DOE/EA-1793

U.S. Department of Energy
Idaho Operations Office

Environmental Assessment for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site

Final

December 2011

Idaho National Laboratory

Department of Energy
Idaho Operations Office
1955 Fremont Avenue
Idaho Falls, ID 83415

December 21, 2011

Dear Citizen:

The U.S. Department of Energy (DOE) has completed the Final Environmental Assessment (EA) for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site and determined that a Finding of No Significant Impact (FONSI) is appropriate. The draft EA was made available for an 81-day public review and comment period on September 1, 2011. DOE considered all comments made on the draft EA when developing the final EA and in making its determination. A Public Comment and Response section has been included as Appendix A of the final EA.

The FONSI and final EA can be accessed on the DOE website at www.id.doe.gov. Thank you for your interest in this important endeavor.

Sincerely,

for Richard B. Provencher
Manager

Enclosures

DOE/EA-1793

Environmental Assessment for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site

December 2011

EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) proposes to provide replacement capability for disposal of remote-handled low-level radioactive waste (LLW) generated at the Idaho National Laboratory (INL) site beginning in October 2017. Historically, INL has disposed of this LLW onsite at a disposal area located within INL's Radioactive Waste Management Complex (RWMC). Disposal activities ceased at a portion of this onsite LLW disposal facility in 2008. The entire LLW disposal facility will undergo closure as part of ongoing Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) cleanup of INL and will not be available after 2017. The proposed project to establish replacement capability is not a DOE Environmental Management Idaho Cleanup Project activity.

DOE has prepared this environmental assessment to evaluate potential environmental impacts related to replacement capability options for the disposal of remote-handled LLW generated on the INL site. DOE will continue to dispose of contact–handled LLW (waste having lower levels of radiation) off-site at acceptable disposal facilities.

DOE developed the following selection criteria to determine a range of reasonable alternatives that would meet DOE's need for replacement disposal capability:

- Provide dependable and predictable disposal capacity in support of continued INL site operations beginning in October 2017 and continuing for at least 20 years, with the potential for expansion to accommodate an additional 30 years

- Minimize impacts to the DOE Office of Nuclear Energy and the Naval Nuclear Propulsion Program missions and operations at facilities that generate remote-handled LLW

- Minimize disturbance of natural and cultural resources and other environmental impacts that may be associated with development of replacement disposal capability

- Minimize radiation exposure to the public from routine shipments and from accidents, in addition to nonradiological impacts of transporting remote-handled LLW.

Alternative 1, Develop Onsite Replacement Disposal Capability, would involve construction and operation of a new disposal facility on the INL site. It would be planned to meet the INL site's disposal needs for the required duration of up to 50 years. All waste transport would take place within the INL site without use of public roads. This alternative is preferred because it provides dependable and predictable disposal in support of DOE's mission and minimizes exposure to the public from accidents and routine shipments.

To develop Alternative 1, onsite disposal, INL completed a *Siting Study for the Remote-Handled Low-Level Waste Disposal Facility* to identify, evaluate, and recommend onsite locations for remote-handled LLW disposal. This Siting Study identified two locations (Candidate Site 1 and Candidate Site 2) that best meet the evaluation criteria; they are included in this environmental assessment.

While both candidate sites are protective of the aquifer, Candidate Site 1 is preferred because of its slightly higher elevation, greater distance from the Big Lost River, and thicker sediment that provides greater protection of the aquifer as compared to Candidate Site 2. In addition, although neither candidate site presents a potential significant impact to groundwater, the potential for cumulative effects to groundwater from other sources of groundwater contaminants is less at Candidate Site 1 than at Candidate Site 2.

Alternative 2, Transport Waste to the Nevada National Security Site (NNSS) (formerly known as the Nevada Test Site), would involve use of existing disposal capability at another DOE disposal facility located at NNSS. NNSS may be able to accept the INL site's remote-handled LLW under its disposal authorization. Alternative 2 may provide continuity of operations because it currently is an operating facility and is assumed, for purposes of consideration of this alternative, to be available for the duration needed (up to 50 years). Alternative 2 would involve infrastructure modifications and construction at the INL site to accommodate shipments offsite and modifications and construction at NNSS for receipt of remote-handled LLW shipments. Although the environmental risk may be comparable with Alternative 1, other risks such as transportation and operational risk may present more influence on the preferred option. Over 100 shipments to NNSS would be conducted each year. Alternative 2 involves the transportation risk of shipping waste for disposal and the operational risk of utilizing disposal capability at a location remote from the generator site and not under the generator's control.

This environmental assessment also includes analysis of the No Action Alternative. This alternative provides a baseline to help understand the impacts associated with the alternatives under consideration. Under the No Action Alternative, no new activities would be conducted by DOE to ensure uninterrupted disposal capabilities for remote-handled LLW generated at the INL site. Ion-exchange resins, hardware, and filters from the Advanced Test Reactor (ATR), which had been disposed of at the portion of the RWMC LLW disposal facility that was closed, have been shipped offsite to NNSS since 2008. An estimated six shipments per year would continue under the No Action Alternative as long as conditions at NNSS remain favorable for disposal. The remaining remote-handled LLW would continue to be disposed of at the existing location until it is full or must be closed in preparation for final CERCLA closure. At that time, operational activities that generate the subject waste would cease or be significantly curtailed because of a lack of disposal capability, which would impact mission-critical activities.

The scope of the environmental assessment focuses on the resources that could potentially be affected by the proposed action as identified by resource specialists. The following were analyzed for potential impacts from Alternative 1:

- Cultural resources
- Water resources
- Air resources
- Ecological resources – vegetation and wildlife

- Energy use
- Transportation
- Accidents and intentional destructive acts.

Under Alternative 1, vegetation would be cleared for facility construction and weeds could increase with soil disturbance. No sensitive plant species would be impacted and no wetlands would be disturbed. This alternative would not affect critical habitat or threatened or endangered animals and would not negatively impact sagebrush-obligate species. There would be no impacts to surface water; the site would be located outside of the 100, 500, 1,000, and 10,000-year flood plain. Modeling of groundwater impacts several thousand years into the future from migrating contaminants after the disposal vaults have lost their integrity shows that radionuclide concentrations in the aquifer would be less than regulatory maximum contaminant levels. Workers may be exposed to radiation through routine shipments or if an accident occurs. There would be no exposure to the public from routine onsite shipments, but members of the public located near the site boundary could be exposed if an accident occurs during onsite shipment or disposal operations.

The offsite (NNSS) disposal alternative, Alternative 2, would take place at an existing facility designed, approved, and operated to accept DOE remote-handled LLW. The potential for groundwater impacts at NNSS was evaluated for this alternative and determined to be absent. Transportation, accidents, and intentional destructive acts and energy use also were analyzed. This alternative could result in radiation exposure to the public and workers from routine shipments and from accidents, in addition to the potential for non-radiological transportation impacts from vehicle emissions and collisions.

The No Action Alternative would involve continued shipment of ion-exchange resins, hardware, and filters from the ATR to NNSS. Transportation, accidents, and intentional destructive acts and energy use were analyzed. This alternative could result in radiation exposure to the public and workers from routine shipments and from accidents, in addition to the potential for non-radiological transportation impacts from vehicle emissions and collisions.

This Environmental Assessment has evaluated the risk of each alternative. Based on this EA, none of the alternatives present significant impacts to the human environment. DOE has identified development of an onsite replacement facility as the preferred alternative that best supports DOE's mission after considering economic, environmental, and technical factors. This Environmental Assessment was made available for public review and comment. The Environmental Assessment served as the basis for the determination of a Finding of No Significant Impact.

CONTENTS

FIGURES

TABLES

ACRONYMS

ATR	Advanced Test Reactor
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
DOE-NE	U.S. Department of Energy Office of Nuclear Energy
EDE	effective dose equivalent
EIS	environmental impact statement
EPA	Environmental Protection Agency
ESRPA	Eastern Snake River Plain Aquifer
GTCC	greater-than-Class C
ICDF	Idaho CERCLA Disposal Facility
IDAPA	Idaho Administrative Procedures Act
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
LCF	latent cancer fatality
LLW	low-level radioactive waste
MCL	maximum contaminant level
MEI	maximally exposed individual
MFC	Materials and Fuels Complex
NEPA	National Environmental Policy Act
NNSS	Nevada National Security Site
NRF	Naval Reactors Facility
RWMC	Radioactive Waste Management Complex

GLOSSARY

Alluvial	Loose, unconsolidated soil or sediment, eroded, deposited, and reshaped by water in some form in a non-marine setting.
Aquifer	A geological formation or structure that stores or transmits water (i.e., to wells and springs).
Basalt	Common extrusive volcanic rock, usually gray to black and fine-grained due to rapid cooling of lava at the surface of a planet.
Bq (Becquerel)	One Becquerel corresponds to the transformation (disintegration) of one atomic nucleus per second. Radon concentration in air is measured by the number of transformations per second in a cubic meter of air (Bq/cubic meters).
Candidate species (candidate)	A plant or animal species for which Fish and Wildlife Service or National Oceanic and Atmospheric Administration fisheries has, on file, sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened, but issuance of the proposed rule is precluded by other higher priority listing activities.
Critical habitat	Specific geographic areas, whether occupied by a listed species or not, that are essential for its conservation and that have been formally designated by rule published in the Federal Register.
Ecosystem	A dynamic and interrelating complex of plant and animal communities and their associated nonliving (i.e., physical and chemical) environment.
Effective dose equivalent	The summation of the products of the dose equivalent received by specified tissues of the body and a tissue-specific weighting factor. This sum is a risk-equivalent value and can be used to estimate the health-effects risk of the exposed individual. The tissue-specific weighting factor represents the fraction of the total health risk resulting from uniform whole-body irradiation that would be contributed by that particular tissue. The effective dose equivalent includes the committed dose from internal deposition of radionuclides and the dose due to penetrating radiation from sources external to the body. The effective dose equivalent is expressed in units of rem.
Endangered species	An animal or plant species in danger of extinction throughout all or a significant portion of its range.
Floodplain	A strip of relatively flat and normally dry land alongside a stream, river, or lake that is covered by water during a flood.
Forb	A broad-leaved herb other than a grass, especially one growing in a field, prairie, or meadow.
Habitat	The place or environment where a plant or animal naturally lives and grows (a group of particular environmental conditions).

Hazardous material	Any item or agent (i.e., biological, chemical, or physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.
Infiltration	The process by which water on the ground surface enters the soil.
Latent cancer fatality	Death from cancer, resulting from and occurring sometime after exposure to ionizing radiation or other carcinogens.
Leks	Breeding grounds that are used by Greater Sage-Grouse each spring. They are usually open areas such as meadows, low sagebrush, or even roads surrounded by sagebrush.
Listed species	A species, subspecies, or distinct population segment that has been added to the federal list of endangered and threatened wildlife and plants.
Loess	An aeolian (wind-blown) sediment formed by the accumulation of wind-blown silt and lesser and variable amounts of sand and clay.
Low-level radioactive waste	Nuclear waste that does not fit into the categorical definitions for high-level waste, spent nuclear fuel, transuranic waste, or certain byproduct materials known as 11e.(2) waste, such as uranium mill tailings.
mrem (millirem)	One thousandth of a rem (a traditional historical unit of radiation dose equivalent) often used for the dosages commonly encountered; 1 rem = 0.01 Sv (sievert); the average annual radiation exposure from natural sources to an individual in the United States is approximately 300 millirem (3 millisieverts).
mSv (millisievert)	One thousandth of a sievert; the International System of Units derived unit of dose equivalent. It reflects the biological effects of radiation as opposed to the physical aspect, which is measured in terms of the energy absorbed in the body tissue and expressed in grays. One gray is one joule deposited per kilogram of mass.
pCi (picocuries)	Common measure of radioactivity. One pCi is equal to the decay of about two radioactive atoms per minute.
Playa	A nearly level area at the bottom of an undrained desert basin, sometimes temporarily covered with water.
Proposed species	A species of animal or plant that is proposed in the Federal Register to be listed under Section 4 of the Endangered Species Act.
Radiation (ionizing)	Emission of particles (i.e., alpha, beta, or gamma) or rays (i.e., alpha, beta, gamma, or x-rays) by the nucleus of an atom.
Radiological	Of or relating to nuclear radiation.
Radon	A colorless, radioactive, inert gaseous element formed by the radioactive decay of radium.

Radioactive material	Material designated in national law or by a regulatory body as being subject to regulatory control because of its radioactivity, often taking account of both activity and activity concentration.
Radionuclide	Radioactive elements. These may be subdivided into natural radionuclides (i.e., radium or uranium) that are normally present in the earth and man-made radionuclides, which are not normally present (or normally present in very small amounts) and are produced by nuclear fission.
Recharge (groundwater recharge)	A hydrologic process where water moves downward from surface water to groundwater.
Remote-handled waste	Waste with radiation levels exceeding 200 millrem/hour at the surface of a container; such material must be handled remotely by using means (such as robots) and having special shielding in treatment, storage, and disposal facilities.
Risk	The probability of a detrimental effect from exposure to a hazard.
Sagebrush steppe	A large, dry, level habitat having few or no trees and characterized by sagebrush and other shrubs and short grasses.
Sink	A depression in the land surface, especially one having a central playa or saline lake with no outlet.
Vadose	The zone between the land surface and the regional water table. It includes the capillary fringe and may also include localized perched groundwater.
Water table	The top of the water surface in the saturated part of an aquifer.
Wetland	Those areas that are inundated or saturated by surface or groundwater 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. Wetlands generally include swamps, marshes, bogs, and similar areas.

Environmental Assessment for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site

1. PURPOSE AND NEED

The Idaho National Laboratory (INL) site, a U.S. Department of Energy (DOE) installation, provides capabilities to support the DOE Office of Nuclear Energy (DOE-NE) mission to advance nuclear power as a resource capable of making major contributions to meeting the nation's energy supply, environmental, and energy security needs (DOE-NE 2010). INL's role is to assist DOE-NE by conducting research, development, and demonstration to resolve barriers to accomplishing this mission. INL hosts the Naval Reactors Facility (NRF), which supports the Naval Nuclear Propulsion Program with examination and storage of spent fuel from Navy defueling operations. INL also provides infrastructure and research, development, and testing for other federal tenants (i.e., DOE Office of Environmental Management and U.S. Department of Defense [DOD]) and sponsors (e.g., the Department of Homeland Security or the U.S. Nuclear Regulatory Commission).

Operations conducted in support of these missions generate low-level radioactive waste (LLW). Some of this LLW is classified as remote-handled LLW because its potential radiation dose is high enough to require additional protection of workers using distance and shielding. Remote-handled LLW includes debris, used materials (i.e., gloves, tools, hardware, and other activated metal components), and ion-exchange resins and filters from filtration of water in pools and canals. DOE will continue to dispose of contact-handled LLW (waste having lower levels of radiation) off-site at acceptable disposal facilities.

Historically, INL has disposed of its remote-handled LLW onsite at a disposal area located within INL's Radioactive Waste Management Complex (RWMC). Disposal activities ceased at a portion of this onsite LLW disposal facility in 2008. The entire LLW disposal facility will undergo closure as part of ongoing cleanup of the INL site and is not planned to be available after the year 2017. The purpose of this action is to provide replacement capability for disposal of remote-handled LLW generated at the INL site after 2017. This provision is not part of the DOE Environmental Management Idaho Cleanup Project.

DOE needs to make decisions regarding disposal of remote-handled LLW in time to support development of new facilities and infrastructure for disposal of this waste before closure of the existing disposal vaults in 2017. Delays in action could impact the ongoing national security mission of the Naval Nuclear Propulsion Program supported by NRF. It also could affect DOE's ability to carry out critical research activities at INL that generate remote-handled LLW.

2. PROPOSED ACTION AND ALTERNATIVES

2.1 Background

Under the Atomic Energy Act of 1954 (42 USC § 2011 et seq.), as amended, DOE is responsible for managing radioactive materials, including radioactive waste, generated from its facilities and operations. DOE regulations and directives govern management of radioactive waste. INL is responsible for managing several types of waste, including LLW, which is radioactive waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in section 11e.(2) of the Atomic Energy Act of 1954, as amended), or naturally occurring radioactive material.

LLW generated at DOE facilities is regulated by DOE pursuant to DOE orders, policy, and directives. LLW is not considered to be hazardous waste if it contains no constituents that are regulated as hazardous waste under state or federal laws. The LLW that is the subject of this proposed action is considered to be remote-handled LLW. Remote-handled waste is waste with radiation levels exceeding 200 millirem per hour at the surface of a container.

The DOE manual for implementing DOE Order 435.1, "Radioactive Waste Management," defines LLW and provides the DOE requirement for disposing of radioactive waste (including LLW), as follows:

> *DOE radioactive waste shall be treated, stored, and in the case of low-level waste, disposed of at the site where the waste is generated, if practical; or at another DOE facility. If DOE capabilities are not practical or cost effective, exemptions may be approved to allow use of non-DOE facilities for the storage, treatment, or disposal of DOE radioactive waste.*

Before DOE authorizes disposal of LLW under DOE Order 435.1, it must be demonstrated that the disposal facility will do the following:

- Be sited, designed, operated, maintained, and closed such that the total all-pathways exposure to the public is less than 25 mrem/year effective dose equivalent (EDE) from the facility and to less than 30 mrem/year EDE for all potential sources of radionuclides.

- Limit the radionuclide concentrations for near surface disposal so that the potential exposure received by an inadvertent intruder (more than 100 years post-closure) would be limited to 100 mrem/year for acute exposure and 500 mrem total EDE for chronic exposure

- Include a combination of design and natural features to provide long-term stability and protection of water and air resources.

INL and DOE-NE strategic planning documents (DOE-NE 2009, DOE-NE 2010, DOE-ID 2011) call for investments in state-of-the-art research capabilities, infrastructure, and management systems to support the mission of DOE-NE. These capabilities include the Advanced Test Reactor (ATR) and the Materials and Fuels Complex (MFC), the focal points for INL's nuclear energy research and development activities. Figure 2-1 depicts the INL site and the associated facilities of interest.

At the ATR Complex, change-out of reactor core components generates remote-handled activated-metal approximately every 8 years. These components are stored in water-filled canals to allow radioactivity to decay. In addition, filtration of the primary coolant and the canal water as part of ongoing maintenance generates spent ion-exchange resins that also are remote-handled LLW.

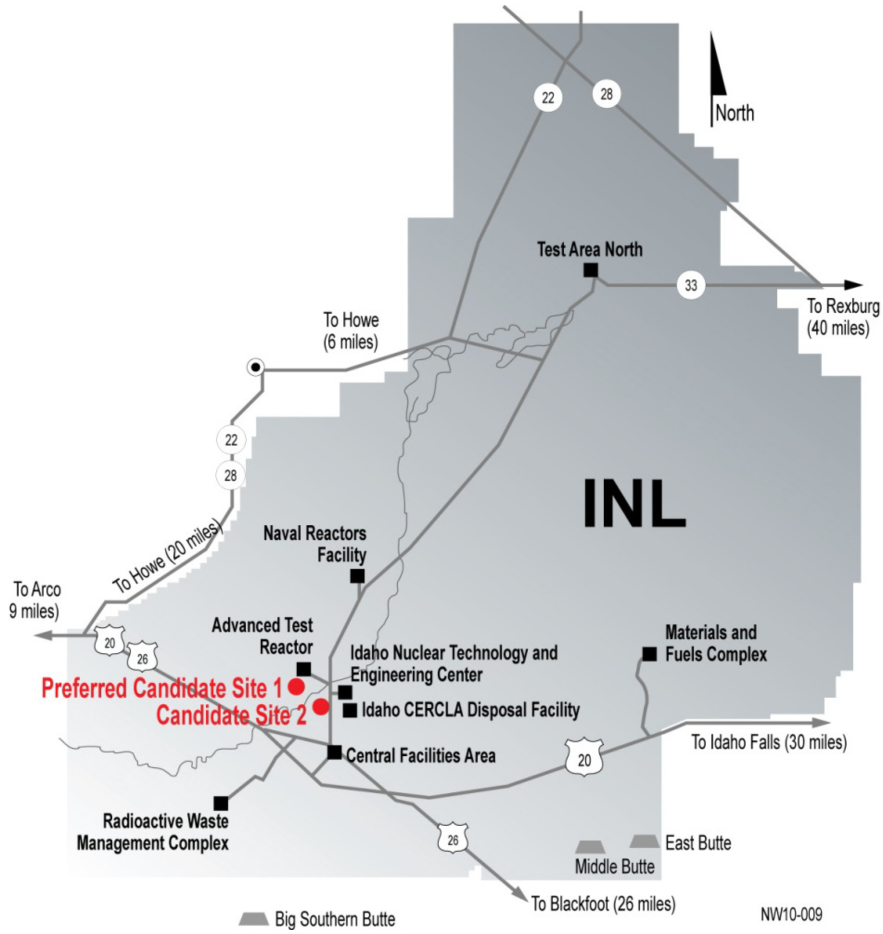

Figure 2-1. Idaho National Laboratory and associated facilities of interest.

At MFC, continuing and potential new DOE-NE missions could result in generation of remote-handled debris and process waste such as gloves, tools, steel hardware, and process components (e.g., pumps and drain tanks). In addition, DOE is continuing to remove and process for disposition remote-handled waste that was placed in storage at the Radioactive Waste and Scrap Facility at MFC between 1965 and 2007 (DOE 2009).

