts on waste management from EREF operations under the proposed action alone are analyzed in Sections 4.2.9 and 4.2.11 of the EIS, respectively.*

Comment: The following comment indicates that economic impacts regarding income and tax revenues should also be evaluated in the EIS on a cumulative basis.

[124-03, Lane Packwood] I found it somewhat interesting that the EIS does take kind of a "sliced bread" approach to income and taxes. They look at one year within preconstruction, one year in construction, one year of operation, and take a look at what those revenues are, when, in fact, we would encourage you to look at the length of -- or the lifetime of the facility. That's all a cumulative impact.

Response: *In Section 4.2.12 of the EIS, economic impacts of the proposed EREF are analyzed on an annual basis during both the construction and operation periods of the proposed facility. These benefits would accrue over the life of the facility. Chapter 7 of the EIS (Benefit-Cost Analysis) provides the total (i.e., summed over all years of the project) employment, income, and fiscal impacts of the project.*

Comment: The following comment recommends that the EIS should consider all sources of air emissions and determine the contribution of each source to air quality, and that the Final EIS should include information to allow accurate air quality impacts and mitigation measures and their effectiveness to be determined.

[138-03, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] Air quality may also be impacted due to cumulative impacts from surrounding activities such as agriculture and fire, herbicides to treat invasive plant species, and continued management of radioactive materials at nearby Idaho National Laboratory. The EIS should consider all sources of emissions and determine the contribution of each source to air quality - negative or positive. Because the DEIS does not include refined analysis of emissions from sources that are utilizing appropriate control technologies and more detailed construction activities and schedules (p. 4-12), we recommend that the final EIS include that information so accurate air quality impacts and mitigation measures and their effectiveness can be determined.

Response: *Air quality impact assessments from preconstruction and construction in the EIS are based on all preconstruction- and construction-related information currently available. A more detailed assessment is not possible until a specific construction schedule is developed by AES, and such a schedule will not be available in time for publication of the Final EIS. Nevertheless, it is the NRC's expectation that AES will be required to submit such a schedule, at the appropriate time, to IDEQ and to Bonneville County in pursuit of necessary construction permits and approvals.*

Ambient air quality for Bonneville County for 2008 was summarized in Section 3.5.3.1 of the EIS; all values were below their respective NAAQS values. EPA guidance regarding the use of its AERMOD dispersion model indicates that circumstantial factors such as other sources of air releases in the region of interest need not be quantified, but should be considered in the interpretation of the dispersion modeling results (Federal Register [70 FR 68218]). Appropriate identification and consideration of those other sources of air pollution in the area are provided in Section 3.5.3. Decisions regarding amendment to Idaho's State Implementation Plan (SIP) that might involve installation of a new ambient air quality monitoring station in the area of the proposed EREF project are outside of the NRC's authority and, therefore, outside the scope of the EIS and instead are the province of IDEQ. The NRC staff believes that the expected short duration of NAAQS exceedance does not argue for a long-term commitment to ambient air quality monitoring in this area.

Comment: The following comment recommends that the routes for some proposed new transmission lines be part of their own NEPA process.

[197-15, Andrea Shipley, on behalf of the Snake River Alliance] It is recommended that the routes for some proposed new transmission lines be part of its own NEPA process, because of potential impacts to wildlife and the land.

Response: *In Section 4.3 of the EIS, the impacts of the proposed new 161-kilovolt (kV) line that would power the proposed EREF are analyzed as cumulative impacts within the ROI of the facility, and as such, analyzed according to the route currently proposed by AES and Rocky Mountain Power. Impacts on wildlife and land use are considered in the analysis. The proposed 161-kV transmission line discussed in the EIS is the only new transmission line for the proposed EREF of which the NRC is aware.*

Comment: The following comment maintains that the assessment of cumulative impacts in the EIS should include shipments to and storage and production at the offsite fuel fabrication facility.

[181-17, Roger Turner] Cumulative effects include Fuel Fabrication. The NEPA requires an assessment of cumulative impacts of this project. This would include additional shipments, storage and production at the off-site fuel fabrication facility. Please add this process, risks, to the cumulative evaluation of Areva plant.

Response: *Impacts at a fuel fabrication facility are beyond the scope of this EIS, which is for the proposed EREF. Furthermore, the cumulative impacts analysis is concerned with impacts to resources from actions within a geographic ROI around the proposed EREF. No offsite fuel fabrication facility is within the ROI for affected resources.*

Comment: The following comments express a position that a proposed route for the Mountain States Transmission Intertie (MSTI) near the proposed EREF is not certain and should not be included in cumulative impacts.

[113-11, Ken Miller] Furthermore, the routes for some proposed new transmission lines, including the proposed Mountain States Transmission Intertie (MSTI), have not been determined and as such should not be considered as certain future transmission infrastructure.

[184-19, Kitty Vincent; 191-28, Liz Woodruff] The routes for some proposed new transmission lines, including the proposed Mountain States Transmission Intertie, have not been determined and as such should not be considered as certain future transmission infrastructure.

[193-17, Liz Woodruff, on behalf of the Snake River Alliance] My next point is regarding transmission issues. The routes of some of the proposed new transmission lines, including the MSTI intertie, have not been determined. Those routes have not been concluded yet in our state, and thus should not be considered as certain future transmission infrastructure, as they are currently in the EIS.

Response: *The preferred route for the MSTI as identified by project developers is within 40 kilometers (25 miles) of the proposed EREF site, and its construction is considered a reasonably foreseeable action affecting socioeconomics within the ROI. Analyzed actions need only be reasonably foreseeable to be included in the cumulative impacts analysis.*

Comment: The following comments suggest that burying the transmission line to power the proposed EREF should be considered as an alternative, so as to minimize impacts to wildlife.

[113-05, Ken Miller] The idea of burying power lines, we believe, needs to be addressed in the EIS before it's finalized, because we do believe -- we agree with the Department of Fish and Game -- that there will continue to be harmful impacts to birds, bats, and other wildlife. This is especially important given impacts of transmission line construction and operation could also include wildlife disturbance and mortality.

Given all of that, we believe that to exempt the transmission work from – as preconstruction, and to exempt that from the EIS review needs to be reassessed.

[113-12, Ken Miller] The Draft EIS should analyze the benefit of burying any additional transmission lines to minimize the known harmful impacts to birds, bats, and other wildlife.

[184-20, Kitty Vincent; 191-29, Liz Woodruff] The draft EIS should also analyze the benefits of burying any additional transmission lines to minimize the known harmful impacts to birds, bats and other wildlife. This is especially important given "impacts of transmission line construction and operation could also include wildlife disturbance and wildlife mortality." (4-150)

[193-18, Liz Woodruff, on behalf of the Snake River Alliance] On another point on transmission, and this is very key, the DEIS should also analyze benefits of bearing any additional transmission lines, to minimize the known harmful impacts to wildlife in the area. This is especially important given that impacts of transmission lines will disturb wildlife and cause wildlife mortality.

[191-30, Liz Woodruff] The Idaho Department of Fish and Game, in a response to the NRC dated April 14, reaffirmed the threats transmission lines would pose to wildlife (draft EIS B-26) and challenges the methodology of sage grouse and lek analysis in the EIS (B-27), recommends burying transmission lines, and suggests Areva submit to the NRC for review plans to mitigate for the expected wildlife impacts. These concerns do not appear to have been addressed in this EIS.

Response: *In Section 4.3 of the EIS, the cumulative impacts of a proposed, above-ground, 161-kV transmission line that would serve the proposed EREF are analyzed. Additional discussion of the potential effects of the transmission line on sage-grouse has been added to Section 4.3.7. This analysis concludes that the line would have SMALL contributions to cumulative impacts in all resource areas. However, text regarding monitoring of the transmission line right-of-way for avian mortality has been added to Section 6.2.2. Because the line is a small action compared to the proposed EREF, the assessment does not analyze impacts from alternative line designs. In any event, when evaluating the recommendation of IDFG to bury the transmission line, AES determined that it was not practical, safe, or standard utility company practice to bury high-voltage lines, such as the 161-kV line (AES, 2010e).*

Comment: The following comments express concern that impacts from the transmission line should be considered as a direct action (i.e., more fully analyzed) rather than a cumulative impact. The predominant concern expressed is that impacts to wildlife were not adequately addressed as a result.

[015-19, Beatrice Brailsford] The NRC's exemption authorizing Areva to undertake preconstruction activities should not include exempting utilities installations, including transmission lines and associated substations and other utility infrastructure. Installation of 80-foot, 161kv transmission lines should not be considered as having "cumulative" impacts but rather direct impacts that must be analyzed in the EIS. But EREF could not operate without the transmission line, which is critical to the proposed action. The NRC therefore errs when it excludes this transmission line from the proposed action.

[113-04, Ken Miller] Installation of 80-foot tall, 161-kilovolt transmission lines should not be considered as having cumulative impacts, as referred to in the EIS, but rather direct impacts that must be analyzed in the EIS. Contrary to assertions, and this is in the Draft EIS 1-10, that this transmission line is not considered by the NRC to be part of the proposed action. EREF could not function without the transmission line, which is critical to the proposed action, and must be considered for its environmental impacts.

The Draft EIS is in error when it suggests at page XLV that "impacts from the construction of a proposed new 161 KV transmission line, a substation, and substation upgrades for the proposed EREF are addressed as cumulative impacts in this EIS." This action is not under

NRC's jurisdiction, according to the EIS, and therefore not considered by the NRC to be part of the proposed action.

We don't believe this is a defensible position. The EIS is replete with positive social and economic benefits from this project. Erecting 80-foot transmission towers and stringing power lines between them must be considered for their environmental impacts, just as Idaho's Department of Fish and Game suggests. And I'll skip through this, and the Fish and Game reference is in an April 14th letter of response to the NRC, which reaffirmed the threats transmission lines would pose to wildlife. This is on B-26, 27, and 28 in the EIS, and it challenges the methodology of sage grouse and lek analysis on the EIS. That's at Draft B-27. It recommends burying transmission lines, and suggests that AREVA submit to the NRC for review plans to mitigate for their wildlife impacts.

[113-10, Ken Miller] On the issue of transmission, the NRC's ill‐advised exemption that authorizes Areva to undertake preconstruction activities as not being part of the proposed action should not include exempting utilities installations, including transmission lines and associated substations and other utility infrastructure. Installation of 80-foot, 161-kV transmission lines should not be considered as having "cumulative" impacts but rather direct and immediate impacts that must be analyzed in the EIS.

Contrary to assertions (DRAFT EIS 1-10) that "this transmission line is not considered by the NRC to be part of the proposed action," EREF could not function without the transmission line, which is critical to the proposed action and must be considered for its environmental impacts. This EIS claims repeatedly that the NRC has no jurisdiction over transmission lines and therefore new transmission lines should not be considered as part of this EIS. Yet the NRC claims authority to determine that EREF deserved credit for being a greenhouse gas sink?