The Naval Nuclear Propulsion Program is a joint Navy and DOE organization responsible for all matters pertaining to U.S. nuclear-powered submarines and aircraft carriers. At the INL site, NRF supports the Naval Nuclear Propulsion Program by receiving, examining, and processing spent fuel assemblies as part of preparations for final disposition. Naval spent nuclear fuel is shipped by rail in shielded shipping containers from naval shipyards to NRF, where it is removed from the shipping containers and placed in water pools for examination. The assemblies are then prepared for dry storage prior to shipment for final disposition. The process for preparing spent fuel assemblies involves removing non-fuel structural components (activated metals), which are remote-handled LLW that require disposal. Filtration of water in the NRF pools as part of ongoing maintenance also generates spent ion-exchange resins that are remote-handled LLW.

INL also provides infrastructure and research, development, and testing for other federal tenants and sponsors. Remote-handled LLW could be generated over the next 50 years from other INL support facilities and operations as part of ongoing activities (such as spent nuclear fuel management) or from potential new missions.

2.2 Related National Environmental Policy Act Documents

The decision for developing replacement disposal capability for INL's remote-handled LLW is being made within the context of related National Environmental Policy Act (NEPA) documents involving DOE's plans for LLW disposal. Disposal of LLW was evaluated in the *DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (EIS) (DOE 1995) and the *Final Waste Management Programmatic EIS* (DOE 1997).

Onsite disposal of LLW was selected in the *1995 Record of Decision for the Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final EIS* (60 FR 28680), although the decision on siting and construction of a new disposal facility, if needed, was deferred until development of a project definition and appropriate NEPA review.

Continued onsite disposal of INL's LLW and offsite disposal at DOE's Hanford Site and the Nevada National Security Site (NNSS) (formerly known as the Nevada Test Site) were identified as alternatives in a Record of Decision for the *Waste Management Programmatic EIS* (65 FR 10061). Under this Record of Decision, waste from offsite could not be received for disposal at INL. In addition, this Record of Decision did not preclude consideration of commercial disposal facilities, consistent with DOE orders and policy.

Recent NEPA documents for waste management at the Hanford Site have the potential to restrict its availability for disposal of LLW from offsite until 2023. On October 30, 2009, the U.S. Environmental Protection Agency (EPA) issued a notice of availability of the *Draft Tank Closure and Waste Management EIS for the Hanford Site, Richland, Washington* (74 FR 56194). The DOE preferred alternative limits offsite waste importation until a proposed Hanford Consent Decree and Tri-Party Agreement milestone of December 31, 2022, is achieved for initial operations of the Waste Treatment Plant for tank waste.

DOE is currently conducting further NEPA review of its sitewide operations at NNSS. On July 29, 2011, DOE issued a notice of availability of a draft sitewide EIS for continued operation of the DOE NNSS and offsite locations in the State of Nevada (76 FR 45548). The draft EIS considers a No Action Alternative and two action alternatives of expanded operations and reduced operations. LLW disposal operations at NNSS would continue under each of the alternatives, including the No Action Alternative. The No Action Alternative reflects the use of existing facilities and ongoing projects to maintain the levels of operations consistent with those experienced in recent years at the NNSS. As part of its EM mission, the NNSS would continue accepting and disposing wastes, such as low-level radioactive waste and mixed low-level radioactive waste. Under the expanded operations alternative, NNSA would accelerate the pace and amount of low-level radioactive waste that would be disposed on the NNSS. Under the reduced operations alternative, the pace of most waste generation and disposal rates would remain unchanged from those of the No Action Alternative. No preferred alternative is identified in the draft EIS.

2.3 Proposed Action and Alternative Selection Criteria

The proposed action would provide disposal capability, beginning in October 2017, to replace the existing RWMC disposal capability and accommodate disposal of remote-handled LLW generated at the INL site. Waste to be disposed of would be limited to remote-handled LLW generated from INL operations. An estimated average volume of 150 m^3 of remote-handled LLW is expected to be generated each year at the INL site. This waste would be packaged, transported, and disposed of in compliance with applicable regulations and standards. The proposed action includes purchase of transport casks as needed to accomplish shipments of waste from the INL site generating facilities to the disposal facility.

DOE developed the following selection criteria to determine potential alternatives that would meet the purpose and need identified in Section 1:

- Provide dependable and predictable disposal capacity in support of continued INL site operations beginning in October 2017 and continuing for at least 20 years, with the potential for expansion to accommodate an additional 30 years

- Minimize impacts to DOE-NE and the Naval Nuclear Propulsion Program missions and operations at facilities that generate remote-handled LLW

- Minimize disturbance of natural and cultural resources and other environmental impacts that may be associated with development of replacement disposal capability

- Minimize radiation exposure to the public from routine shipments and from accidents, in addition to nonradiological impacts of transporting remote-handled LLW.

The listed criteria provided the basis for determining the range of reasonable alternatives considered and analyzed, which are development of an onsite replacement facility and disposal offsite at NNSS. DOE has identified development of an onsite replacement facility as the preferred alternative. The onsite alternative involves evaluation of two candidate site locations.

2.4 Range of Reasonable Alternatives

2.4.1 Alternatives Considered but Eliminated From Further Consideration

DOE considered six other alternatives for accomplishing the purpose and need for action but eliminated them from further evaluation for the reasons listed below.

The alternative of continued disposal at RWMC involved continued use of the current disposal facility at RWMC. The active LLW disposal facility is planned for closure under DOE Manual 435.1-1, "Radioactive Waste Management," in 2017. This alternative is not available for disposal for the needed 20 to 50-year duration.

The alternative of disposal at the Idaho Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Disposal Facility (ICDF) would use an existing INL facility, which is currently limited to receiving only CERCLA waste and has a 2018 assumed closure date. ICDF is not designed to accept remote-handled LLW. Further, this alternative is not available for disposal for the needed 20 to 50-year duration.

The alternative of interim storage involved storage of remote-handled LLW at either the generator facilities or another acceptable, safe location until disposal capability is available. The generator facilities have very limited storage capacity available and there are no plans to expand interim storage capability. No other facilities exist or are planned onsite that could accommodate the remote-handled LLW for interim storage. Even if storage were available, implementation of an alternative for storage instead of disposal does not provide for permanent disposal of remote-handled LLW generated at the INL site beyond 2017.

The alternative of storage for decay considered storage of remote-handled LLW for sufficient time to enable its radioactive source term to decay to levels that would make it acceptable for disposal as contact-handled LLW. Storage for over 80 years would be required to provide time for the remote-handled LLW isotopes to decay to contact-handled LLW. Storage facilities do not exist to support this alternative. Even if storage were available, disposal capability for 80 to 130 years in the future is uncertain. In addition, an alternative for storage instead of disposal does not provide for permanent disposal of remote-handled LLW generated at the INL site beyond 2017.

The alternative of offsite remote-handled LLW disposal involved eight potential offsite facilities that were evaluated against the screening criteria of viability, cost, schedule, and risk. Four facilities were eliminated because they cannot currently receive any of the remote-handled LLW generated at INL. The remaining four facilities were evaluated based on their waste acceptance criteria and their availability for disposal of INL remote-handled LLW in the timeframe needed. None of these remaining four facilities, except NNSS, could accept the entire planned inventory of INL remote-handled LLW. DOE eliminated the offsite facilities, except NNSS, from further consideration because they did not provide replacement disposal capability for the remote-handled LLW anticipated to be generated from the INL site.

The alternative of privatization of remote-handled LLW disposal examined the possibility of contracting with a new commercial facility for disposal of the remote-handled LLW. However, no known commercial facilities will begin operations within the time of the project mission need. The programmatic risks of speculating when, where, and whether such a facility would open in time to support the need for uninterrupted disposal of INL and tenant-generated remote-handled LLW were regarded as too great to retain this alternative for further consideration. This alternative is not available for disposal of all of INL's anticipated remote-handled LLW for the needed 20 to 50-year duration.

2.4.2 Alternative 1 – Develop Onsite Replacement Disposal Capability (Preferred Alternative)

The preferred alternative of onsite disposal involves construction of a new facility specifically designed and operated for the INL site's remote-handled LLW. The conceptual facility layout is presented in Figure 2-2.

Remote-handled LLW coming into the facility would be contained in robust stainless steel liners and transported in a shipping cask. At the facility, the liners would be placed in reinforced concrete disposal vaults constructed as precast concrete cylinders (i.e., pipe sections) stacked on end and placed in a close-packed array (Figure 2-3).

All vaults would be supported by reinforced concrete base sections placed atop a gravel layer and covered with removable precast concrete plugs. The plugs would serve as a radiation shield for emplaced waste and also help prevent water from entering the vaults. At the end of the operational life of the disposal facility, an engineered cover would be placed over the disposal vaults (Figure 2-4). The functional attributes of the facility are summarized in Table 2-1.

Project activities to establish an onsite replacement disposal facility would include (1) preparing the site and acquiring equipment; (2) constructing the site; (3) operating the site; and (4) closing the site (see Table 2-2 for specifics). Equipment and infrastructure used in current operations (i.e., the crane, cask-to-vault adapting structure, and NRF 55-ton or similar shipping cask) would be utilized to the extent possible. Table 2-3 lists operational controls that would be included as part of the onsite alternative to avoid or limit impacts to natural, ecological, or cultural resources, and to avoid contaminating the environment or exposing the public or employees to radioactive materials.

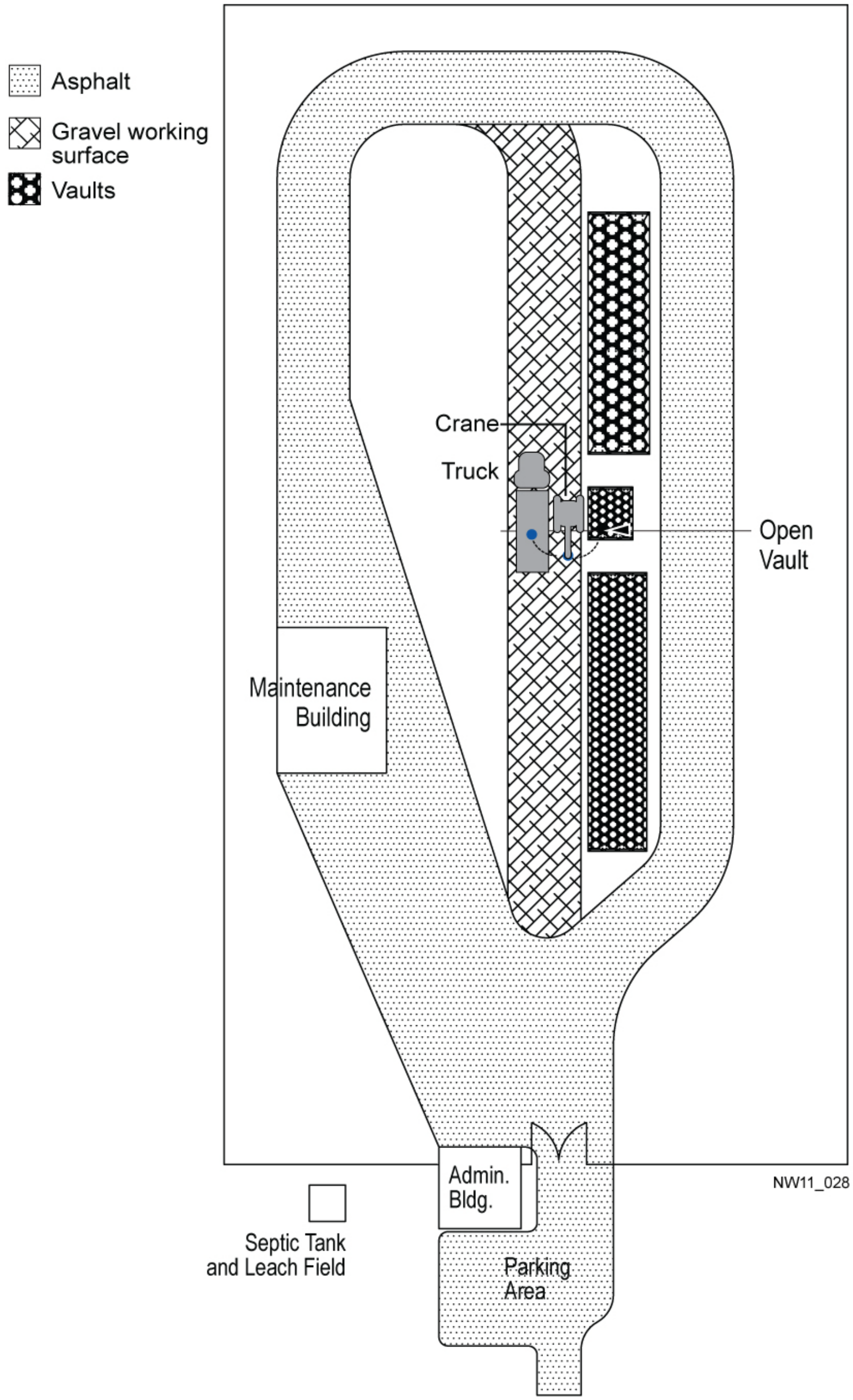

Figure 2-2. Conceptual remote-handled low-level waste facility layout.

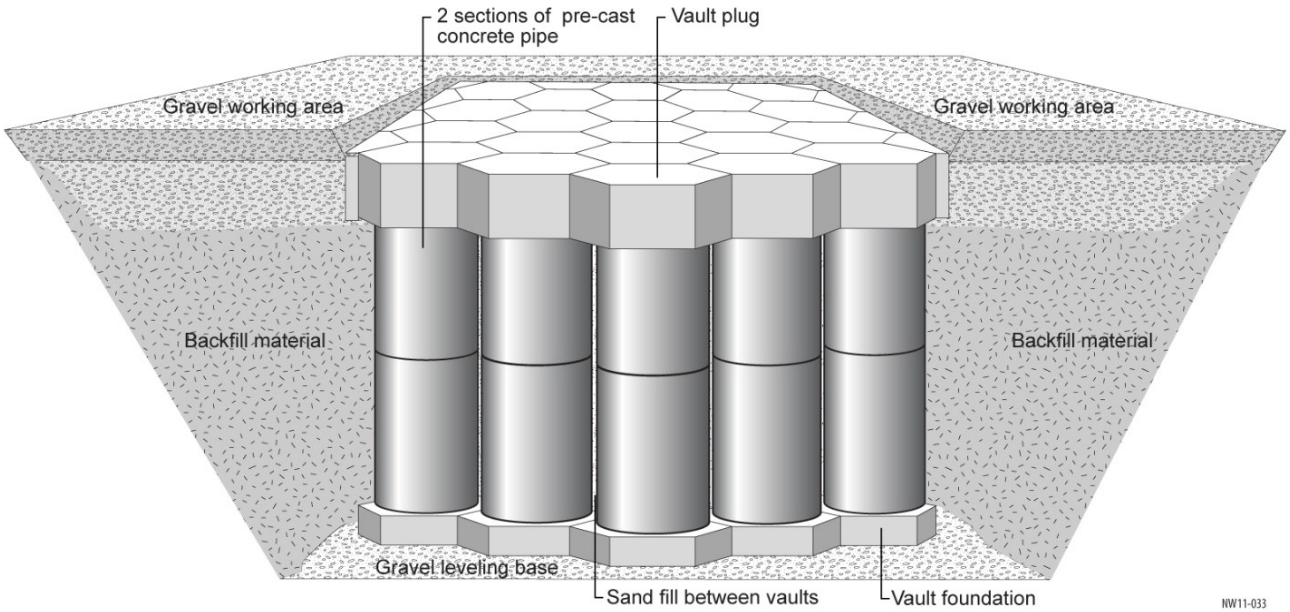

Figure 2-3. Conceptual concrete disposal vault layout.

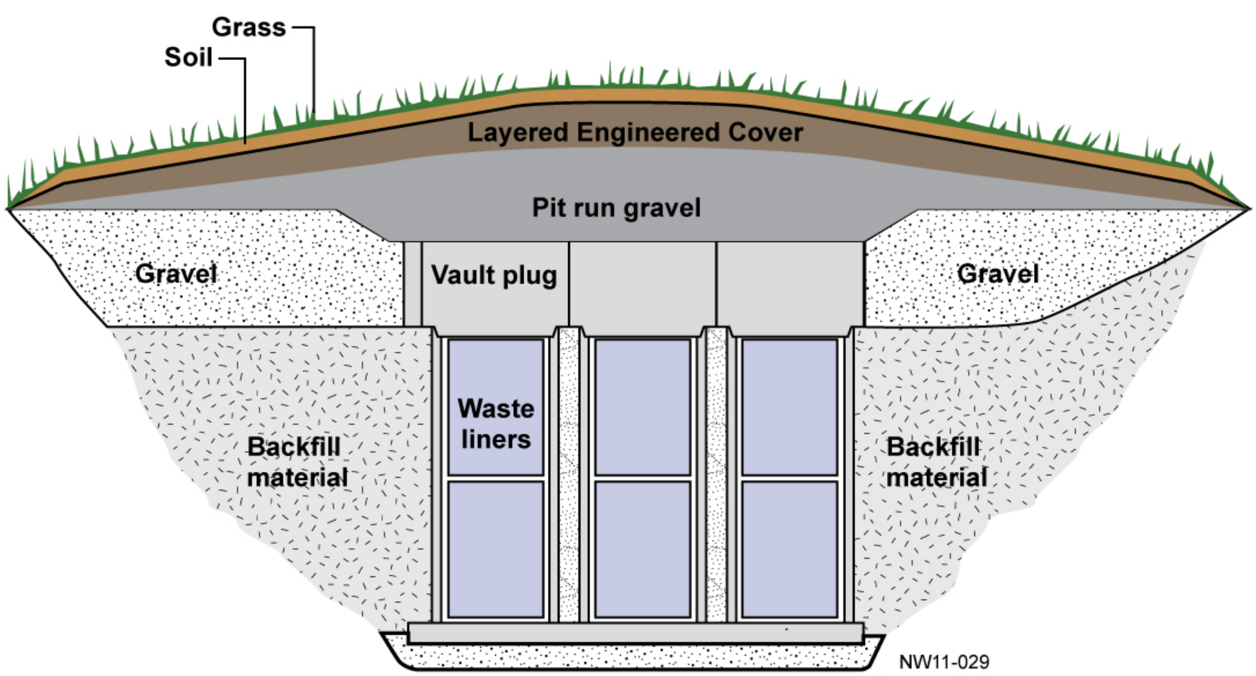

Figure 2-4. Conceptual disposal vault engineered cover.

Table 2-1. Functional attributes of the conceptual disposal facility.

1. Vault Characteristics

- Precast reinforced concrete vault base and riser sections. Reinforced concrete would be used to provide structural support. Concrete vaults are expected to maintain structural integrity for thousands of years.
- Reinforced concrete shielding plugs. Thick shielding plugs would be used to provide shielding for onsite workers. These plugs also would limit water infiltration into the vaults.
- Stainless steel waste liners. Waste would be emplaced in the facility in stainless steel waste liners. These liners would limit water contact with the waste and subsequent release of contaminants. Liners would be of sufficient thickness to mitigate contaminant release to the environment.
- Sand infill between the vault sections and sand/gravel beneath the facility. This material would prevent water accumulation next to the vaults or stainless steel waste liners by allowing free water drainage between and beneath the vaults.

2. Engineered Cover

- An approximate 2-ft thick interim cover would be placed over the facility as the vaults are filled. The interim cover would increase vault stability and would provide additional protection against water infiltration and water contact with the stainless steel waste liners.
- A final engineered cover would be placed over the facility at the end of operations. The primary purposes of the engineered cover would be to (1) reduce infiltration into the disposal facility after facility closure, thus reducing contaminant transport, and (2) provide a physical barrier against intrusion. The cover would be configured to divert surface water away from the vaults and extend beyond the boundary of the facility. The cover dimensions, layer thicknesses, and other specifications would be determined prior to facility closure and would be based on the final size and configuration of the facility.

3. Additional Features

- Groundwater monitoring wells would be installed to allow early detection of releases from the facility as required by DOE Order 435.1. The State of Idaho INL Oversight Program and the Shoshone-Bannock Tribes may participate in well sampling to provide independently derived results for verification purposes.
- Monitoring would be conducted to detect potential releases into the air as required by DOE Order 435.1.
- Berms around the facility would control onsite precipitation and prevent surface water run-on.
- Security enhancements would be used to protect against intentional or inadvertent facility access.

Table 2-2. Site preparation and equipment acquisition, construction, operation, and closure activities.

1. Activities for Site Preparation and Equipment Acquisition
• Construct a facility access road to allow receipt of shipments of remote-handled LLW via truck. • Prepare land in the vault, staging, and support building locations. • Fence the facility for security control. • Establish power, water, and septic systems. • Procure casks and liners for onsite shipments of remote-handled LLW generated at the INL site (the waste is placed in the liners and the liners are placed in the cask for shipment). • Procure equipment to transfer liners from the cask to the vaults.
2. Construction Activities
• Construct support buildings for administrative and equipment storage/maintenance activities. • Conduct excavation for vault installation. • Construct interior access roads and staging/storage pads for operations. • Install vaults that have been fabricated using pre-cast concrete components. Vaults would be designed and configured similar to the current facility at RWMC. • Fabricate concrete vault plugs to provide radioactive shielding for disposed waste.
3. Operational Activities
• Receive truck with transport cask at the facility. • Position truck near a vault array and use the crane to unload the cask. • Position the cask-to-vault transfer system over the vault. • Place the cask within the cask-to-vault transfer system. • Transfer the liner from inside the cask to the vault. • Place concrete plugs onto each vault upon completion of transfer. • Provide interim cover over vault plugs. • Conduct groundwater monitoring. • Conduct air monitoring.
4. Closure Activities
• Place a long-term protective engineered cover over the entire area of the disposal vaults that provides protection from water infiltration, configured to divert surface water away from facility, and protection from animal and biological intrusion. • Maintain and monitor the cover during a 100-year, post-closure period. • Continue air and groundwater monitoring during a 100-year, post-closure period.

Table 2-3. Construction and operational controls to avoid or lessen impacts to natural, ecological, cultural resources, and to the worker and the public.

Activity	Control
Construction Controls	Conduct nesting bird surveys before vegetation removal or disturbance between May 1 and September 1.
	Limit size of area disturbed through controls on the extent of excavation.
	Revegetate project-related disturbed area with native species.
	Implement noxious weed management plan.
	Complete cultural resource monitoring in sensitive areas with authority to redirect work to avoid any sensitive materials discovered.
	Implement a stop work procedure to guide the assessment and protection of any unanticipated discoveries of cultural materials.
	Complete cultural resource sensitivity training for construction personnel to discourage unauthorized artifact collection, off-road vehicle use, and other activities that may impact cultural resources. Encourage a sense of stewardship for cultural resources, including tribally sensitive plants and animals.
	Implement dust control practices during construction to prevent fugitive dust emissions.
	Implement controls for onsite precipitation and surface water run-on.
Operational Controls	Prevent exposure to ionizing radiation through shielded equipment or methods that ensure radiation protection during cask-to-vault transfers.
	Complete cultural resource sensitivity training for construction operations personnel to discourage unauthorized artifact collection, off-road vehicle use, and other activities that may impact cultural resources. Encourage a sense of stewardship for cultural resources, including tribally sensitive plants and animals.
	Implement dust control practices during operation to prevent fugitive dust emissions.
	Maintain controls for onsite precipitation and surface run-on.
	Control access by a perimeter security fence around the facility.

To develop the onsite disposal alternative, INL completed a siting study for the remote-handled LLW disposal facility (INL 2010a) to identify and recommend a limited number of onsite locations for remote-handled LLW disposal. The study used a five-step process to identify, screen, evaluate, score, and rank 34 separate sites located across INL, based on critical requirements from the following key areas: (1) regulations, (2) key assumptions, (3) conceptual design, (4) facility performance; and (5) previous INL siting study criteria. Each site was evaluated as a 45-acre parcel, with a smaller parcel (5 to 10 acres) where the disposal facility could be located.

This siting study identified two potential locations (Figure 2-5) that best meet the evaluation criteria:

1. Candidate Site 1 (the preferred location): located approximately 0.5-miles southwest of the ATR Complex. Surficial sediment thickness determined from wells in the vicinity of Candidate Site 1 ranges from 43 to 73 ft with a mean thickness of 55 ft. Candidate Site 1 is located at an approximate elevation of 4,943 ft and approximately 0.7 mi northeast of the Big Lost River channel.

2. Candidate Site 2: An alternative area located southwest of the Idaho Nuclear Technology and Engineering Center (INTEC) and across Lincoln Boulevard to the west of ICDF. Surficial sediment thickness determined in wells in the vicinity of Candidate Site 2 ranges from 20 to 49 ft with a mean thickness of 31 ft. Candidate Site 2 is located at an approximate elevation of 4,927 ft and approximately 0.4 miles southeast of the Big Lost River channel.

The initial evaluation of both sites indicates they are well suited for LLW disposal. Each site has adequate soil depth to support a remote-handled LLW disposal facility. However, in addition to thicker surficial sediment, Candidate Site 1 is at a slightly higher elevation and is located further from the Big Lost River than Candidate Site 2. These factors lower the potential for migration of contaminants from the facility. The potential for cumulative effects to groundwater from the disposal facility and other sources of groundwater contaminants is less at Candidate Site 1 than at Candidate Site 2. Therefore, Candidate Site 1 is the preferred onsite location.

2.4.3 Alternative 2 – Transport Waste to the Nevada National Security Site for Disposal

Alternative 2 would involve use of existing disposal capability at the NNSS Area 5 Radioactive Waste Management Complex. NNSS is located in Nye County, Nevada (Figure 2-3), approximately 65 miles northwest of Las Vegas, which is the largest population center in the state with nearly 2 million people. NNSS is owned by the federal government and administered, managed, and controlled by DOE. The waste disposed of at NNSS is accepted only from approved DOE and Department of Defense sites. NNSS has a planned LLW disposal capacity of 45,000 m^3 per year (DOE 1997). For purposes of considering this alternative, it is assumed that NNSS could accept remote-handled LLW from INL to meet INL's mission need of 20 to 50 years, subject to the conclusions resulting from the draft EIS (DOE 2011a).

The NNSS Area 5 Radioactive Waste Management Complex is a 732-acre site, with 160 of those acres being used for waste management and disposal. Disposal units are excavated, used, and operationally closed, as needed, and are used for disposal of waste typically delivered to the site in drums, soft-sided containers, large cargo containers, and boxes. Waste would be approved for compliance with the NNSS waste acceptance criteria prior to shipment to NNSS. It is possible that a disposal facility similar to that being considered in Alternative 1 would be required to be built at NNSS to accept the remote-handled LLW. At facility closure, a final cap would be placed over the complex.

Two potential transportation routes have been identified for transporting waste from the INL site to NNSS. These routes are shown in Figure 2-6. Route A is preferred because it involves shipment along the least populated routes; however, Route B may be used depending on road conditions and weather. Table 2-4 provides information on the distances, states traveled, and estimated population residing within a 2,600-ft buffer for each route.

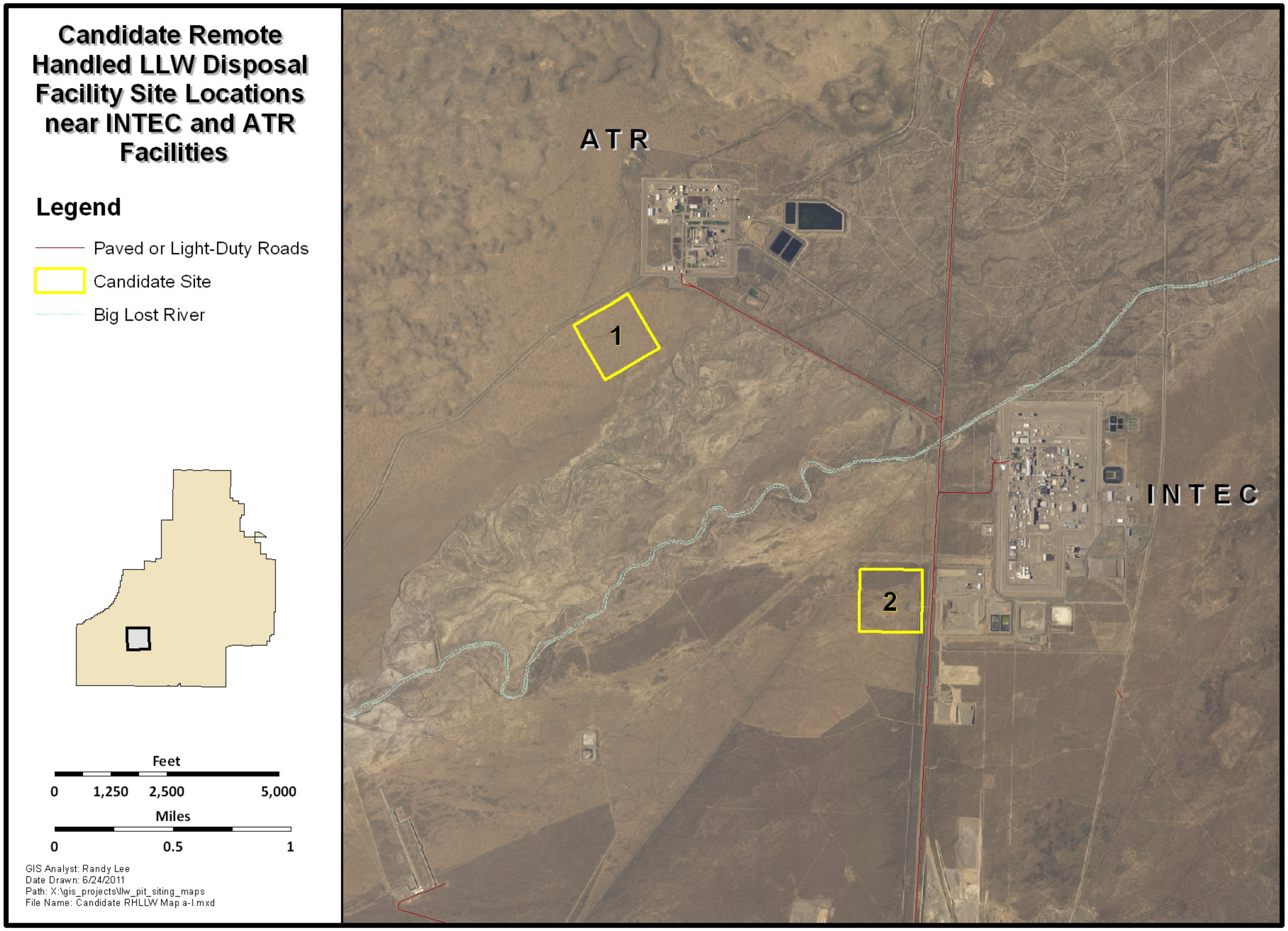

Figure 2-5. Candidate Remote-Handled Low-Level Waste Disposal Facility site locations near the Idaho Nuclear Technology and Engineering Center and the Advanced Test Reactor facilities.

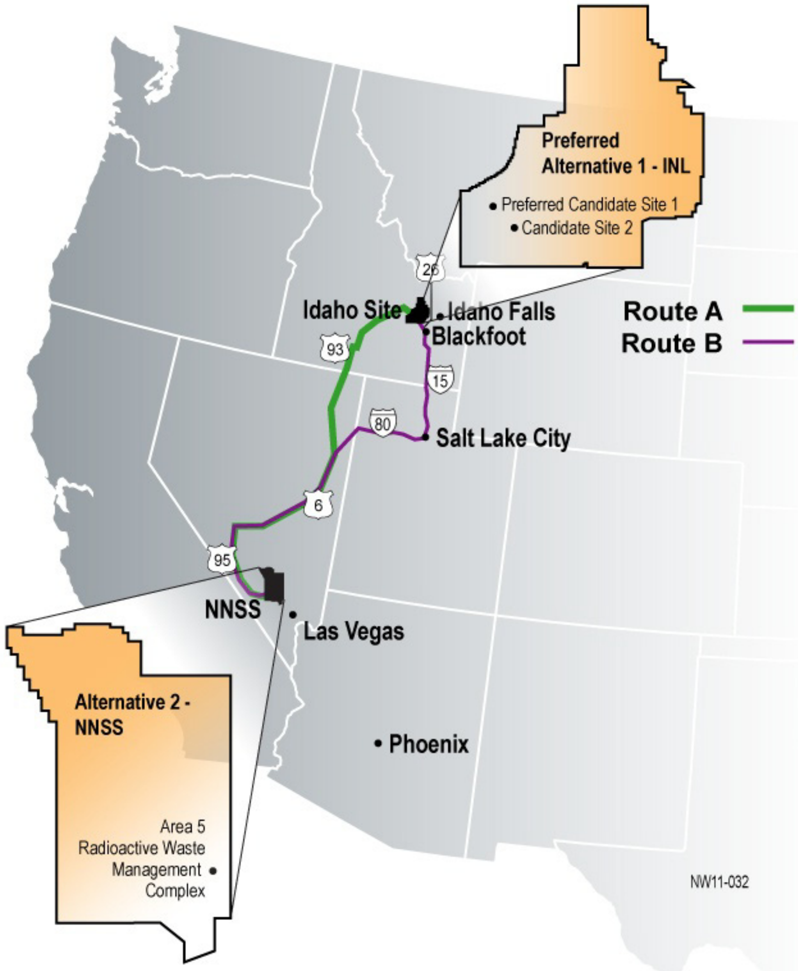

Figure 2-6. The alternatives of onsite disposal at Idaho National Laboratory and transportation to the Nevada National Security Site for disposal.

Table 2-4. Route-specific data for the two proposed transportation routes.

Route Designator	Distance by State (miles)			Total Distance	Population Along Route by State			Total Population
	ID	NV	UT		ID	NV	UT	
Route A	190	530	0	710	17,000	8,000	0	25,000
Route B	140	440	210	790	17,000	7,700	87,000	111,000

More than 100 shipments per year to NNSS would be required. This is a significantly larger number of total shipments than would be required for Alternative 1. In contrast to the shipments in Alternative 1 which would occur entirely within the INL boundary on nonpublic roads, these shipments would occur offsite, introducing potential impacts to the public. More shipments would be required because the current NRF cask used for onsite shipments can contain approximately 3 m^3 of activated metal LLW; this cask system is too heavy to be used for transport along public highways and is not certified for commercial transportation. Smaller 1 m^3 capacity shipping casks and trailers, along with transfer systems, would be required to ship 111 m^3 of metals and debris per year from NRF, ATR, and

MFC. With the capacity of each cask reduced by one third, three times as many shipments would be required than for Alternative 1. The use of smaller casks and the increased frequency of shipments would require modifications to infrastructure and operations at all INL site generating facilities, including reconfiguration and refurbishment of storage pools to accommodate increased use. Design of new casks would likely require an extensive certification process. The remaining 36 m^3 of remote-handled LLW consists of resins generated from pool operations at the ATR. This waste would be packaged into waste liners and shipping casks that can accommodate 6 m^3 per shipment. Therefore, it is estimated that a total of 117 shipments of remote-handled LLW would take place each year from INL to NNSS in Alternative 2. To accommodate the shipments, commercial truck-trailer combinations would be dedicated for exclusive transport of the hazardous materials. The numbers of shipments would require several transports to be in operation continuously.

Facility modifications at NNSS would likely be required to receive the INL remote-handled LLW. INL remote-handled LLW would have to meet the NNSS waste acceptance criteria, or would require waste-specific performance assessments. Because of the number of annual shipments, a dedicated operational crew, and facilities including a crane and excavator would be needed. It is likely that a decontamination station would be constructed and associated processes and procedures would need to be developed.

2.5 No Action Alternative

DOE must consider a No Action Alternative in all of its environmental assessments; the selection of the No Action Alternative means that the proposed activity, as described in Section 2.3, would not take place. Under the No Action Alternative, DOE would conduct no new activities to ensure uninterrupted disposal capabilities for remote-handled LLW generated at the INL site. Because it can use an existing cask, remote-handled LLW from NRF would continue to be disposed of in the active Low-Level waste disposal facility at RWMC until it is full or must be closed in preparation for final CERCLA closure. No transport casks would be procured and individual generators could continue normal operations that result in generation of remote-handled LLW only until interim storage capacity was exhausted. INL missions supporting research, development, and demonstration activities and the activities of the Naval Nuclear Propulsion Program would be impacted by the lack of storage and disposal capacity for remote-handled LLW that would be generated.

Ion-exchange resins, hardware, and filters from ATR that previously had been disposed of at a portion of the onsite RWMC LLW disposal facility that was closed have been shipped offsite to NNSS since 2008. An estimated six shipments per year would continue under the No Action Alternative as long as conditions at NNSS remain favorable for disposal. The 36 m^3 of ion-exchange resin waste are packaged into waste liners and a shipping cask that can accommodate 6 m^3 per shipment, for a total of six shipments per year.

3. AFFECTED ENVIRONMENT

3.1 Idaho National Laboratory

The INL site consists of eight major facilities, each less than 2 mi^2, situated on an 890-mi^2 expanse of otherwise undeveloped, cool, desert terrain. Most INL buildings and structures are located within these developed site areas, separated by miles of primarily undeveloped land. DOE controls all INL site land (Figure 3-1), which occupies portions of five Idaho counties: Butte, Bingham, Bonneville, Clark, and Jefferson.

Public highways US 20 and 26 and Idaho 22, 28, and 33 pass through the INL site, but off-highway travel within the INL site and access to INL site facilities are controlled. Onsite disposal would not involve transport on a public highway.

Population centers in the region include large cities such as Idaho Falls, Pocatello, Rexburg, and Blackfoot, located further than 30 miles to the east and south, and several smaller cities/communities located around the site (approximately 1 to 30 miles away), such as Arco, Howe, Terreton, Fort Hall Reservation, and Atomic City (Figure 3-1). Craters of the Moon National Monument is less than 20 miles to the west; Yellowstone and Grand Teton National Parks and the city of Jackson, Wyoming, are located more than 70 miles northeast. No permanent residents exist on the INL site.

Geographically, the INL site is included within a large territory once inhabited by, and still of importance to, the Shoshone-Bannock Tribes. To the Shoshone-Bannock people, cultural resources include not only archaeological sites affiliated with their history but many kinds of natural resources (i.e., traditionally used plants and animals). Finally, features of the natural landscape (i.e., buttes, rivers, and caves) often have particular significance to the Tribes.

The INL site has a rich and varied cultural resource record due to its continuous access restriction and geographic remoteness. This includes localities that provide an important paleontological context for the region and the many prehistoric archaeological sites. These campsites, cairns, and hunting blinds provide information about the activities of aboriginal hunting and gathering groups who inhabited the area for at least 13,500 years. The archaeological sites, pictographs, caves, and many other features are important to contemporary Native American groups for historic, religious, and traditional reasons. Many historic sites document the area's use during the late 1800s and early 1900s, including the abandoned town of Pioneer/Powell, a northern spur of the Oregon Trail known as Goodale's Cutoff, many small homesteads, irrigation canals, sheep and cattle camps, and stage and wagon trails. During World War II, the military used the central portion of INL to test fire ordnance used by the Pacific Fleet; evidence of this era remains.

National Wetland Inventory maps prepared by the U.S. Fish and Wildlife Service indicate that the primary wetland areas on INL are associated with the Big Lost River, the Big Lost River spreading areas, and the Big Lost River sinks, although smaller (i.e., less than approximately 1 acre) isolated wetlands also occur intermittently. The only areas of jurisdictional wetlands are the Big Lost River sinks (Figure 3-2). Wetlands associated with the Big Lost River are classified as riverine/intermittent, indicating a defined stream channel with flowing water during only part of the year. Wetland vegetation exists along the Big Lost River; however, this vegetation is in poor condition because of recent years of only intermittent flows. The Big Lost River spreading areas and Big Lost River sinks are seasonal wetlands and can provide more than 2,000 acres of wetland habitat during wet years. There are no mapped wetlands within either candidate site location.

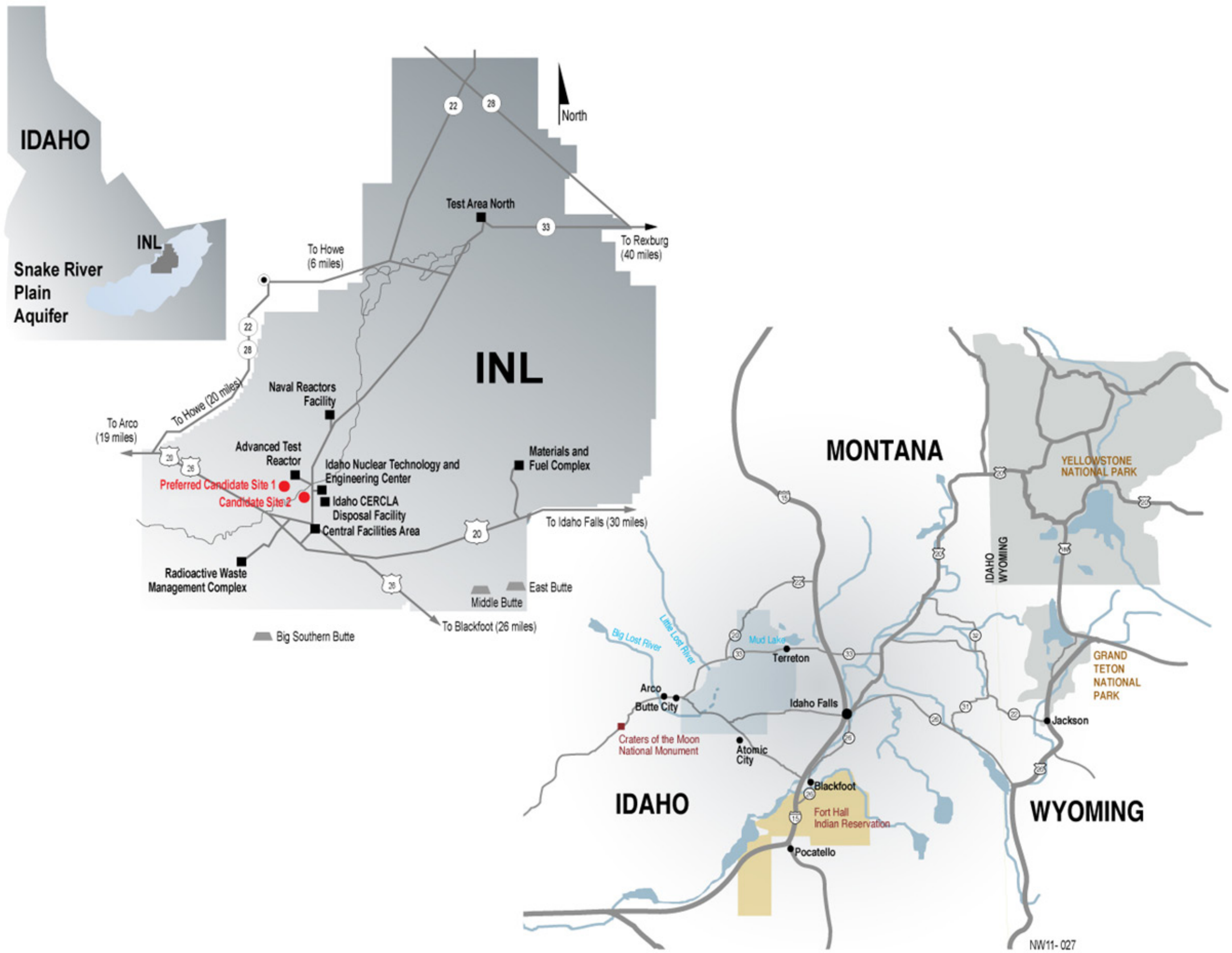

Figure 3-1. Map of Idaho National Laboratory and region showing major facility areas, highways, water bodies, and nearby towns.