This is not a defensible position. The EIS is replete with supposed "positive" social and economic benefits from this project. Erecting transmission towers and stringing power lines between them MUST be considered for their environmental impacts, just as Idaho's Department of Fish and Game suggests. Actually, the installation and operation of this transmission line have everything to do with the proposed action, and the failure of the NRC to consider these impacts in the EIS phase cannot be defended, particularly given the acknowledgment by Areva and NRC that impacts of transmission line construction and operation could also include wildlife disturbance and wildlife mortality. The proposed transmission line route includes potentially suitable habitat for sage brush obligate species, including migratory bird species. The Idaho Department of Fish and Game's response to the NRC, dated April 14, reaffirmed the threats transmission lines would pose to wildlife (Draft EIS B-26) and challenges the methodology of sage grouse and lek analysis n the EIS (Draft B-27), recommends burying transmission lines, and suggests that Areva submit to the NRC for review plans to mitigate for the expected wildlife impacts.

[150-05, Katie Seevers] In addition to these concerns of effects to the environment, the Idaho Department of Fish and Game has reaffirmed threats to the transmission lines would pose to wildlife, which is discussed in the draft EIS, section B-26. With pronghorn antelope, sage grouse, and excuse me if I pronounce this wrong -- ferruginous hawks, all making their habitat on the proposed site, wildlife impact should be more closely examined by the NRC.

[153-13, Andrea Shipley] The EREF could not function without the transmission line, which is critical to the proposed action. It is recommended that the routes for some proposed new transmission lines be part of its own NEPA process because of potential impacts to wildlife and the land.

[197-13, Andrea Shipley, on behalf of the Snake River Alliance] The EREF could not function without the transmission line, which is critical to the proposed action.

[184-18, Kitty Vincent; 191-27, Liz Woodruff] The NRC's exemption that authorizes Areva to undertake preconstruction activities as not part of the proposed action (draft EIS xxvii) should not include exempting utilities installations, including transmission lines and associated substations and other utility infrastructure. Installation of 80-foot, 161-kV transmission lines should not be considered as having "cumulative" impacts but rather direct impacts that must be analyzed in the EIS. Contrary to assertions (draft EIS 1-10) that "this transmission line is not considered by the NRC to be part of the proposed action," EREF could not function without the transmission line, which is critical to the proposed action.

[184-21, Kitty Vincent] The Idaho Department of Fish and Game, in a response to NRC dated April 14, reaffirmed the threats transmission lines would pose to wildlife (draft EIS B-26) and challenges the methodology of sage grouse and leak analysis in the EIS (B-27), recommends burying transmission lines, and suggests Areva submit to plans to mitigate for the expected wildlife impacts. These concerns do not appear to have been addressed in this EIS and must be addressed before any preconstruction activities are allowed or before this EIS review continues.

[191-30, Liz Woodruff] The Idaho Department of Fish and Game, in a response to the NRC dated April 14, reaffirmed the threats transmission lines would pose to wildlife (draft EIS B-26) and challenges the methodology of sage grouse and lek analysis in the EIS (B-27), recommends burying transmission lines, and suggests Areva submit to the NRC for review plans to mitigate for the expected wildlife impacts. These concerns do not appear to have been addressed in this EIS.

[193-19, Liz Woodruff, on behalf of the Snake River Alliance] Now this is something that's considered as a preconstruction impact in EIS, so this isn't given the weight and the technical impact review, the small, moderate, and large that you saw.

But more specifically, in the EIS, in Appendix B, the Idaho Department of Fish and Game affirms that the threat to transmission lines would be great for wildlife, and they recommend barring transmission lines and suggest AREVA submit to plans to mitigate for the expected wildlife impacts. These concerns must be addressed in the EIS, before any preconstruction activities are allowed.

Response: *In Section 1.4.1 of the EIS, the reason the NRC staff has analyzed the impacts of the proposed new 161-kV transmission line, that would serve the proposed EREF, as cumulative impacts is provided. However, the transmission line is not exempted from the EIS review. The impacts of this line are analyzed in Section 4.3 as cumulative impacts within the ROI of the proposed EREF. In addition, the environmental review is not diminished by the fact that the impacts of the proposed transmission line are considered under cumulative impacts rather than direct impacts because all impacts within a 16-kilometer (10-mile) ROI of the* *proposed EREF are associated with the facility. Socioeconomic impacts consider additional actions out to 80 kilometers (50 miles).*

The proposed 161-kV transmission line, while considered by the NRC as preconstruction, is analyzed under cumulative impacts as a foreseeable action. Because the line is necessary for operations of the proposed EREF, it is given particular attention in the EIS and its impacts are fully analyzed. The analysis concludes that the proposed transmission line would have SMALL contributions to cumulative impacts, including the cumulative impacts on ecological resources such as vegetation and birds.

Comment: The following comments express concern that a license extension for the proposed EREF is likely and that depleted uranium waste will be left on site after the original 30-year license period.

[015-05, Beatrice Brailsford] The most domestic part of the proposal is that the waste will, in fact, stay here. The plant would produce 320,000 tons of depleted uranium hexafluoride over its licensed lifetime, and the door is already ajar for the license to be extended. That waste might be stored on outdoor concrete pads above the Snake River aquifer until the plant is decommissioned.

It's worth noting that New Mexico sharply limits how much, and how long waste can stay at the plant there. The waste has to be treated before it can be disposed of. Two government-owned treatment plants are under construction, over budget, and behind schedule. Waste the U.S. has already accumulated will take a combined 43 years to process.

[015-14, Beatrice Brailsford] The EREF will produce more than 350,000 tonnes of depleted uranium hexafluoride (DUF6) over its licensed lifetime, and the door is already ajar for the license to be extended. That waste would be stored in 25,718 cylinders on outdoor concrete pads above the Snake River Aquifer as long as the plant operates. DUF6 is both radioactive and chemically toxic and has to be treated before it can be disposed of. The DOE has built two plants to treat depleted uranium hexafluoride waste the US has already accumulated. That treatment will take a combined 43 years to process. A private US corporation is seeking a license for its own treatment plant. The draft EIS cavalierly dismisses any potential bottlenecks by stating that the waste could simply be sent to the DOE treatment plants before they're ready to process it and then their operating lives extended. But it is at least as likely that the DUF6 will be stored in Idaho for an uncertain length of time above the Snake River Aquifer, a sole source aquifer for nearly 300,000 people. Storage under these conditions must be fully evaluated under NEPA.