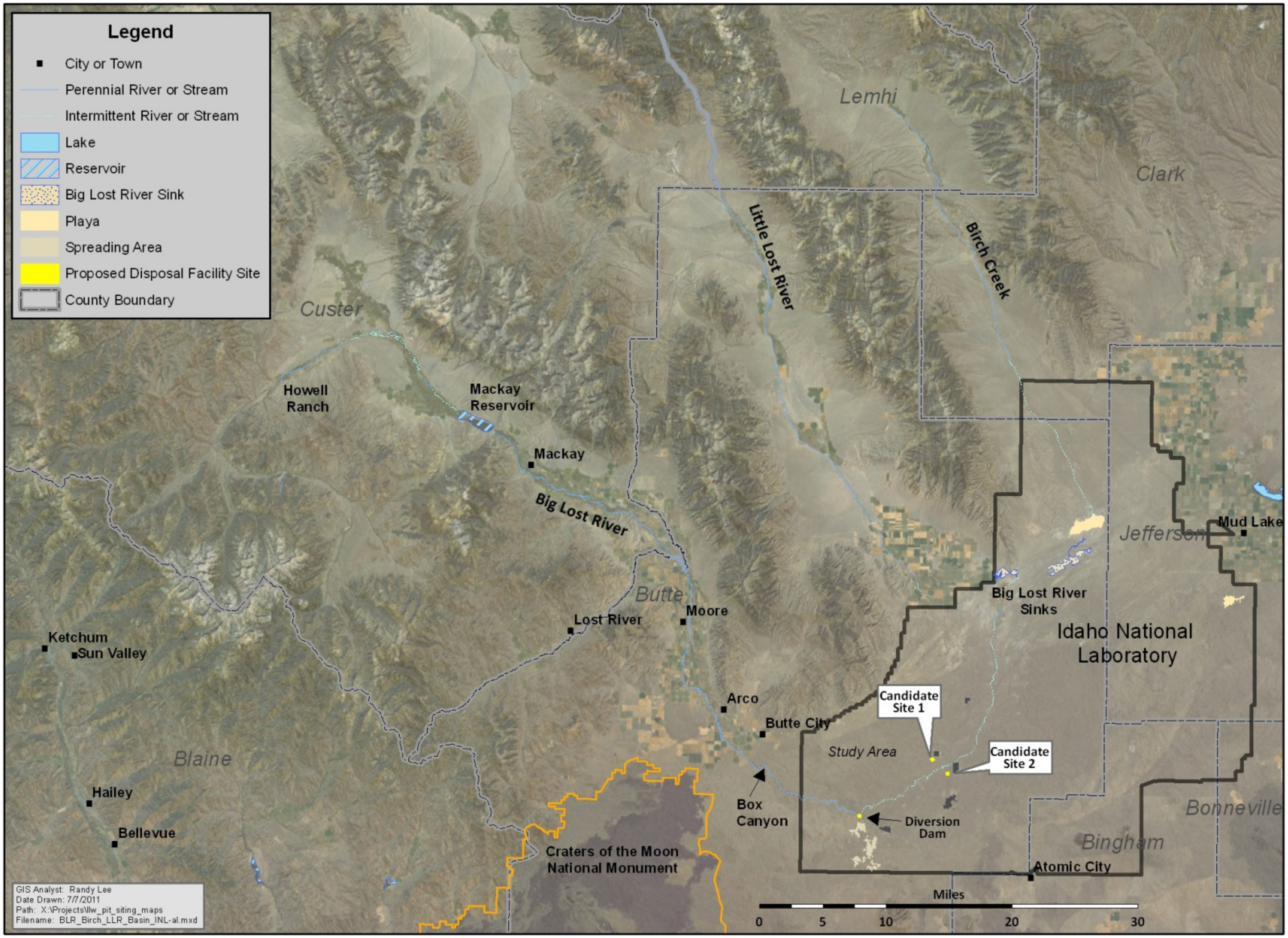

Figure 3-2. Mud Lake-Lost River Basin and candidate onsite locations.

Flow reaching the INL site in the Big Lost River is controlled by the Mackay dam, which releases water from Mackay reservoir. The impacts on the INL site from a potential Mackay dam failure have been evaluated (INL 2010b). While these flows would be higher than incurred during an extreme precipitation event, dam failure would not affect facility performance at either site. Excess flow that reaches the INL site through the Big Lost River can be diverted southward at the INL diversion dam into "spreading areas" at the southern end of the INL site, where the water will infiltrate and recharge the Eastern Snake River Plain Aquifer (ESRPA). Typically, when flows in the Big Lost River exceed 300 ft^3/second, a part of the flow is diverted into the spreading areas. The remainder of the flow continues through culverts at the INL diversion dam and flows northward through the Big Lost River channel. If sufficient flow exists, water will reach the Big Lost River Sinks and, potentially, the terminal ponding areas (Big Lost River playas) where it will either evaporate or infiltrate into the ESRPA (Figure 3-2).

In addition to the Big Lost River, surface waters on the INL site include the Little Lost River and Birch Creek and their tributaries (Figure 3-2). Flow in all three streams is intermittent and largely dependent on runoff from spring and early summer snowmelt from the mountainous upper drainage areas. Much of the flow in these other creeks and rivers is typically diverted for irrigation or is depleted by infiltration losses before reaching INL site boundaries. Both Candidate Sites 1 and 2 are outside the floodplain inundation areas depicted for the 100, 500, and 1,000-year floods (flood events that are predicted to occur once every 100, 500, and 1,000 years, respectively) (INL 2010b). The candidate sites are located within two 45-acre study areas, and small portions of each study area are within the 10,000-year floodplain. The approximate ten-acre footprint of the facility would be located outside of the 10,000-year floodplain within either of the two 45-acre study areas.

The only other surface water bodies at the INL site are the manmade percolation and evaporation ponds used for wastewater management (DOE-ID 2003).

The INL site overlies the north-central portion of the 10,800-mi^2 ESRPA. This highly productive aquifer is the major source of drinking water for southeastern Idaho and has been designated a Sole Source Aquifer by the EPA (56 FR 50634). The U.S. Geological Survey has estimated that the thickness of the active portion of the ESRPA at INL ranges between 250 and 820 ft (Mann 1986). Depth to the water table ranges from about 200 ft below land surface in the northern part of the site to more than 900 ft in the southern part. The depth to the top of the ESRPA is approximately 480 ft below the two candidate remote-handled LLW disposal facility sites (INL 2011a).

The five Idaho counties that are part of the INL site are all in attainment areas or are unclassified for National Ambient Air Quality Standards status under the Clean Air Act. The nearest nonattainment area is located approximately 50 miles south of INL in Power and Bannock counties. INL is classified under the Prevention of Significant Deterioration regulations as a Class II area – an area with reasonable or moderately good air quality.

The natural vegetation of the INL consists of a shrub overstory with a grass and forb understory. The most common shrub is Wyoming big sagebrush, although basin big sagebrush may dominate or co-dominate in areas with deep or sandy soils. Other common shrubs include green rabbitbrush, winterfat, spiney hopsage, gray horsebrush, gray rabbitbrush, and prickly phlox. The grass and forb understory consists of native grasses, thickspiked wheatgrass, Indian ricegrass, bottlebrush squirreltail, needle-and-thread grass, Nevada bluegrass, and bluebunch wheatgrass and native forbs (i.e., tapertip hawksbeard, Hood's phlox, hoary false yarrow, paintbrush, globe-mallow, buckwheat, lupine, milkvetches, and mustards). A portion of INL has been designated as the Sagebrush Steppe Ecosystem Reserve, which is managed to provide research opportunities and preserve sagebrush steppe habitat. In addition, the INL site is designated as a National Environmental Research Park.

A wide range of vertebrate species are located within the site. Several species are considered sagebrush-obligate species, meaning that they rely on sagebrush for survival. Among others, those species include sage sparrow, Brewer's sparrow, northern sagebrush lizard, Greater Sage-Grouse, and pygmy rabbit.

There are currently no species on the INL site that are listed as endangered or threatened under the Endangered Species Act. The Greater Sage-Grouse is a candidate species and is common on the INL site. Several species of concern, including long-eared myotis, small-footed myotis, Townsend's big-eared bat, pygmy rabbit, Merriam's shrew, long-billed curlew, ferruginous hawk, northern sagebrush lizard, and loggerhead shrike occur on the site.

INL also provides important breeding and nesting habitat for many species of raptors and songbirds. Most avian species occupying INL use both sagebrush and grassland habitats from a few days for feeding and resting during migration to several months for breeding and raising young. Many bird species use specific habitats for foraging and reproduction. Species that primarily use sagebrush include the Greater Sage-Grouse, sage sparrow, Brewer's sparrow, sage thrasher, and loggerhead shrike. Species that occur mainly in grassland habitats include horned lark, western meadowlark, vesper sparrow, and grasshopper sparrow. Other common bird species at INL include the following: rock wren, common nighthawk, red-tailed hawk, rough-legged hawk, prairie falcon, ferruginous hawk, golden eagle, and common raven. Although most raptors use the site indiscriminately for foraging, nesting structures are a limiting factor in population abundance and species diversity.

DOE presently contracts with Idaho Power to supply electric power to INL. Site electrical energy availability is about 480,000 megawatt-hours per year. Current electrical energy consumption at INL is 230,000 megawatt-hours annually (based on 2010 data). Fuel consumed at INL includes natural gas (280,000 therms), and fuel oil (heating fuel), propane and liquid natural gas (2,200,000 gallons). Diesel fuel consumption in 2010 was approximately 750,000 gallons and gasoline consumption was approximately 580,000 gallons. Greenhouse gas emissions totaled 110,000 metric tons in 2010.

The INL facilities that currently transport remote-handled LLW are located within a few miles of the candidate onsite disposal locations, with the exception of MFC, which is approximately 18 miles east of the locations. Transport of remote-handled LLW from MFC would utilize a road being constructed that will connect MFC and INTEC (DOE 2010a); therefore, use of public highways for this purpose would not be required. The amount of diesel fuel used for onsite transport is estimated to be 230 gallons per year (Huai et al. 2006).

3.2 Nevada National Security Site

The NNSS is located in Nye County, Nevada (Figure 2-6), approximately 65 miles northwest of Las Vegas, the largest population center in the state, with nearly 2 million people. The NNSS is owned by the federal government and administered, managed, and controlled by DOE. The mission of NNSS is to fully utilize the inherent capabilities and remote location of the site to support the nation's nuclear, energy, and environmental security efforts. This mission includes acceptance of radioactive waste for disposal from DOE and DOD sites. NNSS is suited for radioactive waste disposal due to its arid environment, deep groundwater, and remote location. NNSS has a planned LLW disposal capacity of 45,000 m^3 per year (DOE 1997). It is assumed for purposes of this Environmental Assessment that NNSS could accept remote-handled LLW from the INL site to meet the INL's mission need of 20 to 50 years.

Disposal at NNSS takes place at the Area 5 Radioactive Waste Management Complex. This area is in a closed basin with thick alluvial soil and a depth to groundwater of 781 ft (NNSS 2010). The groundwater at NNSS is classified as Class II groundwater according to the EPA groundwater classification system, which means that it currently or potentially is a source of drinking water. There have been 828 underground nuclear tests conducted at NNSS. Approximately one-third of these tests were detonated near or below the water table. This legacy of nuclear testing has resulted in groundwater contamination in some areas. NNSS evaluates the extent of radionuclide groundwater contamination due to past underground nuclear testing through hydrogeologic investigation and characterization, groundwater flow and transport modeling, and groundwater sampling and monitoring. No adverse impacts on potable groundwater quality have resulted from operations since 1996. Because of the distance between the existing water supply wells at NNSS and the underground tests, DOE believes that groundwater use at NNSS has little or no effect on the migration or spread of contamination from underground nuclear testing. Groundwater at NNSS is deep and slow moving, which affords protection to adjacent areas. Groundwater modeling is used to evaluate the effect of water use on potential radionuclide migration and assist in the selection of optimum water-production wells and monitoring wells. As studies are completed, monitoring plans are negotiated and approved for each of the underground test areas. Maintenance of the quality of waters that currently are clean is managed through implementation of a Groundwater Protection Management Plan (DOE 2011a).

Offsite water use is far removed from the NNSS testing areas. The closest significant offsite withdrawals are in Oasis Valley, approximately 18.6 miles from the nearest underground test. These withdrawals are not thought to affect contaminant migration (DOE 2011a).

One package of remote-handled LLW would be transported from INL to NNSS at a time in a shipping container licensed for transporting radioactive waste on public highways. It is estimated that 117 shipments of remote-handled LLW would be transported each year.

Transport vehicles would be commercial truck-trailer combinations dedicated to exclusive use for hazardous materials transport. Total vehicle weight would not exceed 80,000 lb to comply with road limit restrictions. Annual estimated diesel fuel use for round-trip transport from INL to NNSS (117 shipments or approximately 190,000 miles) would be approximately 28,000 gallons (Huai et al. 2006).

3.3 No Action

Under the No Action Alternative, six shipments of ion-exchange resins, hardware, and filters from ATR would be transported to NNSS each year as long as conditions at NNSS remain favorable for disposal. Transport vehicles would be commercial truck-trailer combinations dedicated to exclusive use for hazardous materials transport. Total vehicle weight would not exceed 80,000 lb to comply with road limit restrictions. The shipping cask container would be licensed for transport of radioactive waste on public highways. Annual estimated diesel fuel use for round-trip transport from INL to NNSS (six shipments or approximately 1,580 miles) would be approximately 1,440 gallons (Huai et al. 2006).

4. ENVIRONMENTAL CONSEQUENCES

Section 4.1 and Section 4.2 describe the potential environmental consequences from Alternative 1 (preferred alternative) and Alternative 2, respectively. Section 4.3 addresses the environmental consequences from the No Action Alternative. Cumulative effects are addressed in Section 4.4, and Section 4.5 presents a comparison of the alternatives.

4.1 Onsite Disposal

4.1.1 Cultural Resources

Since 1984, archaeological surveys of INL lands have been conducted according to the standards outlined in the INL Cultural Resource Management Plan (DOE-ID 2009). Cultural resources investigations have been completed in the vicinity of the alternative onsite disposal facility sites for more than three decades, and none resulted in the recording of cultural resources within the 45-acre candidate site areas or in adjacent areas where utility and access connections might be placed (INL 2010c).

In May 2010, the INL Cultural Resource Management Office conducted archival searches, intensive archaeological field surveys, and initial coordination with the Shoshone-Bannock Tribes to identify cultural resources that may be present within either of the two candidate onsite locations (INL 2010c). Near preferred Candidate Site 1, surveys encompassed 130 acres and four archaeological resources were identified, including a historic homestead, historic canals, and two isolated prehistoric artifacts. The historic homestead and canals are potentially eligible for nomination to the National Register of Historic Places. Near Candidate Site 2, seventy acres were examined and two archaeological resources were identified, including a small historic activity area and a historic canal and ditch. The canal exhibits potential for National Register listing (INL 2010c).

Specific Native American cultural resources were not officially documented by the Shoshone-Bannock Tribes in the candidate onsite locations for construction of the remote-handled LLW disposal facility. However, a representative from the Tribe's Heritage Tribal Office toured the project areas, and general concerns with regard to protection of the natural environment have been documented.

Ground disturbance associated with facility construction and associated infrastructure (e.g., utilities, access roads, and telecommunications) has the potential to impact any archaeological sites and natural resources of importance to the Shoshone-Bannock Tribes in the chosen footprint of the project. Location and construction of the remote-handled LLW disposal facility footprint within either of the two candidate sites would be undertaken to avoid disturbing the archaeological resources identified through the cultural resource surveys. Although no subsurface archaeological resources have been identified, cultural resource monitoring would occur during all ground disturbing activities to prevent inadvertent damage to subsurface archaeological resources.

4.1.2 Water Resources

The Big Lost River is the only surface water feature near the candidate disposal sites. The facility would be located outside the 100, 500, 1,000, and 10,000-year floodplain inundation areas. There are no mapped wetlands within either candidate site location. No impacts to surface water are expected from the proposed action.

Most of INL is underlain by the ESRPA. The depth to the top of the ESRPA is approximately 480 ft below the two candidate sites. The geology above the ESRPA, the vadose zone, is generally comprised of basalt (95%) with a layer of soil (loess) or sediment on top of the basalt with thin layers of sediment (1 to 20-ft intervals) between basalt flows. The ESRPA has similar geology as the overlying vadose zone and is generally 250 to 900-ft thick. No releases from the proposed facility are anticipated from operations. A remote-handled LLW disposal facility would be operated, closed, and maintained post-closure to avoid the potential for migration of contaminants (i.e., radionuclides) from the facility. The potential exists for contaminants to be released from the remote-handled LLW disposal facility at either of the two candidate sites following the closure period (several thousand years in the future) and be transported downward through the vadose zone into the aquifer.

Potential groundwater impacts following facility closure were analyzed for the two candidate onsite locations (INL 2011a). The analysis evaluated radionuclide transport from the facility to a hypothetical human receptor via the groundwater pathway. The analysis assumed the failure of the stainless steel waste liners, concrete vaults, and an engineered cover. It compared predicted groundwater concentrations to groundwater quality standards, and compared the predicted cumulative all-pathways EDE to the dose criteria for a member of the public set forth in DOE Order 435.1 (25 mrem per year). The receptor is assumed to be located 330 ft downgradient from the edge of the remote-handled LLW disposal facility for all times following facility closure.

The Idaho Ground Water Quality Rule (IDAPA 58.01.11) establishes minimum requirements for protection of groundwater quality through standards and an aquifer categorization process. Primary constituent standards are based on protection of human health, and secondary constituent standards are generally based on aesthetic qualities. The primary constituent standards for radionuclides incorporate standards set by EPA (40 CFR 141.66). These limits are typically specified as a maximum contaminant level (MCL). MCLs found in 40 CFR 141 include values for beta-gamma-emitting radionuclides and alpha-emitting radionuclides. The MCL for beta-gamma-emitting radionuclides is the concentration that, assuming an ingestion rate of about one-half gallon of water per day for 365 days per year, the dose equivalent to the whole body or critical organ does not exceed 4.0 mrem/year. Other specific limits include a maximum gross alpha activity of 15 pCi/L (excluding radon and uranium isotopes), a maximum combined Ra-226 and Ra-228 concentration of 5 pCi/L, a maximum uranium mass concentration of 30 μg/L, and maximum H-3 and Sr-90 concentrations of 20,000 pCi/L and 8 pCi/L, respectively.

Table 4-1 presents, for each candidate site, the peak predicted concentrations for the radionuclides that are the primary dose contributors, along with the predicted time of occurrence and corresponding MCL. The list includes parent radionuclides and the daughters of each parent (shown in parentheses). The primary radionuclides are Tc-99, C-14, I-129, and U-238. At each candidate site location, predicted concentrations were lower than the MCL and meet all of the state groundwater primary constituent standards. The predicted concentrations for the preferred Candidate Site 1 were lower than Candidate Site 2 concentrations. The analysis also evaluated the total all-pathways dose from ingesting groundwater, locally grown crops, locally raised beef, and locally produced milk for each radionuclide. These estimated peak doses and corresponding time of occurrence are presented in Table 4-2. The predicted peak cumulative all-pathways dose from all radionuclides will never exceed the regulatory limit of 25 mrem/year (DOE Order 435.1). For Candidate Site 1, the total peak all-pathways dose is estimated to be 0.88 mrem/year in year 5500. For Candidate Site 2, the total peak all-pathways dose is estimated to be 1.6 mrem/year in year 4000. The average annual radiation exposure from natural sources to an individual in the United States is approximately 300 mrem/year.

The results shown in Tables 4-1 and 4-2 for both candidate sites are conservative because the evaluation of groundwater impacts does not take into account all natural and engineered features of the facility, which would reduce and slow migration of contaminants. These features include use of stainless steel waste liners to reduce water contact with the waste, reinforced concrete vaults to provide structural integrity, placement of an engineered cover to reduce the potential for infiltration of water into the facility, and operational controls, including berms and an interim cover. Predictive certainty in estimated concentrations and doses was assessed to account for variability in source inventories, geologic parameters, infiltration rates, and aquifer velocity. The concentrations and doses in Table 4-1 and 4-2 are within the (5^{th} and 95^{th}) percentile confidence limits, providing assurance that the potential groundwater impacts have been bounded by the analysis.

Table 4-1. Peak predicted groundwater concentrations and time of occurrence for Candidate Sites 1 and 2.

Radionuclide (Progeny)	Candidate Site 1 Peak Concentration (pCi/L)	Candidate Site 1 Calendar Year Peak Occurs	Candidate Site 2 Peak Concentration (pCi/L)	Candidate Site 2 Calendar Year Peak Occurs	MCL[a] (pCi/L)
C-14	150	5500	280	4000	2,000
Cl-36	0.12	3900	0.11	3500	700
H-3	0.000023	2200	0.0004	2200	20,000
I-129	0.19	11000	0.26	8600	1
Mo-93	0.044	22000	0.38	16000	469
Nb-94	0.016	410000	0.092	300000	853
Ni-59	5.8	270000	14	210000	300
Tc-99	110	3100	150	2800	900
Np-237	0.00072	57000	0.00095	42000	15
(U-233)[b]	0.0002	49000	0.0002	37000	289,000
(Th-229)	3.8E-06	59000	3.4E-06	46000	15
Pu-239	3.1E-13	260000	7.7E-11	220000	15
(U-235)[b]	3.2E-06	56000	3.5E-06	40000	65
(Pa-231)	3.4E-08	92000	3.3E-08	71000	15
(Ac-227)	5.4E-08	92000	5.4E-08	71000	15
Pu-240	5.3E-16	67000	7.0E-15	67000	15
(U-236)[b]	2.4E-05	42000	2.9E-05	33000	1,941
(Th-232)	9.5E-13	580000	9.10E-13	430000	15
(Ra-228)	8.1E-13	580000	7.8E-13	440000	5
(Th-228)	5.9E-13	580000	5.7E-13	440000	15
U-235[b]	0.0021	56000	0.0029	40000	65
(Pa-231)	0.000016	92000	0.000017	71000	15
(Ac-227)	0.000026	92000	0.000028	71000	15
U-238[b]	0.097	130000	0.093	92000	10
(U-234)[b]	0.54	92000	0.54	63000	187,000
(Th-230)	0.0097	370000	0.0096	360000	15
(Ra-226)	0.0097	380000	0.0096	360000	5
(Pb-210)	0.016	370000	0.016	360000	2.12

a. MCLs for beta-gamma emitting radionuclides are based on a whole body and critical organ dose equivalent limit of 4 mrem/year. The whole body and critical organ doses are calculated using the dose conversion factors in the National Bureau of Standards Handbook 69, "Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air and Water for Occupational Exposure," (NBS 1963). The dose conversion factors in National Bureau of Standards Handbook 69 are based on International Commission on Radiation Protection Publication 2, which has been superseded by International Commission on Radiation Protection Publication 30, and more recently, International Commission on Radiation Protection Publication 72 (ICRP 72 1995).

b. MCL for uranium isotopes converted from 30 µg/L mass concentration to equivalent activity concentration.

Table 4-2. Peak predicted all-pathways doses and time of occurrence for Candidate Sites 1 and 2.

Radionuclide (progeny)	Candidate Site 1		Candidate Site 2	
	Peak All-Pathways Groundwater Dose (mrem/year)[a,b]	Calendar Year Peak Occurs	Peak All-Pathways Groundwater Dose (mrem/year)[a,b]	Calendar Year Peak Occurs
C-14	0.85	5500	1.6	4000
Cl-36	0.012	3900	0.012	3500
H-3	2.9E-09	2200	5.2E-08	2200
I-129	0.13	11000	0.16	8600
Mo-93	0.00056	22000	0.0049	16000
Nb-94	0.0011	410000	0.0068	300000
Ni-59	0.0014	270000	0.0034	210000
Tc-99	0.60	3100	0.81	2800
Np-237	0.00022	57000	0.00029	42000
(U-233)	3.1E-05	49000	3.0E-05	37000
(Th-229)	6.9E-06	59000	6.2E-06	46000
Np-237 Total[c]	0.00026	56000	0.000032	42000
Pu-239	2.2E-13	260000	5.4E-11	220000
(U-235)	4.5E-07	56000	4.9E-07	40000
(Pa-231)	4.6E-08	92000	4.5E-08	71000
(Ac-227)	6.8E-08	92000	6.7E-08	71000
Pu-239 Total[c]	5.2E-07	60000	5.6E-07	42000
Pu-240	3.8E-16	67000	5.0E-15	67000
(U-236)	3.4E-06	42000	4.1E-06	33000
(Th-232)	6.2E-13	580000	5.9E-13	430000
(Ra-228)	1.7E-12	580000	1.6E-12	440000
(Th-228)	2.4E-13	580000	2.3E-13	440000
Pu-240 Total[c]	3.4E-06	42000	4.1E-06	33000
U-235	4.5E-07	56000	5.0E-07	40000
(Pa-231)	4.6E-08	92000	4.5E-08	71000
(Ac-227)	6.8E-08	92000	6.7E-08	71000
U-235 Total[c]	5.2E-07	60000	5.6E-07	42000
U-238	0.014	130000	0.013	92000
(U-234)	0.08	92000	0.08	63000
(Th-230)	0.0059	370000	0.0058	360000
(Ra-226)	0.008	380000	0.008	360000
(Pb-210)	0.065	370000	0.064	360000
U-238 Total[c]	0.16	310000	0.16	280000

a. The dose limit is 25 mrem/year (DOE Order 435.1). The average annual radiation exposure from natural sources to an individual in the United States is approximately 300 mrem/year.

b. Doses calculated using dose coefficients from Federal Guidance Report 13: Cancer Risk Coefficients for Environmental Exposure to Radionuclides (EPA 1999) and corresponding supplement (EPA 2002).

c. Peak doses for parent and progeny are not additive because of differences in time of occurrence.

4.1.3 Ecological Resources

Both candidate sites are in an area burned by the Tin Cup Wildfire in 2000. Only a few patches of sagebrush remain in these areas. The current vegetation includes primarily native and non-native perennial grasses, green rabbit brush, native perennial forbs, and non-native annual grasses and forbs. A number of small mammals and reptiles permanently reside in the area around the candidate sites, while bird species and large mammals use this habitat in a seasonally transitory manner. Wildlife species of concern include Greater Sage-Grouse, all migratory birds (including raptors), pygmy rabbits, Great Basin rattlesnakes, and all large mammal species (Blew et al. 2010).

Bird species observed at Candidate Site 1 were horned lark, ravens, and various species of sparrow. Two active nests were found at Candidate Site 1. Bird species observed at Candidate Site 2 were western meadowlark, sage thrasher, horned lark, and various sparrow species. Five active bird nests were located at Candidate Site 2.

Elk, mule deer, and pronghorn have been observed using the general vicinity of both candidate sites during semiannual surveys. During surveys conducted in June 2010, there was visual confirmation of pronghorn antelope, horned lark, ravens, ground squirrels, and other small mammals at Candidate Site 1. There also was evidence of badger present in the area. Wildlife or signs observed at Candidate Site 2 included ground squirrels and other small mammals, badger, sage thrasher, barn swallow, horned lark, meadowlark, pronghorn, and coyote.

The U.S. Fish and Wildlife Service recently released a finding indicating that Greater Sage-Grouse warrant protection under the Endangered Species Act (16 USC §1531, et. seq.) but are precluded due to other listing priorities (DOI-FWS 2010). With the loss of big sagebrush in the Tin Cup Wildfire, no suitable nesting, brood rearing, or wintering habitat exists in the general vicinity of either candidate site. Surveys in June 2010 did not find sign of Greater Sage-Grouse using these areas.

Pygmy rabbits are sagebrush obligate species that are under consideration for protection under the Endangered Species Act (16 USC § 1531, et. seq.). They depend on sagebrush for cover and forage. Surveys conducted in February 2010 indicated that no active burrows, and little, if any, suitable habitat were present at either of the onsite candidate sites.

No critical habitat for threatened or endangered species, as defined in the Endangered Species Act, exists on the INL site. Greater Sage-Grouse is considered to be a candidate species for listing under the Endangered Species Act. However, if a species such as the Greater Sage-Grouse or pygmy rabbit are listed before or during construction of the facility, DOE would initiate formal consultation with the U.S. Fish and Wildlife Service. No habitat or sign for either Greater Sage-Grouse or pygmy rabbit were found in either candidate site location (Blew et al. 2010).

After placing the engineered cover over the facility, native vegetation will be established on the cover and in the surrounding area to promote re-establishment of native habitat.

4.1.4 Routine Transportation

Transportation of remote-handled LLW would take place entirely within the INL site, and the public would not have access to the transport route or the disposal facility. The chance of radiological exposure during routine operation of the remote-handled LLW disposal facility is extremely low. The principal radiation hazard is direct radiation emitting from the remote-handled LLW. With adequate shielding, the radiation levels at the surface of the remote-handled LLW transport cask may be maintained at levels that are protective of workers and the public.

Approximately 2,500 vehicle miles would be travelled onsite each year to support remote-handled LLW disposal operations. No health impacts to the public are anticipated from emissions associated with these miles because the transportation would not occur on public highways (North Wind 2011).

4.1.5 Accidents and Intentional Destructive Acts

The potential exists for an accident to occur during transport onsite. There also is the potential for unlawful entry onto the INL site, including the candidate remote-handled LLW disposal facility sites, to cause harm to facilities and personnel. Extensive security measures are in place to prevent this from occurring. Transport and disposal of radioactive material at the INL site routinely employs a variety of measures that mitigate the likelihood and consequences of intentional destructive acts at the candidate remote-handled LLW disposal facility sites. Access to the INL site facilities is controlled, with only those persons performing official business and presenting the proper credentials being allowed onsite. The INL site perimeter is monitored and patrolled to prevent unauthorized entry. The INL site maintains a highly trained and equipped protective force intended to prevent attacks against and entry into INL's facilities.

Potential impacts for transportation and handling accidents and intentional destructive acts were analyzed for the onsite disposal alternative (North Wind 2011). In a transportation or handling accident, the principal material hazard originates from a breach of a payload and release of radioactive material. A truck collision involving fire and a partial release of the contents of the shipping cask was analyzed. The upper bound number of such accidents for onsite waste shipments over the life of the facility is estimated to be 0.00059 (substantially less than one occurrence). Dropping a shipping container, improper loading, and single or multiple vehicle crashes are considered bounded by the truck collision-fire scenario. An intentional destructive act involving transportation or handling of the remote-handled LLW is considered bounded by this truck collision-fire scenario. In this accident scenario, dose to the facility worker, collocated worker, and a maximally exposed individual (MEI) member of the public is estimated from intake of radiological material made airborne in the fire. Inhalation dose consequences were estimated for a crash resulting in a breach of a container and a vehicle fuel fire that engulfs the container and causes airborne dispersion of a portion of the contents.

The estimate of the radiation dose is then converted to an estimate of health effects. Exposure of populations to low levels of ionizing radiation is associated with an estimated number of resulting latent cancer fatalities (LCFs) in the exposed population. If an accident involved radiation exposures, the potential LCFs would be a consequence. The number of radiation-induced LCFs is estimated by multiplying the dose in person-rem by health risk conversion factors. These factors relate the radiation dose to the potential number of expected LCFs based on comprehensive studies of people historically exposed to large doses of radiation (e.g., the Japanese atomic bomb survivors). The health risk conversion factor recommended for use by the Interagency Steering Committee on Radiation Standards is 0.0006 LCF per person-rem of exposure (ISCORS 2002). A calculated value of less than 1 indicates that there will be no LCFs in the population from a transportation or handling exposure.

The consequence of a dose to an individual is expressed as the probability that the individual would incur fatal cancer from the exposure. For example, based on a dose-to-risk conversion factor of 0.0006 LCFs per person-rem, a maximally exposed worker receiving a dose of 1 rem in an accident would have an estimated lifetime probability of fatal cancer induced by the radiation of 0.0006 or 1 chance in 1,700.

Using conservative estimates, the likelihood that a MEI (located 2.5 miles from the accident at the point of nearest public access to the candidate sites) would incur an LCF was estimated to be 5.0E-08 (0.000082 rem). The LCF likelihood for a crew member is estimated to be 1.0E-05 (0.018 rem). The LCF likelihood for a collocated worker (330 ft away) is estimated to be 7.0E-06 (0.011 rem) (North Wind

2011). There are no populations residing near the INL site; therefore, collective dose and associated LCFs were not estimated for this onsite accident.

4.1.6 Energy Use

Energy resource impacts would include both fuel consumption associated with construction and longer-term fuel and energy consumption associated with transporting waste and operating the remote-handled LLW disposal facility. The amount of energy that would be consumed during the construction and operation phases of the project is likely to be similar at either candidate onsite location. There would be short term increase in fuel use during construction. It is expected that approximately 230 gallons of diesel fuel would be used for transport each year for longer-term fuel and energy use. Operation of a replacement remote-handled LLW disposal facility would not overburden energy capacities at the INL site. Impacts from energy use would be in the form of carbon dioxide emission from use of fuel for transport and disposal operation. Carbon dioxide emissions for the onsite alternative are estimated to be 3 tons per year (North Wind 2011).

4.1.7 Other Resources

Air emissions from construction activities would be similar to those produced during typical facility and infrastructure construction activities. Light-duty and heavy-duty trucks would be used to deliver materials to specific construction areas and remove any debris within the project area. During construction, short-term adverse effects on air quality, including increased greenhouse gas emissions, may result from dust and exhaust emissions. Any emissions discharged during construction of the proposed facility are not expected to cause an increase in local air pollutant concentrations beyond state and federal standards at any time or to be a significant source of greenhouse gas emissions. Topography and meteorology of the area in which the project is located would not seriously restrict dispersion of any air pollutants. Only small, short-term impacts are expected from the construction phase of the proposed project.

Once the remote-handled LLW disposal facility is operational, air quality would return to pre-construction levels. There would be no significant greenhouse gas emissions resulting at any time from remote-handled LLW disposal. There would be negligible toxic and criteria air pollutant emissions. After closure, there would be no potential emissions from the facility except insignificant amounts of gaseous radionuclide emissions, including radon (INL 2011b).

4.2 Offsite Disposal at the Nevada National Security Site

4.2.1 Water Resources

The INL Site's remote-handled LLW would be disposed of at the NNSS Area 5 Radioactive Waste Management Complex under the offsite disposal alternative. No disposal activities at NNSS are expected to result in violations of water quality standards, water level draw-downs precluding other uses of an aquifer, or alterations of groundwater recharge adversely affecting downgradient aquifers. Groundwater monitoring at the Area 5 Radioactive Waste Management Complex indicates that no contamination of groundwater resources has occurred as a result of waste management activities. Annual modeling exercises used to support the performance assessment for the Area 5 Radioactive Waste Management Complex conclude that no groundwater pathway exists for this disposal facility (DOE 2011a). No impacts to water resources at NNSS are anticipated under this alternative.

4.2.2 Routine Transportation

Potential impacts for routine transportation of remote-handled LLW were analyzed for the offsite disposal alternative (North Wind 2011). This analysis of transportation impacts assumes that shipments of remote-handled LLW from the INL site to NNSS would take place over 20 years with the potential for up to an additional 30 years, for a total timeframe of 50 years.

The radiological cargo-related risks from the transportation of radiological waste from the INL site to the NNSS (Figure 2-6) would be attributable to ionizing radiation exposure. The radiological risk associated with routine transportation results from the potential exposure of people to low levels of external radiation near a loaded shipment. The RADTRAN (Weiner et al. 2008) and RISKIND (Yuan et al. 2002) computer codes were used for routine and accident risk assessments to estimate the radiological impacts to collective populations and individuals. Using these codes and conservative assumptions to evaluate transportation risk, the collective population dose from routine radiological exposure can be estimated.

The dose rate from each shipping container is assumed to be 10 mrem/hour at 3.3 ft, which is typical for remote-handled radioactive waste shipping analysis (DOE 2002a). The exposures to members of the pubic within 2,600 ft of the transport link (off-link), sharing the transport link (on-link), and at stops are added to yield the collective dose to the public for each shipment. This per shipment dose can be multiplied by the number of shipments per year to estimate the total potential annual dose that could be received by members of the public. Consequences of the collective population dose are expressed in terms of increased LCFs per year using the health risk conversion factors recommended by the Interagency Steering Committee on Radiation Standards (ISCORS 2002). Table 4-3 presents the results of the analysis of impacts to the population along the two potential transport routes.

Table 4-3. Transportation impacts to the surrounding population from routine shipment of remote-handled low-level waste from the Idaho National Laboratory site to the Nevada National Security Site under the Offsite Transportation Alternative.

Transport Route	Off-link Collective Dose[a]	On-link Collective Dose	Total Stop Collective Dose[b]	Per Shipment Collective Dose	Collective Dose Per Year (117 Shipments)	LCFs/Year[c]
Route A	0.00014	0.0066	0.072	0.079	9.2	0.006
Route B	0.0002	0.0073	0.072	0.08	9.4	0.006

a. Dose is collective population dose and is presented in person-rem.

b. Total stop dose assumes three one-half-hour stops made during the course of each shipment.

c. Conversion factor of 0.0006 LCFs per person rem (ISCORS 2002).

Table 4-4 presents the results of the RADTRAN analysis for each of the two crew members. Consequences of the individual doses received are expressed in terms of increased likelihood of the individual incurring an LCF. It is assumed the crew would be DOE or contractor employees working under the DOE occupational exposure limit of 5 rem/year for radiological workers (10 CFR 835). This limit will be enforced by limiting the number of shipments per person-year.

Vehicle-related risks (i.e., latent health effects from vehicle emissions) result simply from transporting any material from one location to another independent of the characteristics of the cargo. The presence or absence of cargo is not a factor in the assessment of these risks. The collective risk of pollution health effects to the surrounding population from truck emissions, which include greenhouse gas emissions (Biwer and Butler 1999), is estimated to be 0.00025.

Table 4-4. Transportation impacts to the crew from routine shipment of remote-handled low-level waste from the Idaho National Laboratory site to the Nevada National Security Site under the Offsite Transportation Alternative.

Transport Route	Crew Member Dose[a] – Transport	Crew Member Total Stop Dose[b]	Crew Member Dose Per Shipment[c]	Crew Member Dose Per Year (117 Shipments)	Increased LCF Likelihood/ Year[d]
Route A	0.039	0.04	0.079	9.2	0.006
Route B	0.043	0.04	0.083	9.7	0.006

a. Dose is individual dose and is presented in rem.

b. Total stop dose assumes three one-half-hour stops made during the course of each shipment.

c. Sum of Crew Member Dose (Transport) and Crew Member Total Stop Dose.

d. Conversion factor of 0.0006 LCFs per rem used (ISCORS 2002).

4.2.3 Accidents and Intentional Destructive Acts

Potential impacts for transportation and handling accidents and intentional destructive acts were analyzed for the offsite disposal alternative (North Wind 2011). This analysis of transportation impacts assumes that shipments of remote-handled LLW from the INL site to NNSS would take place over 20 years with the potential for up to an additional 30 years, for a total timeframe of 50 years. Approximately 185,000 vehicle-miles would be traveled for all projected waste shipments from the INL site to NNSS in Nevada each year.

Based on state-specific accident and fatality rates (Saricks and Tompkins 1999), the upper bound number of traffic accidents for all projected waste shipments is estimated to be 0.048 (less than one occurrence) and no traffic-related fatalities are expected.

The radiological risk from transportation-related accidents and intentional destructive acts lays in the potential release and dispersal of radioactive materials into the environment during an accident and the subsequent exposure of people through multiple exposure pathways (i.e., exposure to contaminated soil, inhalation, or the ingestion of contaminated food). Collective population dose in an urban area from the accidental release of radioactive materials caused by a shipping accident involving a fuel fire and an impact severe enough to damage a shipping container is shown in Table 4-5. Dose and the associated LCFs are presented for the surrounding population, an MEI near the site of the accident, the crew member, and a collocated worker. There is no risk of an acute cancer fatality under any of the accident scenarios (North Wind 2011).

Table 4-5. Estimated impacts to the collective population, a maximally exposed individual, the crew member, and a collocated worker from an offsite accident.

	Collective Population		MEI		Crew Member		Collocated Worker	
Accident	Dose	LCFs[a]	Dose	Increased LCF Likelihood	Dose	Increased LCF Likelihood	Dose	Increased LCF Likelihood
Vehicle collision and fuel fire	1.8 person-rem	0.001	0.0083 rem	<0.0001[a]	0.077 rem	<0.0001[a]	0.011 rem	<0.0001[a]

a. Conversion factor of 0.0006 per rem/person-rem used (ISCORS 2002).