[045-01, Joan Drake] I write to oppose the construction of the Areva nuclear power plant. I am very concerned that the proposed plant would produce an estimated 320,000 tons of depleted uranium hexafluoride over its licensed lifetime. In view of this, and the fact that its license might well be extended, indications are that this waste would likely be stored in or near Idaho until the plant's decommissioning. Even after its removal and treatment, there is no certain disposal pathway. The Areva plant should not be licensed until regulations are in place for the environmentally safe disposal of large quantities of depleted uranium.

[086-03, Paula Jull] Areva's plant would produce 320,000 tons of depleted uranium hexafluoride over its licensed lifetime, and its license might well be extended. All this waste might be stored in Idaho until the plant was decommissioned.

[095-05, Linda Leeuwrik] Areva's plant would produce 320,000 tonnes of depleted uranium hexafluoride over its licensed lifetime, and its license might well be extended. All this waste would likely be stored in Idaho until the plant was decommissioned. Even after it is removed and treated, there is no certain disposal pathway.

[097-01, Bryan Martin] So based on the capabilities of those facilities, and what's going to be produced here – well, just based on what's presently in existence, it would take over 22 years to deconvert all of the existing nuclear waste, leaving at least 22 years of depleted uranium, on site at Eagle Rock, before anything can be started.

And so that's a concern, because then you have 22 years of waste that's sitting on sites, that can then be shipped off, you know, as time progresses, but with that type of lag, it suggests that there will be waste present on site past the scheduled lifespan of the facility, that 30 years. And so that kind of begs the question of, well, are you expecting this to be a license extension? And so if that is the case, if that's kind of implied, that should be something that should be addressed and discussed within the EIS before it's finalized.

[122-01, Kathy O'Brien] I do not want the waste from this plant here in Idaho or anywhere. It is not clean energy because of the waste both from this plant and from nuclear power plants. Areva's plant would produce 320,000 tonnes of depleted uranium hexafluoride over its licensed lifetime, and its license might well be extended. All this waste might be stored in Idaho until the plant was decommissioned. Even after it's removed and treated, there is no good way to dispose of it.

[150-02, Katie Seevers] The draft EIS assumes that the depleted uranium hexafluoride will not be stored on the site past the license life of the facility. However, it also acknowledges that Areva may apply for a license extension. I find the lack of a fully developed rule on disposal of depleted uranium problematic, especially when coupled with the prospect of seismic activity in the area and the potentiality for a license extension.

[153-06, Andrea Shipley; 197-06, Andrea Shipley, on behalf of the Snake River Alliance; 184-08, Kitty Vincent] The draft EIS assumes that depleted uranium hexafluoride will not be stored on site beyond the licensed life of the facility. But it also acknowledges Areva may apply for a license extension. As a matter of fact, Areva plans to ask federal regulators for permission to alter the normally required procedure as it ends the manufacturing of nuclear fuel in Virginia because the company would still use the site for other nuclear activities. (Gentry, The News & Advance © Copyright 2009). So, what's next for the Idaho facility if an extension is approved? The NRC must discuss the length of an extension and whether cumulative waste storage would be allowed.

[175-04, Ellen Thomas] Areva's plant would produce 320,000 tonnes of depleted uranium hexafluoride over its licensed lifetime, and its license might well be extended. There is no certain disposal pathway.

[191-12, Liz Woodruff] The draft EIS assumes that depleted uranium hexafluoride will not be stored on site beyond the licensed life of the facility. But the draft EIS also acknowledges that Areva may well apply for a license extension. The NRC must discuss the length of a potential extension and whether or not cumulative waste storage would be allowed.

[192-02, Lisa Young] I'm concerned about many different issues surrounding this facility's Environmental Impact Statement, but today I'll focus on the storage of depleted uranium hexafluoride waste on site, and the future transportation and storage off site. While the proposal commits to removing all of the depleted uranium waste from the site, after decommissioning, the question still lingers. What if they receive a license extension? It's important to analyze the environmental impact that the storage of this waste on site, beyond the timeline currently implicated by the proposal, as this is a very real possibility and could result in very different analyses of the storage of the waste on site.

[192-08, Lisa Young] I am concerned about many different issues surrounding this facility's environmental impact statement, but in the comments that follow I will focus on the storage of depleted uranium hexafluoride waste on-site, and the future transportation and storage of that waste off-site. While the proposal commits to removing all of the depleted uranium waste from the site after decommissioning, the question still lingers: what if they receive a license extension? It's important to analyze the environmental impact of the storage of this waste on-site beyond the timeline currently implicated by the proposal, as this is a very real possibility, and could result in very different analyses of the storage of the waste on-site.

Response: *AES's license for the proposed EREF, if granted by the NRC, would be for a period of 30 years for construction and operation of the proposed facility. Any extension of the license would require a separate licensing action by the NRC and a separate environmental review at the time of the application for license extension.*

I.5.26 Mitigation

Comments on mitigation measures can be found in the Section I.5 subsections specific to the applicable resource areas.

I.5.27 Environmental Measurement and Monitoring Programs

Comment: The following comment asks why the Draft EIS references NRC Regulatory Guide Revision 1 rather than Revision 2.

[066-06 Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 4. Several places in the draft EIS reference NRC reg guide 4.15 revision 1 (1979). Please explain why the NRC does not reference revision 2 (2007).