Transport of remote-handled LLW would routinely employ a variety of measures that mitigate the likelihood and consequences of an intentional destructive act, including acts of terrorism. Crew members would be screened for behavioral and substance abuse issues and would receive safety and security training. Crew members would conduct a thorough inspection of their vehicle and load prior to transport. During transport, crew members would always have in their possession a working means of communication and would be trained to immediately report suspicious activity encountered en route.

4.2.4 Energy Use

Energy resources would include fuel consumption associated with transport of the waste from the INL site to NNSS and the return trip to the INL site. It is expected that approximately 28,000 gallons of diesel fuel would be used for transport each year. Impacts from energy use would be in the form of carbon dioxide emissions from use of fuel for transport operations. Carbon dioxide emissions for the offsite alternative are estimated to be 310 tons per year (North Wind 2011).

4.3 No Action Alternative

Under the No Action Alternative, ion-exchange resins, hardware, and filters from ATR would continue to be shipped offsite to NNSS as long as conditions at NNSS remain favorable for disposal. No other onsite or offsite actions would be taken to provide remote-handled LLW disposal capacity. Because NRF has an existing cask, it would continue shipments to RWMC until it is closed or filled. No new transport casks would be developed and remote-handled LLW activated metals and ion-exchange resins from NRF would continue to be stored at the generating facilities until storage capacity is exceeded; at that time, activities that generate the subject waste would cease or be significantly curtailed because of a lack of disposal capability, which would impact mission-critical activities. INL site missions supporting research, development, and demonstration activities and the activities of the Naval Nuclear Propulsion Program could be impacted by the lack of storage and disposal capacity for remote-handled LLW that would be generated. Under this scenario, the No Action Alternative would not result in any additional impacts on the physical, biological, and socioeconomic environments because waste generation would cease.

Selection of the No Action Alternative would result in DOE not having sufficient disposal capacity for its remote-handled LLW. If waste streams continued to be generated after 2017 without additional storage or disposal capacity, the potential for exposures to workers, the public, and the environment from the waste would increase. The remainder of this section addresses the impacts of continued shipments of the ATR ion-exchange resins, hardware, and filters as part of this No Action Alternative.

4.3.1 Water Resources

Fewer shipments of waste from the INL Site would take place under the No Action Alternative as compared to Alternative 2, which involves transport of all of INL's remote-handled LLW to NNSS. Therefore, as with Alternative 2, no impacts to water resources at NNSS are expected under the No Action Alternative.

4.3.2 Routine Transportation of Advanced Test Reactor Ion-Exchange Resins, Hardware, and Filters

The impacts analysis of routine transportation of the ATR ion-exchange resins, hardware, and filters follows the same approach used for routine transport under the Offsite Disposal Alternative in Section 4.2.1, except that six shipments per year are analyzed instead of 117. The same assumptions for shipping container dose rates, potentially exposed members of the public and workers, and transport routes are used to arrive at a per shipment and annual dose (North Wind 2011).

Consequences of the collective population dose are expressed in terms of increased LCFs per year, using the health risk conversion factors recommended by the Interagency Steering Committee on Radiation Standards (ISCORS 2002). Table 4-6 presents the results of the impacts analysis to the population along the two potential transport routes under the No Action Alternative.

Table 4-6. Transportation impacts to the surrounding population from routine shipment of remote-handled low-level waste from the Idaho National Laboratory site to the Nevada National Security Site under the No Action Alternative.

Transport Route	Off-Link Collective Dose[a]	On-Link Collective Dose	Total Stop Collective Dose[b]	Per Shipment Collective Dose	Collective Dose Per Year (Six Shipments)	LCFs/Year[c]
Route A	0.00014	0.0066	0.072	0.079	0.47	0.00028
Route B	0.0002	0.0073	0.072	0.08	0.48	0.00029

a. Dose is collective population dose and is presented in person-rem.

b. Total stop dose assumes three 1/2-hour stops made during the course of each shipment.

c. Conversion factor of 0.0006 LCFs per person rem (ISCORS 2002).

Table 4-7 presents the results of the RADTRAN analysis for each of the two crew members. Consequences of the individual doses received are expressed in terms of increased likelihood of the individual incurring an LCF.

Table 4-7. Transportation impacts to the crew from routine shipment of remote-handled low-level waste from the Idaho National Laboratory site to the Nevada National Security Site under the No Action Alternative.

Transport Route	Crew Member Dose[a] – Transport	Crew Member Total Stop Dose[b]	Crew Member Dose Per Shipment[c]	Crew Member Dose Per Year (Six Shipments)	Increased LCF Likelihood/ Year[d]
Route A	0.039	0.04	0.079	0.47	0.00028
Route B	0.043	0.04	0.083	0.50	0.0003

a. Dose is individual dose and is presented in rem.

b. Total stop dose assumes three 1/2-hour stops made during the course of each shipment.

c. Sum of Crew Member Dose (Transport) and Crew Member Total Stop Dose.

d. Conversion factor of 0.0006 LCFs per rem used (ISCORS 2002).

Vehicle-related risks of the No Action Alternative (i.e., latent health effects from vehicle emissions) result simply from transporting any material from one location to another independent of the characteristics of the cargo. The presence or absence of cargo is not a factor in the assessment of these risks. The collective risk of pollution health effects to the surrounding population from truck emissions, which include greenhouse gas emissions (Biwer and Butler 1999), is estimated to be 0.000013.

4.3.3 Accidents and Intentional Destructive Acts

Potential impacts for transportation and handling accidents and intentional destructive acts were analyzed for the No Action Alternative (North Wind 2011). This analysis of transportation impacts assumes that shipments of ATR ion-exchange resins, hardware, and filters from the INL site to NNSS would take place as long as conditions at NNSS remain favorable for disposal or up to 50 years. Approximately 9,500 vehicle-miles would be traveled for all projected waste shipments from the INL site to NNSS each year under the No Action Alternative.

Based on state-specific accident and fatality rates (Saricks and Tompkins 1999), the upper bound number of traffic accidents for all projected shipments of ion-exchange resins, hardware, and filters from ATR is estimated to be 0.00248 (less than one occurrence) and no traffic-related fatalities are expected.

The radiological risk from transportation-related accidents and intentional destructive acts was analyzed in the same manner for the No Action Alternative as for the Offsite Disposal Alternative, using waste data specific to the ion-exchange resins, hardware, and filters from ATR. Collective population dose in an urban area from accidental release of radioactive materials caused by a shipping accident involving a fuel fire and an impact severe enough to damage a shipping container of ion-exchange resins from ATR is shown in Table 4-8. Dose and the associated LCFs are presented for the surrounding population, an MEI near the site of the accident, the crew member, and a collocated worker. There is no risk of an acute cancer fatality under any of the accident scenarios (North Wind 2011).

Transport of ion-exchange resins, hardware, and filters from ATR would routinely employ a variety of measures that mitigate the likelihood and consequences of an intentional destructive act, including acts of terrorism. Crew members would be screened for behavioral and substance abuse issues and would receive safety and security training. Crew members would conduct a thorough inspection of their vehicle and load prior to transport. During transport, crew members would always have in their possession a working means of communication and would be trained to immediately report suspicious activity encountered en route.

Table 4-8. Estimated impacts to the collective population, a maximally exposed individual, the crew member, and a collocated worker from an offsite accident under the No Action Alternative.

	Collective Population		MEI		Crew Member		Collocated Worker	
Accident	Dose	LCFs[a]	Dose	Increased LCF Likelihood	Dose	Increased LCF Likelihood	Dose	Increased LCF Likelihood
Vehicle collision and fuel fire	0.029 person rem	<0.0001	0.00013	<0.0001	0.0072	<0.0001	0.00019	<0.0001

a. Conversion factor of 0.0006 per rem/person-rem used (ISCORS 2002).

4.3.4 Energy Use

Energy resources under the No Action Alternative would include fuel consumption associated with transport of the ATR ion-exchange resins, hardware, and filters from the INL site to NNSS and the return trip to the INL site. It is expected that approximately 1,440 gallons of diesel fuel would be used for transport each year under the No Action Alternative. Impacts from energy use would be in the form of carbon dioxide emissions from use of fuel for transport operations. Carbon dioxide emissions for the No Action Alternative are estimated to be16 tons per year (North Wind 2011).

4.4 Cumulative Effects

This section describes cumulative effects of the project that are caused by the aggregate of past, present, and reasonably foreseeable future actions. The impact of this project on resources such as air, energy, and transportation is not significant and cumulative effects are anticipated to be minimal. The onsite disposal alternatives have the potential to affect cultural, ecological, and groundwater resources by their activities, which include land disturbance and waste disposal.

Two recently approved projects have the potential to contribute cumulative impacts to cultural resources. The Radiological Response Training Range will include two ranges, one at the north end of the INL site and one to the south, near RWMC (DOE 2010b). The ranges are for outdoor field exercises that would simulate conditions expected during a major radiological incident. The Stand-Off Experiment Range will be located at the north end of the INL site (DOE 2011b). This range is for testing of nonintrusive active-interrogation systems capable of detecting nuclear and explosive materials in a variety of field-deployable applications at greater standoff distances. Both projects have identified the potential for minor direct and indirect impacts to cultural and archaeological resources at the north end of the INL site. Operational controls would be implemented before and during project activities to minimize the potential for adverse direct and indirect impacts to cultural resources in the range areas. Considering the small potential impacts to cultural resources at the INL site from these ranges and that most of the site remains pristine, the cumulative impact of a remote-handled LLW disposal facility is likely small.

Construction and operation of the remote-handled LLW disposal facility would increase habitat loss and fragmentation; however, it is unlikely that this would have a substantial effect on wildlife because Candidate Sites 1 and 2 are adjacent to or near existing industrial infrastructure in areas that are presently not dominated by sagebrush. A small amount of native vegetation would be impacted as a result of the proposed project, because most of the area within each of the proposed construction sites has previously been disturbed. Implementation of revegetation and non-native invasive plant species control practices should result in minimal impacts to site ecology.

Other future projects at the INL site could involve cumulative effects to cultural and ecological resources as a result of ground disturbance. The DOE Naval Nuclear Propulsion Program has announced its intent to prepare an EIS for recapitalization of naval spent nuclear fuel handling and examination facilities at the INL site (75 FR 42082). The proposed action includes alternatives for development of new facilities for spent fuel handling and examination at NRF, and the ATR Complex. The cumulative impact from these projects would be small, because they would be located at existing INL site facilities where the vegetation and soil has previously been disturbed and cultural resources have been evaluated. Monitoring for cultural resources would be conducted to avoid any sensitive materials that might be discovered during excavation. The potential for increased remote-handled LLW generation and disposal as a result of the expanded capability for Naval spent nuclear fuel handling and examination is bounded by the groundwater analysis and accident scenarios used in this assessment. Airborne release for the cumulative effects of the NRF recapitalization is not expected to have impacts on the ground water.

Assessing the cumulative impacts to groundwater requires consideration of other sources of contaminants that either exist in the aquifer currently or will enter the aquifer in the future. Locations of the sources include upgradient contaminants that could migrate through the aquifer volume potentially impacted by the remote-handled LLW disposal facility, nearby sources that could overlap the impacted region, and those sources downgradient that might be affected by the remote-handled LLW disposal facility. The potential for cumulative impacts to groundwater were analyzed for each candidate onsite location (INL 2011a).

The preferred location, Candidate Site 1, is essentially located downgradient of the ATR Complex and NRF. There are no predicted or existing contaminants of concern in the aquifer upgradient of NRF with the potential to impact groundwater concentrations at Candidate Site 1. Historic releases at NRF have been addressed under CERCLA. There also have been historical releases within the ATR Complex identified and partially remediated through CERCLA activities. The potential groundwater concentrations from historical releases at the ATR Complex and NRF that could be expected to reach the groundwater beneath Candidate Site 1 were evaluated for the potential for cumulative impacts, and it is unlikely that contamination from either the ATR complex or NRF will increase the dose over and above what is predicted at Candidate Site 1 (INL 2011a).

Predicted peak all-pathways EDE at NRF and the ATR Complex are given in Table 4-9 (INL 2011a). The peak dose shown for C-14 at NRF will be much lower once it reaches Candidate Site 1 and will occur just after the facility begins to accept waste. The later contributions from NRF and the ATR Complex are predicted to occur more than 3,000 years after facility closure.

Table 4-9. Predicted annual groundwater dose and peak time at facilities upgradient of the remote-handled low-level waste disposal facility candidate sites and at the candidate sites.

Site	Radionuclide	Peak Dose (mrem/year)	Calendar Year of Peak Dose
Candidate Site 1			
ATR	U-234	0.027	44000
NRF	U-234	0.02	43000
NRF	C-14	2.6	2000
Remote-Handled LLW Facility	Mostly C-14	0.88	5500
Expected Peak Dose and Year of Occurrence		About 0.88	5500
Candidate Site 2			
Operable Unit 3-14	U-234	0.22	About 44000
ICDF	Mostly C-14	0.58	8400
Tank Farm	All Pathways	1.4	About 2900
Remote-Handled LLW Facility	Mostly C-14	1.6	4000
Expected Combined Dose and Year of Occurrence		1.6 to 3.6	2900 to 8400

A similar analysis was conducted for Candidate Site 2 (INL 2011a). Candidate Site 2 is located southwest of INTEC. There are no predicted or existing contaminants with the potential of impacting the aquifer upgradient of INTEC. Residual radionuclides from historical releases at INTEC evaluated under CERCLA, radionuclides disposed of in ICDF located southwest of INTEC, and the residual inventory in the Tank Farm Facility at INTEC all have the potential to impact groundwater near Candidate Site 2 (INL 2011a).

Based on the analysis conducted for Candidate Site 2, it is very unlikely that doses from the INTEC CERCLA sites will overlap in time to any great extent with the peak dose from the candidate remote-handled LLW facility. However, peak doses from ICDF and the Tank Farm Facility occur closer in time to the predicted facility peak dose and, therefore, could potentially overlap and contribute to an increase in the total dose. These potential doses are shown in Table 4-9 (INL 2011a). If the peak doses from ICDF and the Tank Farm Facility were added to the peak dose from Candidate Site 2, the total dose could be 3.54 mrem/year, although dilution could result in the combined impact being less than the sum of the peak doses.

An assessment of both sites shows that cumulative impacts for Site 2 are expected to be greater than for Site 1; however, the cumulative impacts at either site will not be significant. At either site, doses from all releases would not exceed the groundwater protection limit set by DOE of an annual all-pathways dose to the public of 30 mrem/year. The peak cumulative doses are significantly less than the average annual radiation exposure from natural sources to an individual in the United States of approximately 300 mrem/year.

DOE has issued the *Draft EIS for the Disposal of Greater-Than-Class C Low-Level Radioactive Waste and Greater-Than-Class C -Like Waste* (DOE 2011c). That document provides an analysis of the environmental impacts of disposing of radioactive waste at several alternative locations in the United States, including the INL Site. While the document includes an analysis of the disposal of radioactive waste on the INL Site, the draft EIS did not identify a preferred alternative. In addition, as required under the Energy Policy Act of 2005, before DOE makes a final decision on a disposal method or location, DOE must submit a report to Congress that includes a description of the alternatives under consideration and await action by Congress. Because Congressional action in regard to this EIS is unknown at this time and will be dependent on a number of circumstances and considerations, DOE considers the potential for greater-than-Class C waste disposal at INL to be speculative and not a reasonably foreseeable action at this point.

DOE is planning to develop capabilities to support nuclear research, development, and testing at the INL Site and at facilities located in Idaho Falls (DOE-ID 2011). At the INL site, the restart of the Transient Reactor Test Facility is being considered for testing fuel behavior over a brief interval of time. Potential new capabilities include an analytical laboratory for post-irradiation examination and facilities for conducting laboratory-and engineering-scale testing of aqueous separations and materials disposition. These projects are in the initial planning phases and insufficient data exists to support evaluation of whether they could have a cumulative effect on a remote-handled LLW disposal facility. As these projects progress, their potential for cumulative effects will be considered as part of project planning.

No cumulative effects have been identified for Alternative 2, Transport of Waste for Offsite Disposal at NNSS, or for the No Action Alternative. Past underground nuclear testing has contaminated an unknown volume of groundwater beneath NNSS. That contamination is not expected to impact publicly available water supplies within the next 100 years. Disposal activities at NNSS under these alternatives would not cause new or additional groundwater contamination.

4.5 Comparison of Alternatives

This section compares the onsite, offsite and no action alternatives and presents a summary of effects to the resources evaluated as they pertain to the alternatives (Table 4-10). Disposal at NNSS (Alternative 2) would take place at an existing facility designed, approved, and operated to accept DOE's LLW. Therefore, impacts to cultural and ecological resources were not evaluated for this alternative.

Table 4-10. Comparison of effects on resources evaluated for onsite and offsite alternatives.

Resource	Preferred Location Near the ATR Complex (Candidate Site 1)	Location Near ICDF (Candidate Site 2)	Offsite Disposal at NNSS	No Action Alternative	Cumulative Effects
Cultural Resources	Disturbance of cultural resources would be avoided; impacts not significant.	Same as Candidate Site 1. ←	No impact	No impact	New projects could contribute slight cumulative impacts to cultural resource under the onsite alternatives.
Water Resources	Peak annual all-pathways EDE impacts to groundwater of 0.88 mrem/year in year 5500.	Peak annual all-pathways EDE impacts to groundwater of 1.6 mrem/year in year 4000.	No impact	No impact	Combined peak annual dose and year for groundwater at Candidate Site 1 of about 0.88 mrem/year in year 5500. Combined peak annual dose and year for groundwater at Candidate Site 2 of 1.6 to 3.6 mrem/year between 2900 and 8400. No cumulative effects anticipated under the Offsite Disposal or No action Alternatives.
Ecological Resources	Vegetation removed for site development. Potential increase in weeds. No effects to sensitive plants. No effects to critical habitat or threatened or endangered animals. No adverse effects to sagebrush obligate species.	Same as Candidate Site 1. ←	No impact	No impact	Minimal increased habitat loss and fragmentation because both candidate sites are in areas of low quality habitat. Negligible impacts to vegetation due to past disturbance.

Table 4-7. (continued).

Resource	Preferred Location Near the ATR Complex (Candidate Site 1)	Location Near ICDF (Candidate Site 2)	Offsite Disposal at NNSS	No Action Alternative	Cumulative Effects
Energy Resources	Short term increase in fuel use. Long-term fuel and energy use of 230 gallons/year.	Same as Candidate Site 1. ←	No short term increase in fuel use. Long-term fuel and energy use of 28,000 gallons/year.	No short term increase in fuel use. Fuel and energy use of 1,440 gallons/year.	No cumulative effects anticipated due to small amounts of energy resources consumed.
Air Resources, including Greenhouse Gas Emissions	Insignificant impacts to climate and air quality from construction and transportation. Greenhouse gas emissions of 3 tons/year.	Same as Candidate Site 1. ←	Insignificant impacts to climate and air quality from transportation. Greenhouse gas emissions of 310 tons/year.	Insignificant impacts to climate and air quality from transportation. Greenhouse gas emissions of 16 tons/year.	No cumulative effects anticipated due to small amounts of air emissions.
Routine Transportation	2,500 vehicle miles/year No exposure to public from routine transportation.	Same as Candidate Site 1. ←	190,000 vehicle miles/year Potential annual LCFs to public and crew from routine incident free shipments: • For public: 0.006 • For crew: 0.006	9,500 vehicle miles/year Potential annual LCFs to public and crew from routine incident free shipments: • For public: 0.00029 • For crew: 0.0003	No cumulative effects anticipated due to small number of shipments.

Table 4-7. (continued).

Resource	Preferred Location Near the ATR Complex (Candidate Site 1)	Location Near ICDF (Candidate Site 2)	Offsite Disposal at NNSS	No Action Alternative	Cumulative Effects
Accidents and Intentional Destructive Acts	LCF risk from an accident: No collective (surrounding) population For MEI: less than 0.0001 For crew member: 0.0001 For collocated worker: less than 0.0001 Risk to public of injury accident: 0.00059 (all shipments) Risk to public of fatality: 0.0 (all shipments)	Same as Candidate Site 1. ←	LCF risk from an accident: For collective population: 0.001 For MEI: less than 0.0001 For crew member: less than 0.0001 For collocated worker: less than 0.0001 Risk to public of injury accident: 0.048/year Annual risk to public of fatality accident: 0.0/year	LCF risk from an accident: For collective population: less than 0.0001 For MEI: less than 0.0001 For crew member: less than 0.0001 For collocated worker: less than 0.0001 Risk to public of injury accident: 0.00248 /year Annual risk to public of fatality accident: 0.0/year	No cumulative effects anticipated due to low probability that multiple acts would occur.

5. REGULATORY REQUIREMENTS

This section describes the regulatory requirements that apply to the proposed action.

5.1 Remote-Handled Low-Level Waste Management

The Atomic Energy Act authorizes DOE to manage its radioactive materials. DOE's radioactive waste management, including disposal of remote-handled LLW at the INL site, is governed by DOE Order 435.1. This requires that LLW disposal facilities be sited, designed, operated, maintained, and closed so that a reasonable expectation exists that the following objectives will be met:

- Dose to representative members of the public shall not exceed 25 mrem (0.25 mSv) in a year total EDE from all exposure pathways, excluding the dose from radon and its progeny in air.

- Dose to representative members of the public via the air pathway shall not exceed 10 mrem (0.10 mSv) in a year total EDE, excluding the dose from radon and its progeny.

- Release of radon shall be less than an average flux of 0.74 $Bq/m^2/s$ (20 $pCi/m^2/s$) at the surface of the disposal facility. Alternatively, a limit of 0.0185 Bq/L (0.5 pCi/L) of air may be applied at the boundary of the facility.

Each disposal facility conducts a performance assessment that includes calculations of potential doses to representative future members of the public and potential releases from the facility for a 1,000-year period after closure. The performance assessment is an analysis of physical and chemical mechanisms that control the migration of radioactive materials through the environment to points of potential human exposure. The performance assessment includes activities that future members of the public may conduct (e.g., drinking water and recreational activities) that could potentially result in an exposure to the radioactive material. Real-time worker protection is not a future concern; therefore, worker radiological exposure is addressed by operational safety analysis and is not included in the performance assessment.

In addition to completing a performance assessment for the disposal facility, a site-specific radiological composite analysis that accounts for all sources of radioactive material that may be left at the DOE site and may interact with the LLW disposal facility must be completed. The performance assessment and composite analysis conducted on the disposal facility provide the reasonable expectation that the performance objectives will be met by establishing parameters, limits, and controls on the siting, design, operations, maintenance, and closure of the facility.

A Disposal Authorization Statement must be obtained from DOE before construction of a new disposal facility can begin. This statement is based on a review of the performance assessment, composite analysis, preliminary closure plan, and monitoring plan. It provides the specific limits for design, construction, operation, and closure.

5.2 Cultural Resources

A variety of laws, regulations, and statutes manage or protect cultural resources, including buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and scientific importance. The requirements include the following:

- American Antiquities Act of 1906 (Public Law 59-209, 16 USC §§ 431-433)

- National Historic Preservation Act of 1966 (Public Law 89-665, 16 USC § 470 et seq.); Section 106 of this act and its implementing procedures require federal agencies to take into account the potential effects of proposed projects on historic properties listed on or potentially eligible for listing on the National Register of Historic Places
- Protection and Enhancement of the Cultural Environment (Executive Order 11593)
- Archaeological and Historic Preservation Act of 1974 (Public Law 93-291, 16 USC § 469-469c)
- Archaeological Resources Protection Act of 1979 (Public Law 96-95, 16 USC § 470aa-470ll)
- Native American Graves Protection and Repatriation Act of 1990 (25 USC § 3001 et seq.).

In 2004, DOE-ID entered into a programmatic agreement with the Idaho State Historic Preservation Office and the Advisory Council on Historic Preservation. The agreement legitimizes the INL Cultural Resource Management Plan (DOE-ID 2009), by which INL complies with Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR 800), as well as various other sections of the National Historic Preservation Act and cultural resource laws to meet the unique needs of the INL site. DOE-ID's "Agreement-in-Principle" (DOE 2002b) with the Shoshone-Bannock Tribes ensures an active tribal role in cultural resource impact assessment and protection. INL would continue to comply with the National Historic Preservation Act, Section 106, through the INL Cultural Resource Management Plan, and the plan would be used to develop a strategy to protect cultural resources from adverse impact. If the preferred alternative for onsite disposal at Candidate Site 1 is selected, a cultural resource protection plan would be developed for the project in consultation with the Idaho State Historic Preservation Office and Shoshone-Bannock Tribes.

5.3 Groundwater

The Idaho Ground Water Quality Rule (IDAPA 58.01.11) establishes minimum requirements for protection of groundwater quality through standards and an aquifer categorization process. The requirements of this rule serve as a basis for the administration of programs that address groundwater quality. Depending on the specific location of the facility and the availability of existing sanitary facilities, a new system for handling wastewater may be required. The State of Idaho has regulations and a technical guidance manual governing individual/subsurface sewage disposal (IDAPA 58.01.03).

The Idaho Rules for Public Drinking Water Systems (IDAPA 58.01.08) issues MCLs for public drinking water systems. The Idaho Department of Environmental Quality also sets forth monitoring and reporting requirements for inorganic and organic chemicals and radiochemicals. Water quality monitoring data at the INL site is compared to Idaho's groundwater primary constituent standards and secondary constituent standards (IDAPA 58.01.11). All water quality monitoring and reporting at the INL site is consistent with IDAPA requirements.

5.4 Climate and Air Quality

Parts of the proposed facility are considered a fugitive source of particulate matter by state (IDAPA 58.01.01.006.47) and federal rules as applied through the State Implementation Plan (DEQ 2010). Under state regulations, fugitive sources are exempt from pre-construction permit (IDAPA 58.01.01.220.01); therefore, the facility has no pre-construction permit requirements. However, activities at the INL site are subject to a Clean Air Act Title V Operating Permit, which specifies facility-wide requirements for activities that generate pollutants such as fugitive dust. Activities at the preferred onsite candidate site will operate in compliance with all requirements of the Title V Operating Permit.

The Council on Environmental Quality has issued draft NEPA guidance on consideration of the effects of climate change and greenhouse gas emissions (CEQ 2010). This guidance encourages the consideration of (1) the greenhouse gas emissions effects of a proposed action and alternative actions; and (2) the relationship of climate change effects to a proposed action or alternatives, including the relationship to proposal design, environmental impacts, mitigation, and adaptation measures in NEPA analyses. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent greenhouse gas emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. Greenhouse gas emissions would be below thresholds under any of the alternatives being considered in this Environmental Assessment.

5.5 Ecological Resources

Soil disturbing activities, including those associated with the use of unimproved roads, have the potential to increase noxious weeds and invasive plant species that would be managed according to 7 USC § 2814, "Management of Undesirable Plants on Federal Lands," and Executive Order 13112, "Invasive Species." The INL site would follow the applicable requirements to manage undesirable plants.

In analyzing the potential ecological impacts of the use of alternative routes for this project, DOE-ID has followed the requirements of the Endangered Species Act (16 USC §1531 et seq.) and has reviewed the most current lists for threatened and endangered plant and animal species. Other federal laws that could apply include the Fish and Wildlife Coordination Act (16 USC § 661 et seq.), Bald Eagle Protection Act (16 USC § 668), and the Migratory Bird Treaty Act (16 USC §§ 703-712).

5.6 Transportation

Transportation of hazardous and radioactive materials and substances is governed by the Hazardous Materials Transportation Act (49 USC §§ 5101-5127) and by the U.S. Department of Transportation, Nuclear Regulatory Commission, and DOE regulations. Onsite shipments would not travel along public highways and would be shipped per DOE Order 460.1B, "Packaging and Transportation Safety" requirements. These out-of-commerce shipments would be described in a transport plan that demonstrates equivalent safety to the applicable Department of Transportation and Nuclear Regulatory Commission regulations. Shipments under the alternative of disposal at NNSS would be conducted in accordance with Nuclear Regulatory Commission and Department of Transportation requirements for shipment of hazardous and radioactive materials on public highways.

5.7 Energy Use

Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," strives to improve energy efficiency and environmental performance in federal agencies. This Executive Order strengthens requirements set forth by the Energy Independence and Security Act, the Energy Policy Act of 2005, and Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management." It contains a variety of initiatives for federal agencies to implement for energy efficiency and conservation, including consideration of the energy impacts of decisions. This Environmental Assessment considers the relative energy impacts of the alternatives being evaluated.

6. LIST OF AGENCIES AND PERSONS CONSULTED

No other federal or state agencies were formally consulted during preparation of this Environmental Assessment. DOE-ID conducted separate notifications and briefings to the Idaho Governor's and Congressional Delegation Offices, the Shoshone-Bannock Tribes, and the Idaho Department of Environmental Quality (INL Oversight Program).

The Shoshone-Bannock Tribes and Idaho State Historic Preservation Office have been contacted regarding cultural resources at the two candidate onsite locations. Communication and consultation, if necessary, would continue to identify and assess cultural resources and, if necessary, develop a cultural resource protection plan.

7. REFERENCES

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Appendix A – Environmental Assessment for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site

Response to Comments

The formal comment period for the Environmental Assessment (EA) for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste (LLW) Generated at the Department of Energy's (DOE's) Idaho Site ended on October 18, 2011. The comment period was extended to November 21, 2011, to accommodate a request DOE received from the State of Idaho. DOE received several comments from interested parties and groups. Several of the comments were similar in nature or subject matter; therefore, they were evaluated and consolidated according to subject. The comments have been reprinted verbatim as received by DOE. The following pages contain DOE's responses to the comments. This document is being prepared as an appendix to the EA and will be provided to those individuals and groups who provided comments. It also will be available online and to other interested parties upon request. Comments have been organized into the following categories. Under each category is a list of the comments in numerical order and the commenter.

Category	Commenter	Page Number(s)
Waste Description		
1.	jhonjanet@aol.com	A-3 – A-4
2.	Roger Turner	A-4
3.	Roger Turner	A-5
4.	Roger Turner	A-5 – A-6
5.	Roger Turner	A-6
6.	Roger Turner	A-6
7.	Beatrice Brailsford, Snake River Alliance	A-6 – A-7
8.	Beatrice Brailsford, Snake River Alliance	A-7
Purpose and Need		
1.	Willie Preacher, Shoshone-Bannock Tribes	A-7
Proposed Action		
1.	jhonjanet@aol.com	A-8
2.	jhonjanet@aol.com	A-8
3.	Susan Burke, Idaho Department of Environmental Quality	A-8 – A-9
4.	Susan Burke, Idaho Department of Environmental Quality	A-9
5.	Willie Preacher, Shoshone-Bannock Tribes	A-9
6.	Willie Preacher, Shoshone-Bannock Tribes	A-9
7.	Christina Cutler, Shoshone-Bannock Tribes	A-9 – A-10
8.	Beatrice Brailsford, Snake River Alliance	A-10
9.	Beatrice Brailsford, Snake River Alliance	A-10
10.	Beatrice Brailsford, Snake River Alliance	A-10
Alternative Selection		
1.	Mark M. Giese	A-11
2.	jhonjanet@aol.com	A-11
3.	jhonjanet@aol.com	A-11
4.	Romelia Martinez	A-11 – A-12
5.	Kim Coe	A-12

Category	Commenter	Page Number(s)
6.	Susan Burke, Idaho Department of Environmental Quality	A-12
7.	Willie Preacher, Shoshone-Bannock Tribes	A-12
8.	Willie Preacher, Shoshone-Bannock Tribes	A-12 –A-13
9.	Christina Cutler, Shoshone-Bannock Tribes	A-13
10.	Carolyn Boyer-Smith, Shoshone Bannock Tribes	A-13
Alternative 1 – Develop Onsite Replacement Disposal Capability (Preferred Alternative)		
1.	John Tanner	A-13
2.	Susan Burke, Idaho Department of Environmental Quality	A-13
3.	Susan Burke, Idaho Department of Environmental Quality	A-14
4.	Susan Burke, Idaho Department of Environmental Quality	A-14
5.	Beatrice Brailsford, Snake River Alliance	A-14
6.	Beatrice Brailsford, Snake River Alliance	A-14
Alternative 2 – Transport Waste to the Nevada National Security Site for Disposal		
1.	jhonjanet@aol.com	A-14 – A-15
2.	Beatrice Brailsford, Snake River Alliance	A-15
3.	Beatrice Brailsford, Snake River Alliance	A-15
4.	Beatrice Brailsford, Snake River Alliance	A-15 – A-16
5.	Beatrice Brailsford, Snake River Alliance	A-16
6.	Beatrice Brailsford, Snake River Alliance	A-16
No Action Alternative		
1.	jhonjanet@aol.com	A-17
2.	Beatrice Brailsford, Snake River Alliance	A-17
Alternatives Considered But Eliminated from Further Consideration		
1.	Beatrice Brailsford, Snake River Alliance	A-17 – A-18
2.	Beatrice Brailsford, Snake River Alliance	A-18
Transportation		
1.	Roger Turner	A-18
2.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-18
Accidents and Intentional Destructive Acts		
1.	Roger Turner	A-19
2.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-19
Analysis Related – Groundwater		
1.	jhonjanet@aol.com	A-19
2.	Roger Turner	A-20
3.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-20
4.	Susan Burke, Idaho Department of Environmental Quality	A-20 – A-21
5.	Christina Cutler, Shoshone-Bannock Tribes	A-21
6.	Beatrice Brailsford, Snake River Alliance	A-21
Analysis Related – Archaeological and Cultural Resources		
1.	Romelia Martinez, Carolyn Boyer-Smith, Shoshone Bannock Tribes	A-21 – A-22
2.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-22
Analysis Related – Cumulative Effects		
1.	Romelia Martinez	A-23

Category	Commenter	Page Number(s)
2.	Beatrice Brailsford, Snake River Alliance	A-23
3.	Beatrice Brailsford, Snake River Alliance	A-23
National Environmental Policy Act Process		
1.	Snake River Alliance	A-23 – A-24
2.	Theo Mbabaliye, U.S. EPA Region 10	A-24
3.	Theo Mbabaliye, U.S. EPA Region 10	A-24
4.	Roger Turner	A-24 – A-25
5.	Roger Turner	A-25 – A-26
6.	Roger Turner	A-26
7.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-26
8.	Roger Turner	A-26 – A-27
9.	Roger Turner	A-27
10.	Roger Turner	A-27
11.	Roger Turner	A-28 – A-29
12.	Roger Turner	A-29 – A-30
13.	Roger Turner	A-30
14.	Roger Turner	A-30
15.	Willie Preacher, Shoshone-Bannock Tribes	A-31
16.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-31
17.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-31
18.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-31 – A-32
19.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-32
20.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-32 – A-33
21.	Shoshone-Bannock Air Quality Program, Roger Turner, Lori Howell, and Stan Baldwin	A-33
22.	Beatrice Brailsford, Snake River Alliance	A-33
23.	Beatrice Brailsford, Snake River Alliance	A-33 – A-34
24.	Beatrice Brailsford, Snake River Alliance	A-34
25.	Carolyn Boyer-Smith, Shoshone-Bannock Tribes	A-34 – A-35

Waste Description

1. Comment

The EA can, at best, be described as incomplete. However, the reviewer feels the document borders on being deceitful. Further, because of the incorrect information contained in the subject document, the reviewer does not see how a reader/stakeholder/decision maker will be able to arrive at a useful conclusion. The reason the reviewer concludes the EA is incomplete/deceitful is as follows: 1. The EA creates a definition for Remote-Handled Low Level Radioactive Waste. The EA leads a reader/stakeholder/decision maker to conclude that Idaho's RH LLW is different and needs special handling and care. However, DOE Order 435.1, Radioactive Waste Management (the Order DOE uses to manage all its radioactive waste, including LLW), does not have such a definition for RH LLW. The

Order only defines high-level, transuranic, and low-level waste. Therefore, Idaho's definition of RH LLW is a sub-category of LLW Idaho arbitrary created. In other words, Idaho's RH LLW is simply LLW. DOE already has a Regional LLW disposal facility that is able to handle Idaho's LLW disposal needs (including its RH LLW). The regional DOE disposal facility has 60 plus years disposing of LLW. It is very difficult to believe that in these economic times, DOE needs to build and operate a separate LLW disposal facility when one is located within one-days drive from the Idaho site.

1. Response

DOE disagrees with the comment. DOE prepared the EA and included all information necessary to determine the potential for significant environmental impact. DOE used state-of-the-art science, technology, and expertise to produce data of assured quality and reach its decision. DOE acknowledges that many different perceptions are represented in the comments received, but no comments indicate that any of the impact data presented in the EA should be reconsidered based on technical or scientific reasons.

The comment is correct in that remote-handled LLW is not defined in DOE Order 435.1, "Radioactive Waste Management." However, DOE did not arbitrarily define remote-handled LLW. DOE has consistently used the distinction between contact-handled LLW and remote-handled LLW in National Environmental Policy Act (NEPA) documents as a means of classifying the two types of LLW. The 1997 Waste Management Programmatic Environmental Impact Statement (EIS-0200-F) states "Remote-handled wastes are those with radiation levels exceeding 200 millirem per hour at the surface of a container. Such material must be handled remotely, by using such means as robots, and must have special shielding in treatment, storage and disposal facilities." Similarly, the glossary of the recent draft *Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security Administration Nevada National Security Site and Off-Site Locations in the State of Nevada* (Chapter 12, page 12 and 13), contains the following definition "remote-handled waste: In general, refers to radioactive waste that must be handled at a distance to protect workers from unnecessary exposure (waste with a dose rate of 200 millirem per hour or more at the surface of the waste package)." The term is used several times in that document when discussing waste disposal at the Nevada National Security Site (NNSS). The EA includes the same definition in the glossary.

The EA includes disposal at NNSS as an alternative. The commenter's preference for this alternative is noted.

2. Comment

Mixed RH-LLW- The Final EA (or EIS) must also address mixed LLW if that material is likely to be sent from off-site from INL, especially if sent to NNSS for disposal, since that would require casks and containers and Waste Acceptance Criteria that may overlap the costs RH-LLW shipping and handling costs. Hence reduced costs may apply to RH-LLW actions if Mixed LLW is being prepared, put in casks, transported off-site from the INL and these need to be addressed in the NEPA documents for Remote Handled LLW.

2. Response

The purpose and need of the proposed action is limited to the need for replacement capability for remote-handled LLW. The remote-handled LLW that is the subject of the proposed action is described in the EA; it does not include mixed remote-handled LLW.

3. Comment

Waste Source Information Missing and Waste Reduction Missing from Document There is a need for more detailed on RH-LLW sources at the INL, including the annual production levels from the various

DOE facilities. The answer to the question as to which facilities would be most affected, and what are their future missions, and schedules --is not answered in the draft E.A. Which facility produces liquid RH-LLW and how is it treated? If information is provided in the EA or EIS, reviewers may offer DOE suggestions (or new alternatives) to reduce this production, storage and disposal of waste that may sit above the Eastern Snake River Plain Aquifer. More detail may allow reviewers to offer up more or better alternatives than that proposed by DOE in this draft E.A. For example the draft E.A. reports that the Naval Nuclear Propulsion Program would be impacted by the lack of storage if the no action alternative were selected, but offers no information on this facility's production levels, processes, or on-going waste-reduction efforts there.

3. Response

A description of DOE operations and activities that generate remote-handled LLW is provided in Section 2.1. Waste characteristics and generation rates are based on years of historical data and existing waste inventories sufficient to analyze the environmental impacts of the proposed action. The proposed action addresses remote-handled LLW that is in a solid form only.

The scope of the proposed action only addresses the need for final disposal location of remote-handled LLW waste generated by various operations at various facilities on the Idaho National Laboratory (INL) Site. The environmental impacts from operating the facilities at the INL Site that will or may generate remote-handled LLW in the future are out of the scope of this EA.

4. Comment

Waste Forms and categories - One important aspect that is lacking is an alternative to concentrate some of the RH-LLW to TRU waste so that it could be shipped out of Idaho. Another aspect could be to study other storage options than that proposed in the E.A. What would be the cost savings to utilize the GTCC storage method (see GTCC EIS) for Remote Handled LLW? Further the lack of detailed information on Nevada's NNSS site makes it too difficult for reviewers to compare the alternatives, because the draft E.A. has incomplete information on the resource impacts at the Nevada site. Since the Nevada site has been approved for handling and disposal of this type of waste, wouldn't there be cost savings to ship RH-LLW to Nevada? The costs of each alternative needs to be provided.

4. Response

A description of DOE operations and activities that generate remote-handled LLW is provided in Section 2.1. Waste characteristics and generation rates are based on years of historical data and existing waste inventories sufficient to analyze the environmental impacts of the proposed action.

The scope of the proposed action only addresses the need for final disposal location of remote-handled LLW waste generated by various operations at various facilities on the INL Site. The environmental impacts from operating the facilities at the INL Site that will or may generate remote-handled LLW in the future are out of the scope of this EA.

Regarding the suggested alternative of storage, as stated in Section 2.4.1 of the EA, storage is not an alternative that meets the need for dependable and predictable disposal capability. The EA relies on existing NEPA documents approving disposal at NNSS and does not revisit the disposal decision. The final EA has been modified to clarify that no impacts to groundwater at NNSS are anticipated from disposal activities.

In response to other comments, additional information related to the disposal of remote-handled LLW at NNSS has been incorporated into the final EA.

Costs are not an area of environmental impacts assessed under NEPA. Costs, along with technical feasibility, are relevant to the selection of the range of reasonable alternatives and are considered as part of all information the decision maker uses to make a decision on the proposed action.

5. Comment

The 1995 Spent Fuel Programmatic EIS, revealed that RH-LLW may be produced at INL as both a solid and a liquid, and reports that liquid LLW may be better disposed of after conversion to a solid, and better disposed of after compaction, but no mention is made in the RH-LLW-EA of either the inventory or production levels of liquid RH-LLW, or of these treatments or their costs prior to disposal. This represents a serious disconnect in the draft RH-LLW-EA, violates NEPA and underscores the need for a full EIS.

5. Response

The proposed action addresses remote-handled LLW that is in a solid form only.