Response: *The NRC acknowledges that Revision 2 (2007) of Regulatory Guide 4.15 should have been the proper reference. The reference list of Chapter 6 (Section 6.3) and the text of Sections 6.1, 6.1.2, and 6.1.8 of the EIS has been revised accordingly.*

Comment: The following comment requests clarification in the EIS concerning how AES will tie into the appropriate monitoring networks to the maximum extent possible in order to better delineate INL impacts from impacts of the proposed EREF, as well as understanding the broader regional impacts.

[066-07, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 5. The DEQ INL Oversight program works in conjunction with the INL (DOE and contractors) to monitor soils, air quality, ground water and surface water through a complex monitoring system. DEQ requests clarification in the EIS concerning how AES will tie into the appropriate monitoring networks to the maximum extent possible in order to better delineate INL impacts from AES impacts as well as understanding the broader regional impacts.

Response: *The NRC staff acknowledges this comment. However, the staff finds that the actions AES has committed to taking with regard to monitoring of soils, air, groundwater, and surface water will be sufficiently protective of the environment. These actions are described in Chapter 6 of the EIS (Environmental Measurements and Monitoring Program).*

When NRC reviews a proposed action, its ability to impose additional requirements and environmental mitigation and monitoring measures beyond those proposed as part of the license application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the proposed facility be built in accordance with the submitted application, including mitigation and monitoring measures proposed by the applicant that are not specifically required by or directly related to NRC's regulations. Thus, the NRC does have the ability to hold licensees to key mitigation and monitoring measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.

Comment: The following comment questions the locations of some of the deep groundwater sampling locations on the proposed EREF site, and requests an explanation for why there are no groundwater sampling wells in the southwest (SW) or south-southwest (SSW) sectors of the monitoring locations map.

[066-10, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] Chapter 6: pp, 6-3, Figure 6-1. Many of the deep groundwater sampling locations are too close to the facility to ensure detection at depth. Additionally, it is generally accepted that the groundwater flows in a southwesterly direction. Please explain why there are not groundwater sampling wells in the SW or SSW sectors of the monitoring locations map.

Response: *Groundwater sampling wells are located on the proposed EREF property on the basis of the predominant groundwater flow direction, which is from the northeast to the southwest in the vicinity of the proposed EREF. Several of the groundwater sampling points (wells) shown on Figure 6-1 in the EIS, indicated by the number 6, are located in the southwest (downgradient) sector; these are mainly deep wells, but include one shallow well to monitor perched groundwater near the facility. Two wells are located to the northeast (upgradient) of the facility to provide sampling control points. The IDEQ has a statewide network of wells it monitors to evaluate the overall quality of groundwater throughout the State to meet the objectives of the State's Ground Water Quality Protection Act. Any monitoring outside of the* *proposed EREF property boundary, therefore, would occur under the aegis of the State's groundwater quality monitoring program. Section 6.1.5 of the EIS has been revised to include this information.*

Comment: The following comment requests clarification on whether any gross alpha or beta measurement over 10 percent of the listed U (uranium) value will be analyzed further, or if there are specific criteria based on a gross alpha beta screening that will trigger the analysis.

[066-11, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 9. Chapter 6: pp. 6-4, Table 6-2 states "Isotopic analyses for uranium isotopes (238U, 236U, 235U, and 234U) would commence whenever gross alpha and gross beta activities indicate that an individual radionuclide could be present in a concentration >I0 percent of the specified concentrations in Table 2 of Appendix B to 10 CFR Part 20." Please clarify whether any gross alpha or beta measurement over 10% of the listed U value will be analyzed further, or if there are specific criteria based on a gross alpha beta screening that will trigger the analysis.

Response: *Should a sample exhibit a gross alpha or beta measurement over 10 percent of the listed uranium value in Table 2 of Appendix B to 10 CFR Part 20, the concentrations of the four specific uranium isotopes would be determined. There are no other screening criteria that will trigger the isotopic analysis (AES, 2010d).*

Comment: The following comment presents recommendations and questions regarding air quality monitoring.

[066-12, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] Chapter 6: pp. 6-6, Lines 10. , & Fig 6-1, pp. 6-3 describes the environmental monitoring sites. DEQ has the following recommendations and questions:

- There should be an air sampling site on the west side of the property which is nearest the INL.

- There should be an air sampling site between the facility and Hwy 20 to the south.

- The air sampling site on the southern fence of the facility is off-set to the SW and is approximately 2 km from the road. This may not be a good indicator of off-site public dose impact at the road and should be relocated.

- The wind rose for the nearest meteorological tower at MFC on pp. C-9 shows winds from the SW and SSW to the NE are the predominate direction and magnitude, yet the only sampling planned in the NE and ENE sectors are one TLD and two groundwater samples collectively. Please explain why are there no air, soil, or vegetation samples in the sectors where impacts are most likely to be observed.

Response: *The NRC staff acknowledges this comment. However, the staff finds that the actions AES has committed to taking with regard to monitoring of soils, air, groundwater, and* *surface water will be sufficiently protective of the environment. These actions are described in Chapter 6 of the EIS (Environmental Measurements and Monitoring Program).*

When NRC reviews a proposed action, its ability to impose additional requirements and environmental mitigation and monitoring measures beyond those proposed as part of the license application is limited to those with a reasonable nexus to providing protection for radiological health and safety and common defense and security. The NRC can, however, require that the proposed facility be built in accordance with the submitted application, including mitigation and monitoring measures proposed by the applicant that are not specifically required by or directly related to NRC's regulations. Thus, the NRC does have the ability to hold licensees to key mitigation and monitoring measures committed to in their applications and subsequently incorporated in the NRC license directly or by reference.

Comment: The following comment requests that the NRC define "sectors" in the cited sentence in Chapter 6, on page 6-9, line 40 of the Draft EIS.

[066-13, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 11. Chapter 6: pp. 6-9, Line 40 states "Samples would be collected quarterly from each sector at locations near the Owner Controlled Area fence line." Please define the "sectors".

Response: *The sectors, shown on Figure 6-1 of the EIS, are the areas identified with the 16 compass directions centered on the proposed EREF. This has been added to the text of Section 6.1.6.*

Comment: The following comment requests clarification of information regarding thermoluminescent dosimeters (TLDs) in the cited sentence in Chapter 6, on page 6-10, lines 6–8, and in Figure 6-1 of the Draft EIS.

[066-14, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 12. Chapter 6: pp. 6-10, Lines 6-8 states "The environmental TLDs would be placed at the Owner Controlled Area fence line near the UF6 storage cylinders. In addition, two TLDs would be placed at offsite locations for control purposes". This implies that TLDs are only placed near the storage pads, but Fig 6-1 shows a network of 15 TLDs at the fence on all sides of the facility. Please explain which description is correct.

Response: *No implication was intended. TLDs would be placed along the entire fence line. The text in Section 6.1.7 has been revised to state, "The environmental TLDs would be placed along the Owner Controlled Area fence line."*

Comment: The following comment recommends a change to the cited sentence in Chapter 6, on page 6-10, lines 11-12 of the Draft EIS.

[066-15, Toni Hardesty, on behalf of the Idaho Department of Environmental Quality] 13. Chapter 6: pp. 6-10, Lines 11-12 states "The TLD along the fence line would provide a combined reading of background as well as above background readings associated with the

UF6 cylinders." DEQ recommends this statement be changed to read "*...provide a combined reading of background as well as any above background readings associated with plant operations and cylinder handling and storage.*

Response: *The text in Section 6.1.7 in the EIS has been changed as recommended.*

Comment: The following comment expresses caution regarding the potential accumulation of radioactivity elsewhere in the environment resulting from effluent releases from the proposed EREF that are within regulatory limits

[087-03, Dennis Kasnicki] Comment 2b: Regardless of releases to the environment that are within legal release limits, watch out for this contamination *accumulating* somewhere. Once, a sewage treatment plant near Nuclear Fuel Services (Erwin, TN) had accumulated a sufficient amount of HIGH enriched uranium to warrant an HEU license, and the NRC actually considered licensing that sewage treatment plant as an option!

Response: *The NRC acknowledges the comment regarding the potential accumulation of radioactivity in the environment resulting from effluent releases from the proposed EREF that are within regulatory limits. Such accumulations would be monitored and addressed through the environmental measurements and monitoring program described in Chapter 6 of the EIS.*

Comment: The following comment requests that monitoring data relating to wildlife and plants be provided electronically to the IDFG within one year of collection.

[089-01, Sharon Kiefer, on behalf of the Idaho Department of Fish and Game] Ecological Monitoring: The Department appreciates and supports the improvements in monitoring protocols resulting from our previous consultation with AES and their contractors. The DEIS documents the ecological monitoring program that would be carried out in accordance with generally accepted monitoring protocols of the Department. Under the program, data would be collected, recorded, stored, and analyzed. We request that monitoring data relating to wildlife and plants be provided electronically to the Department within one year of collection and will pursue discussion with AES for this coordination.

Response: *The NRC staff acknowledges that the IDFG will pursue discussion with AES for this request and coordination.*

Comment: The following comment asks for clarification of what "anomalous" ecological monitoring results might be and what appropriate efforts would be taken to reconcile them.

[089-02, Sharon Kiefer, on behalf of the Idaho Department of Fish and Game] Ecological Monitoring: The DEIS states on page 6-18 lines 4-6, *Procedures would be established, as appropriate, for data Collection, storage, analysis, reporting, and corrective actions. Actions would be taken as necessary to reconcile anomalous results (AES, 2010a).* We are unsure what "anomalous" results might be and what efforts to reconcile them would be appropriate. Please clarify this issue.

Response: *Generally accepted monitoring practices would be expected to include the evaluation of data collection and analysis methods and determinations regarding necessary corrective actions. Anomalous results would be expected to include those that would appear unlikely based on other results of the ecological monitoring program. Potential actions could include, for example, modifications of data collection methods.*

Comment: The following comment requests that a statement be inserted in the ecological monitoring section of Chapter 6 of the EIS, regarding the need to obtain appropriate permits from IDFG or the FWS to handle, transport, or release wildlife, in order to conduct capture and releases.

[089-03, Sharon Kiefer, on behalf of the Idaho Department of Fish and Game] Ecological Monitoring: Page 6-18 lines 20-22, *Measures would be taken to release any entrapped wildlife.* While the Department supports this measure, please insert the statement: <u>Appropriate permits to handle, transport or release wildlife will be obtained from IDFG or USFWS to conduct capture and releases</u>.

Response: *The NRC staff acknowledges this comment. Section 6.2.2 of the EIS states that the ecological monitoring program would be carried out in accordance with the requirements of the IDFG and FWS. However, the staff finds that the actions AES has committed to taking with regard to ecological monitoring, as described in Section 6.2.2, will be sufficiently protective of the environment. It is the responsibility of the applicant, AES in this case, to obtain all required Federal, State, and local permits and approvals for the project.*

Comment: The following comment requests that certain text be inserted in the cited sentence in Chapter 6, on page 6-18, lines 44–46 of the Draft EIS.

[089-04, Sharon Kiefer, on behalf of the Idaho Department of Fish and Game] Ecological Monitoring: On page 6-18 lines 44-46, *Data collected for the ecological monitoring program would be recorded on paper and/or electronic forms. These data would be kept on file for the life of the proposed facility (AES. 20/0).* Please insert <u>and will be provided to IDFG annually (as mentioned above).</u>

Response: *The NRC staff acknowledges this comment. However, the staff finds that the actions AES has committed to taking with regard to ecological monitoring, as described in Section 6.2.2, will be sufficiently protective of the environment. The NRC staff acknowledges that the IDFG will pursue discussion with AES for this request and coordination, as stated in its Comment Number 089-01 above.*

Comment: The following comment deals with the monitoring of emissions (radiological and ambient air) and taking corrective action if air quality standards are not met. Also, the comment points out that there is no monitoring station close to the proposed facility site.

[138-04, Christine Reichgott, on behalf of the U.S. Environmental Protection Agency, Region 10] Since the project area and surrounding areas may include sensitive populations such as the elderly and children, it will also be important to monitor emissions (radiological and ambient air) and take corrective action if air quality standards are not met. Proposed monitoring strategies should be tailored to local conditions because localized air quality impacts can be substantial, even though area-wide and/or long term monitoring may show compliance with air quality standards. The draft EIS indicates that monitoring data from a distant monitoring station in Pocatello, for example, may not represent accurate air emission at the project site. Further, there is no monitoring station close to the proposed facility site (p. 4-16).

Response: *As discussed in Section 3.13 of the EIS, information available to the NRC does not indicate the presence of sensitive populations in the vicinity of the project. Given that air quality impacts are expected to be localized and agricultural activities will continue in the vicinity of the proposed EREF, no populations would appear to be at risk from short-duration, construction-related impacts on air quality, especially since all construction activities would proceed under the auspices of IDEQ-issued permits and Bonneville County-approved mitigation strategies. Decisions regarding amendment to the SIP that might involve installation of a new ambient air quality monitoring station in the project area are outside of the NRC's authority and the scope of the EIS and instead are the province of IDEQ. The expected short duration of NAAQS exceedance does not argue for a long-term commitment to ambient air quality monitoring in this area.*

Comment: The following comment requests that the applicant include air monitoring and reporting plans that are specific to the operations of the proposed facility.

[027-16, Sara Cohn] We request that the applicant include air monitoring and reporting plans that are specific to the operations of the proposed facility. These plans should include guidance for public alerts, immediate containment, responsible parties, etc., should air releases be detected.

Response: *The IDEQ operating permit to be obtained by AES would specify that procedures will be in place to guarantee the expected performance of the air filter systems through rigorous monitoring, inspection, and maintenance programs and that responses to monitoring data would be in accordance with applicable IDEQ regulations.*

I.5.28 Benefit-Cost Analysis

Comment: The following comments deal with the benefits and costs of the proposed EREF project.

[025-06, Hon. Sue Chew] Furthermore, it is my opinion that this uranium enrichment project is unnecessary and exposes the citizens of Idaho to a potential harm that cannot be offset by the proposed benefits of such a program.

[039-01, Kreg Davis] Much has been said about how small money is compared to safety, and we certainly would all agree with that. However, I would object to the minimization of the importance of jobs, and jobs in the State of Idaho as it's been characterized. In the last several, couple of years, 18 months, particularly, there's been a major economic downturn that has hit this state. No one knows more, how more important it is, a job is, than somebody who is losing it. I've been a first-hand witness of what it's like for people to lose their job, and I would hope that no one in this room would minimize that in comparison to those people. Certainly still agree with the safety issue. I would like to thank everyone here for the opportunity to speak in support of the AREVA-proposed uranium enrichment plant.

[040-04, Collin Day] But there's just no need to take risks and gamble with things like the aquifer that, you know, supplies drinking water to some 300,000 people, because 500 people need jobs. I just--I don't see the point in that.

[067-03, Mike Hart] With respect to the need, I, looking at global warming, I know there are obviously impacts of nuclear energy, but the reality is, seven generations from now I think they won't be worrying as much about depleted uranium as they will be about depleted glaciers, depleted ice caps, and nuclear energy has a significant benefit. It's not without its warts, it's not without its impacts, but there is "no free lunch" when it comes to energy.

You can conserve, but we do use energy. It is used globally, whether this is a French company, whether it's used locally, or nationally, the reality is its carbon-free, and that carbon-free resource is something that is very precious, and until we have alternative technologies that can produce significant usable quantities of electricity, nuclear is a very positive step in between now and a carbon-free future.

[068-04, Anne Hausrath] My husband and I raised our children in Idaho. We are very much concerned about the current economic climate for their generation, and we believe there's a responsibility of all of us to provide for that. I don't believe that this plant is adequate -- that the economic is adequate justification for that.

[074-02, Don Howard] …what concerns me most is two things. One is economic impact that Idaho does need. But the waste from the uranium we don't need. And I would say that the economic--we need the economic boost that this will bring to the State of Idaho. But I say at what cost to Idaho?

[088-01, Stan Kidwell] Areva's plant will do more harm than good to Idaho. Any jobs that would be gained would not counter the damage, both fiscally and environmentally, that would be done to Idaho.

[095-01, Linda Leeuwrik] I would like to voice my very strong opposition to the uranium enrichment facility that the French company Areva is proposing to build not far from where I live in South East Idaho. This facility would provide no real benefit or advantage to Idaho, instead only leaving the waste for us to contend with for many years to come -- contaminating our land and our water supply and negatively impacting our wildlife.

[128-05, Bob Poyser] Third. AREVA has, and will continue to incorporate sustainability features, including the use of lead-certified building standards as a part of the overall effort to ensure that we deploy our best efforts in creating a facility that is environmentally benign and respects the site conditions.

[130-02, Park and Sharon Price] The benefits of this project substantially outweigh the potential small or moderate impacts identified in the draft EIS.

We strongly support your preliminary conclusions that this project deserves to move forward.

[147-04, Joey Schueler] I am in opposition to the Eagle Rock Uranium enrichment plant being put in Idaho Falls, Idaho! Although I understand the positive incentive arguments for the proposed plant, the arguments against the plant far outweigh the rather short term positive benefits. I think careful consideration should be given to each of the fifteen points I listed below when deciding whether to take this action. I also doubt many Idahoans know about this action and should be brought to a larger table of discussion.

[177-01, Hon. T.J. Thomson] As a Boise City Council Member, I am dedicated to safeguarding tax payer dollars to assure that every penny spent is spent wisely. Outside of keeping this city safe, fiscal responsibility is my highest priority. Every city project must be highly scrutinized to assure we are getting the very best product available. And so, with fiscal stewardship in mind, I ask that you exercise caution as you move forward with the Areva Plant. Considering the large amount of state and federal tax dollars that will be invested into the plant, it is vital you assure taxpayers that all costs regarding the management and disposal of waste are included in your long-term budgeting process.

[182-04, Brianna Ursenbach] On balance, it is readily apparent, then, that this facility will not be beneficial, so no amount of negative environmental impact, degradation, is acceptable. In conclusion, this facility is not needed, not wanted, and cannot be licensed.

[193-23, Liz Woodruff, on behalf of the Snake River Alliance] So in conclusion, radioactive waste poses an unacceptable risk to our state. You heard that the NRC has a cost-benefit analysis. Well, based on our read and the reading of our members, and other Idahoans, it’s very clear that the costs of this facility are far greater than the benefits, to our public safety, to our water, to our air, to our land, to wildlife habitat. And this definitely outweighs the hypothetical and very risk assertion by the NRC, that we need uranium enrichment.

AREVA’s proposed Eagle Rock enrichment facility will store radioactive waste at the sole source aquifer for 300,000 people. It will impact sensitive species, require the transport of radioactive materials, impair a national monument in Idaho, support destruction of a historic site, devour billions of dollars in state and federal largesse to meet a hypothetical need that does not yet exist, and obliterate farmland that is potentially protected by the Federal Government.

We are here to say this is simply not worth the risks, and new evaluations on the draft EIS are needed, specifically around preconstruction and transmission issues, and until that time, this facility should not be licensed.

Response: *The results of the benefit-cost analysis presented in Chapter 7 of the EIS show that the benefits of the facility outweigh the costs. Although there are potential impacts the costs of which cannot be quantified – impacts to air, water quality, or ecology, for example – these impacts would be SMALL or SMALL-to-MODERATE, and would be unlikely to affect the outcome of the benefit-cost analysis.*

I.5.29 Editorial Comments

Comment: The following comments identify typographical errors noted in the Draft EIS.

[228-01, Jim Kay] The word lightning is misspelled as lightening. (Table 3-10, Storm Events in the Vicinity of the Proposed EREF Site, Page 3-26)

[228-02, Jim Kay] There is a typo in DEIS Table 3-15 in the row "Volcanic earthquakes" under the column "Hazard Level." The focal depth should be 2.5 mi versus 2.5 ft. (Table 3-15, Hazards Associated with Basaltic Volcanism on the ESRP, Page 3-41)

[228-03, Jim Kay] There are typos on the emission factors. The value 2560 should be 2.560 and the value 10,292 should be 10.292. (Table 4-7, NRC's Estimated Emissions of Criteria Pollutants Resulting from Operations at the Proposed EREF, Page 4-24)

[228-04, Jim Kay] A D/Q value (2.43 x 10-7) is presented in the first full paragraph with units of kg per square meters. The units for D/Q values are 1 over square meters (1/m2). (Section 4.2.4.2, Facility Operation, Generation and Release of Non-Criteria Chemical Pollutants Related to EREF Operations, Page 4-27)

[228-05, Jim Kay] The DEIS specifies that the Retention Basins …each would have a storage capacity of about 83,000 cubic meters (76 acre-feet)… should be 67 acre-feet. (Section 4.2.6.2, Facility Operation, Cylinder Storage Pads Stormwater Retention Basin, Page 4-40, Line 15)

[228-06, Jim Kay] In the 1st bullet, "apply water twice daily to…." should be twice daily (when needed) for consistency with DEIS page 5-6, Ecological Resources. (Table 5-1, Summary of Mitigation Measures Identified by AES for Preconstruction and Construction Environmental Impacts, Air Quality Page 5-3)

Response: *The EIS has been reviewed and appropriate revisions have been made as noted in the comments.*

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Docket No. 70-7015

11. ABSTRACT *(200 words or less)*

AREVA Enrichment Services LLC (AES) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct, operate, and decommission the proposed Eagle Rock Enrichment Facility (EREF) near Idaho Falls in Bonneville County, Idaho. If licensed, the proposed facility would enrich uranium for use in commercial nuclear fuel for power reactors. Feed material would be non-enriched uranium hexafluoride (UF6). AES would employ a gas centrifuge process to enrich uranium up to 5 percent uranium-235 by weight, with a planned maximum target production of 6.6 million separative work units (SWUs) per year. The proposed EREF would be licensed in accordance with the provisions of the Atomic Energy Act. Specifically, an NRC license under Title 10, "Energy," of the U.S. Code of Federal Regulations (10 CFR) Parts 30, 40, and 70 would be required to authorize AES to possess and use special nuclear material, source material, and byproduct material at the proposed EREF site.

This Environmental Impact Statement (EIS) was prepared in compliance with the National Environmental Policy Act (NEPA) and the NRC regulations for implementing NEPA (10 CFR Part 51). This EIS evaluates the potential environmental impacts of the proposed action and its reasonable alternatives.

12. KEY WORDS/DESCRIPTORS *(List words or phrases that will assist researchers in locating the report.)*

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