6. Comment

The EIS for Greater Than Class C waste includes a cask and storage vault system design which appears similar to the vault system proposed in this RH-LLW-EA. There needs to be a discussion of utilizing the GTCC design. The draft RH-LLW-EA does not specifically state whether GTCC waste will be handled or disposed at one of the alternate sites in the RH-LLW-EA. It does not delineate how GTCC waste is separated from RH-LLW or, for that matter, from contact-handled LLW. Nor does it review the difference in LLW through-put, or storage that might be expected with the various alternatives that may be selected in the GTCC EIS. Nor does it describe such variables we might see with each alternative selected from the Navy recapitalization EIS that is pending. The draft RH-LLW-EA does not specifically exclude GTCC waste from that proposed in this E.A. and this issue must be addressed in the subsequent phases of NEPA review.

6. Response

DOE's conceptual design for a vault system is appropriate for the types of remote-handled LLW waste requiring disposal. Section 2.3 of the EA states that only remote-handled LLW generated at the INL Site will be disposed of as part of the proposed action.

As noted in the cumulative effects Section 4.4, the potential for increased remote-handled LLW generation from the Navy recapitalization project is bounded by the groundwater analysis and accident scenarios used in this EA.

7. Comment

"Over 100 shipments to NNSS would be conducted each year." The EA's offhand discussion of the number and frequency of shipments is insufficient. Instead, a full EIS must examine in detail what remote-handled low level waste has been generated at the INL in each of the last 10 years and present a defensible projection of future RH LLW generation. It is very difficult to believe that either the nuclear navy or the Advanced Test Reactor produce such a steady waste stream, let alone the Materials and Fuels Complex. The draft environmental impact statement must be far more specific about both the "operational activities that generate the subject waste" and the definition of "mission-critical," particularly 50 years out.

7. Response

The analysis in the EA (see Section 2.1) is based on the best available waste projections and is sufficient to make a decision on the significance of environmental impacts. The waste projections would not change if an Environmental Impact Statement (EIS) were prepared. It was not necessary for DOE to include more specific details on the waste or the facility operations in this EA to convey the important results of the impact analyses and to the keep the project understandable to the general public, consistent with the spirit and intent of NEPA.

<u>8. Comment</u>

Pages 2-1, 2-2. Please discuss in detail the waste streams mentioned here. Why does the nuclear navy remove non-fuel structural components from its spent fuel assemblies? Do all other spent fuel generators remove those components as well? Why or why not? If the nuclear navy's practice of removing non-fuel structural components from its spent fuel assemblies is some sort of waste reduction program, it should be reassessed based on its intended consequence of increasing nuclear waste disposal above Idaho's drinking water.

<u>8. Response</u>

In addition to the discussion in Section 2.1, further details on the waste streams are provided in documents referenced in the EA, and contain sufficient detail to support the EA analysis (for example, see the *Evaluation of Groundwater Impacts to Support the National Environmental Policy Act Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project* [INL/EXT-10-19168, Revision 3]).

The Navy has always removed and disposed of, in Idaho, the structural components from its fuel assemblies (see Section 2.4 of Appendix D, *Volume 1 of the 1995 Programmatic Spent Nuclear Fuel and Idaho Engineering Laboratory Environmental Restoration and Waste Management Environmental Impact Statement*). The structural components removed from the fuel assemblies are activated corrosion-resistant metal, and, as a waste stream, this material poses negligible risk to the aquifer. This waste stream is not new nor is its removal related to a waste reduction program. Because of significant differences in fuel designs, the Navy practice of removing structural components is not directly comparable with commercial spent fuel management practices.

<u>Purpose and Need</u>

<u>1. Comment</u>

There is a definite conflict with the current cleanup mission (ICP) and the reduction of the footprint at the INL site with this proposal or alternative. Therefore a new plan is in the works for another waste storage facility to be built such as the ICDF. In evaluating sites, the environmental assessment should consider the long-term cumulative effect of waste that will be stored above the Snake River aquifer.

<u>1. Response</u>

The disposal facility project is not associated with the Environmental Management Idaho Cleanup Project and the reduction of the Environmental Management footprint at INL. DOE has the responsibility to carry out certain assigned missions on behalf of the citizens of the United States. Radioactive waste is unavoidably generated at INL by completion of some of these missions and must be disposed of in an environmentally safe manner. The future INL need for disposal capacity for remote-handled LLW will not go away. This NEPA analysis presents the requisite hard look at disposal alternatives and their potential environmental impacts. DOE decision makers will use this and other relevant information to adopt the best plan. The long-term cumulative effects were analyzed in the EA in Section 4.4.

Proposed Action

1. Comment

The EA leads the reader/stakeholder/decision maker to believe DOE Order 435.1 mandates on-site disposal for LLW. The Order makes no such demand. If it is impractical to develop an on-site disposal unit, the site has the option to dispose of its LLW (including its arbitrarily defined RH LLW) at another DOE site, or to dispose of it commercially (albeit, the site will have to write a justification for disposing of their LLW at a commercial site). There is another DOE LLW disposal site within one-day's driving distance of the Idaho site (i.e., the Nevada National Security Site – hereafter referred to as the NNSS). Further, commercial disposal may be available for Idaho's RH LLW in the very near future in Texas.

It is difficult to believe it will more advantageous (i.e., better, cheaper, faster) to build a new 50-year LLW disposal site when one is so close to the Idaho site or when commercial disposal will becoming available in the near future in Texas. Especially when Idaho has been successfully disposing LLW (including Idaho's LLW and Idaho's RH LLW) at the NNSS, which has 60 plus years, experience in LLW disposal and will continue to dispose LLW in perpetuity.

1. Response

DOE agrees with the comment that DOE Order 435.1 does not mandate disposal of LLW on the site where it was generated. For that reason, DOE included a reasonable alternative for offsite disposal in the EA. However, DOE Manual 435.1-1, "Radioactive Waste Management," does state a preference for onsite disposal. "DOE radioactive waste shall be treated, stored, and in the case of low-level waste, disposed of at the site where the waste is generated, if practical; or at another DOE facility. If DOE capabilities are not practical or cost effective, exemptions may be approved to allow use of non-DOE facilities for the storage, treatment, or disposal of DOE radioactive waste..."

The EA evaluated onsite disposal and disposal at another DOE facility (NNSS). In reaching its decision, DOE considered the environmental impacts and the current plans to close the NNSS disposal facility in the 2027 to 2028 timeframe, which increases the risk associated with selecting Alternative 2. At this time, DOE has not made a decision to continue disposal operations at NNSS.

The alternative of disposal offsite at a commercial facility was identified but eliminated from further consideration because the commercial facility's license does not allow the type of waste generated at the INL Site.

2. Comment

The EA leads the reader/stakeholder/decision maker to believe Idaho does not dispose of its RH LLW (an arbitrary Idaho defined sub-category) off-site. Idaho successful disposed of RH (specifically, the Light Water Breeder Reactor) waste at the NNSS.

2. Response

The information in the EA has been clarified to identify that remote-handled ion-exchange resins, hardware, and filters, from the Advanced Test Reactor (ATR) currently are disposed of at NNSS. The other instance of disposal of remote-handled LLW from INL at NNSS was a small quantity of light water breeder reactor waste. That waste was generated as part of INL cleanup and DOE does not plan to generate that waste in the future; therefore, it is not part of the proposed action.

3. Comment

DEQ understands that CH-LLW will not be disposed in Idaho.

3. Response

Remote-handled waste is waste with radiation levels exceeding 200 millirem per hour at the surface of the container. Only waste containers meeting the definition of remote-handled -LLW will be disposed of at the facility. Contact handled LLW containers will not be disposed of in this facility.

4. Comment

DEQ understands that a new on-site disposal facility will be limited to RH-LLW generated at the INL and not wastes generated out of state.

4. Response

That understanding is correct. The scope of the proposed action only addresses the need for final disposal location of remote-handled LLW waste generated by various operations at various facilities on the INL Site. The environmental impacts from operating facilities at the INL Site that will or may generate remote-handled LLW in the future are out of the scope of this EA.

5. Comment

With that in mind the Tribes are concerned with the possibility of the establishment of a repository of high radioactive waste here at the Idaho National Laboratory and further for other sites to send their waste here. The current cleanup mission at this time has removed a limited amount of radioactive waste such as the TRU-waste to the WIPP facility and some of the mixed waste to Nevada. These areas will never be utilized by anyone other than DOE or the contractors.

5. Response

The proposed action is limited to development of replacement disposal capability for remote-handled LLW generated at the INL Site, not from other sites. The disposal facility will not be available for any purpose and need other than stated in the EA.

6. Comment

One of the previous issues that has been addressed in the cleanup of the INL is that DOE would remove INL generated radioactive waste from Idaho but it seems characterized low level waste is being left in Idaho instead of being removed from the state.

6. Response

DOE is meeting its cleanup agreements. In addition, DOE has the responsibility to carry out certain assigned missions on behalf of the citizens of the United States. Radioactive waste is unavoidably generated at INL by completion of some of these missions and must be disposed of in an environmentally safe manner. The future INL need for disposal capacity for remote-handled LLW will not go away. This NEPA analysis presents the requisite hard look at disposal alternatives and their potential environmental impacts. This disposal facility project will only take INL-generated remote-handled LLW for which reasonable disposal options were analyzed in this EA. DOE has the flexibility to send certain remote-handled LLW forms offsite for disposal if circumstances are favorable and a disposal facility exists.

7. Comment

We are very concerned that developing a long term storage facility at the INL will set a precedent for additional long term storage to take place at the INL. Can language be added to the final document that states “no additional long term storage facilities will be constructed at the INL”?

7. Response

The action analyzed in this EA is for permanent waste disposal, not storage. The potential need for future facilities will be addressed through the NEPA process.

8. Comment

Page 1-1. In the cursory discussion of the need—and the need for speed—reference is made to "critical research activities at INL that generate remote-handled LLW." The Snake River Alliance is not the only entity curious about INL research activities, particularly those that may be going forward some place other than the ATR, at the Materials and Fuels Complex, for example. Page 2-3. "An estimated average volume of 150 m3 of remote-handled LLW is expected to be generated each at the INL site." The assumptions underlying all assertions about the next fifty years of nuclear waste generation must be made clear. This is particularly necessary in light of the draft EA's offhand dismissal of the notion that new storage facilities could be developed at INL (page 2-4). If the DOE cannot expand existing or develop new interim waste storage facilities, it cannot develop new waste production facilities, either.

8. Response

In addition to the discussion in Section 2.1, further details on the waste streams are provided in documents referenced within the EA and contain sufficient detail to support the EA analysis (for example, see the *Evaluation of Groundwater Impacts to Support the National Environmental Policy Act Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project* [INL/EXT-10-19168, Revision 3]).

The alternative of developing new storage facilities for this waste at INL was eliminated from further consideration because it does not meet the purpose and need for replacement disposal capacity for remote-handled LLW generated at the INL site (page 2-4).

9. Comment

Page 2-2. "In addition, DOE is continuing to remove and process for disposition remote-handled waste that was placed in storage at the Radioactive Waste and Scrap Facility at MFC between 1965 and 2007." Is this activity covered by the EA on the Remote-Handled Waste Disposition Project? If so, why isn't that document in the reference section? If not, what does this sentence mean?

9. Response

The final EA has been changed to reference the Environmental Assessment for the Remote-Handled Waste Disposition Project.

10. Comment

Why must the entire planned inventory of INL remote-handled LLW be disposed of together?

10. Response

The no action alternative in the final EA has been modified in response to this and other comments to clarify that remote-handled LLW ion-exchange resins, hardware, and filters from ATR are being sent offsite and could continue to be sent offsite to NNSS as long as conditions for disposal of ATR resins at NNSS remain favorable. An action alternative that would include a combination of onsite and offsite disposal is considered to be bounded by the action alternatives in the final EA that address onsite disposal and offsite disposal, respectively. Nothing precludes DOE from continuing to ship some remote-handled LLW forms offsite as long as NNSS is available and if it is practical to do so. Retention of this option allows DOE to retain flexibility in responding to future circumstances and needs.

Alternative Selection

1. Comment

Please end plans for a new dump for very radioactive waste from INL.

1. Response

DOE has responsibility to carry out certain assigned missions on behalf of the citizens of the United States. Radioactive waste is unavoidably generated at INL by completion of some of these missions, and this waste must be disposed of in an environmentally safe manner. The future INL need for disposal capacity for remote-handled LLW will not go away. This NEPA analysis presents the requisite hard look at disposal alternatives and their potential environmental impacts. DOE decision makers will use this and other relevant information to adopt the best plan.

2. Comment

The reviewer concludes a reader/stakeholder/decision maker would not conclude alternative 1 as the preferred alternative if the EA recognized the NNSS is protective of the groundwater as required by DOE Order 435.1.

2. Response

DOE disagrees with the comment. Many factors are involved in making a decision regarding the preferred alternative. The purpose of the EA is to provide an analysis of the potential environmental impacts of alternatives for meeting the agency's need and allow for a scientifically based determination on whether any of the alternatives would have a significant impact as defined by 40 CFR 1508.27. Groundwater and other environmental impacts are only pieces of the information a decision maker uses to make a decision.

3. Comment

As written, the reviewer concludes the EA is useless as a decision making document. From past knowledge of the NNSS Alternative 2 (i.e., Alternative 2) and the reason mentioned above, the reviewer does not conclude the replacement unit in the best interest of DOE. Further, the reviewer encourages the decision makers to select alternative 2 over the preferred alternative mentioned in the EA.

3. Response

DOE disagrees with the comment. DOE prepared the EA and included all information necessary to determine the potential for significant environmental impact. The science, technology, and expertise applied to arrive at DOE's determination were state-of-the-art and rigorously administered to produce data of assured quality. The analyses indicate that the proposed action will not have a significant impact. The public has been provided a reasonable length of time to comment on the analyses in the EA and point out incorrect or insufficient data. DOE acknowledges that many different perceptions are represented in the comments received, but no comments were received that indicate any of the impact data presented in the EA should be reconsidered based on technical or scientific reasons. Given DOE's thorough analysis and the lack of any scientific or technical deficiencies identified by the comment process, DOE has therefore issued a Finding of No Significant Impact. The commenter's preference has been noted.

4. Comment

I strongly disagree with Department of Energy's preference of Alternative 1 and Candidate Site 1. I agree with Alternative 2, transport the waste to the Nevada National Security Site (NNSS) for disposal. The NNSS is able (assumed) to accept the shipments; therefore, this choice will eliminate all un-necessary ground disturbing activities, the potential for sensitive material discovery and cumulative environmental impacts. The inherent ancestral lands of the Shoshone and Bannock people can further be protected, according to 3.1 of the Draft EA "…due to its continuous access restriction and geographic remoteness." The major goal of the DOE should also be to preserve what is left of the lands original heritage; therefore, I would like to thank the Department of Energy in aiding in this protection; however, request Alternative 2.

4. Response

The commenter's preference has been noted.

5. Comment

Keep nuclear waste out of our state! Andrus did it years ago – what's wrong with Kempthorne besides the obvious?

5. Response

See response to Alternative Selection Comment 1, above.

6. Comment

There was no discussion in the draft EA as to selecting a combination of on-site and off-site disposal options. Some RH-LLW from the INL is already being disposed of at the Nevada National Security Site (NNSS). This facility is owned and operated by DOE and appears to have the needed 20 to 50 year life span. While it may be prudent to dispose of certain types of RH-LLW on-site, it may also be appropriate to continue disposing of other RH-LLW at the NNSS. This combination of disposal options may allow for a smaller on-site disposal facility. The EA should consider a combination of on-site and off-site disposal options for the RH-LLW or explain why that alternative was not addressed.

6. Response

The no action alternative in the final EA has been modified in response to this and other comments to clarify that remote-handled LLW ion-exchange resins, hardware, and filters from ATR are being sent offsite and could continue to be sent offsite to NNSS as long as conditions for disposal of ATR resins at NNSS remain favorable. An action alternative that would include a combination of onsite and offsite disposal is considered to be bounded by the action alternatives in the final EA that address onsite disposal and offsite disposal, respectively. Nothing precludes DOE from continuing to ship some remote-handled LLW forms offsite as long as NNSS is available and if it is practical to do so. Retention of this option allows DOE to retain flexibility in responding to future circumstances and needs.

7. Comment

In regards to this EA, the Tribe feels the Department of Energy (DOE) should consider alternative 2, to transport this type of waste to the Nevada National Security Site. Due to the nature of this type of waste which is highly radioactive it seems to us a more suitable and safe location.

7. Response

The commenter's preference is noted.

8. Comment

Lastly it is the concern from the Shoshone-Bannock Tribes that alternative 1 would not be the Tribes preferred choice but they would approve of Alternative 2. Therefore it is the Shoshone-Bannock Tribes recommendation for DOE to permanently store this type of waste at the NNSS in Nevada.

8. Response

The commenter’s preference is noted.

9. Comment

Burying canisters of waste at the INL does not have the best track record. Over time there is a potential for worker and/or environmental exposures to take place. We cannot stress enough the concern we have for worker safety and environmental protection. We would encourage other alternatives that do not include burying waste at the INL to be pursued. Burying waste at the INL should be viewed as a last resort option.

9. Response

The commenter’s preference is noted.

10. Comment

The Tribes HeTO prefers Alternative 2, transport the waste to the Nevada National Security Site (NNSS) for disposal. The NNSS is able (assumed) to accept the shipments; therefore, this choice will eliminate all un-necessary ground disturbing activities the potential for sensitive material discovery and cumulative environmental impacts. The inherent ancestral lands of the Shoshone and Bannock people can further be protected, according to 3.1 of the Draft EA " ... due to its continuous access restriction and geographic remoteness." The Tribes HeTO's major goal is to preserve what is left of our heritage; therefore, we would like to thank the Department of Energy in aiding in this protection; however, requests Alternative 2.

10. Response

The commenter’s preference is noted.

Alternative 1 – Develop Onsite Replacement Disposal Capability (Preferred Alternative)

1. Comment

The fact that the waste is to be put into vaults, not just a lined landfill, should make this plan acceptable. I didn’t find the half lives of the expected major components. That would have been helpful.

1. Response

Information on the radioactive half-lives is included in Table 7 of the *Evaluation of Groundwater Impacts to Support the National Environmental Policy Act Environmental Assessment for the INL Remote-Handled Low Level Waste Disposal Project* (INL/EXT-10-19168, Revision 3), which is referenced in the EA and is available in the administrative record.

2. Comment

DEQ should be consulted in the selection of the ground water monitoring wells for the new disposal facility including the number of wells, their location, size, and depth as well as the frequency they will be monitored.

2. Response

DOE commits to engaging the State in establishment of the groundwater monitoring network for the disposal facility.

3. Comment

DEQ will require access to the monitoring wells at the new disposal facility to take independent ground water samples for analysis.

3. Response

DOE will work with the state security point of contact to ensure access to the disposal facility location and with the site contractor to ensure coordination for independent state groundwater sampling efforts.

4. Comment

DEQ agrees DOE should implement the operation controls set out in the draft EA to limit impacts to the environment.

4. Response

DOE intends to fully implement the operational controls presented in the EA to minimize the potential for environmental impact.

5. Comment

Page 2-8. What waste form is better stored in carbon than in stainless steel? How long would "security enhancements" last?

5. Response

Stainless steel is more protective than carbon steel for all waste forms considered in this EA. The final EA has been changed to clarify that all remote-handled LLW will be disposed of in stainless steel liners. Security enhancements would be in place during the operational life of the facility. In addition, an institutional control period of at least 100 years is required.

6. Comment

Page 2-11. Since the draft EA does not adequately discuss the impacts of RH LLW disposal at INL, it's impossible to evaluate why Candidate Site 1 is better than Candidate Site 2. The fact that an additional 16 feet of soil between the waste and Idaho's water leads to the inevitable conclusion that the proposed facility would be extremely vulnerable. The observation that the preferred site is farther away from the Big Lost River demands a full discussion of flood potential.

6. Response

DOE disagrees with the comment. Table 4-10 provides a comparison of the alternatives and no comments were received that indicate any of the impact data presented in the EA should be reconsidered based on technical or scientific reasons. The additional sediment thickness at INL Candidate Site 1 provides 25% more sorption capacity, which slows migration, reduces concentrations, and provides additional decay time. The analysis indicates there will be no significant impact to the Snake River Plain Aquifer (SRPA). Flood potential at both sites was addressed in INL/EXT-10-18191, which is referenced in the EA. The fact that both candidate sites are located outside the 100, 500, 1,000, and 10,000-year floodplain (Section 4.1.2) indicates that concern is not an issue and does not require further analysis.

Alternative 2 – Transport Waste to the Nevada National Security Site for Disposal

1. Comment

Idaho's EA assumes the NNSS would need to upgrade its infrastructure to dispose of Idaho's RH LLW (See section 2.4.3, Alternative 2 – Transport Waste to the NNSS for disposal, 2nd paragraph, 3rd sentence). However, Idaho did not confirm its assumption such upgrades would be necessary. The EA did not indicate Idaho even contacted the NNSS when drafting the document (something one would assume Idaho would do). The reviewer believes that had not even Idaho contacted the NNSS to discover whether disposal of Idaho's RH LLW would or would not require upgrades at the NNSS. After 60 plus years of LLW disposal experience, the NNSS may be able to dispose of Idaho's RH LLW without infrastructure upgrades.

This sentence alone forces a reader/stakeholder/decision maker to conclude the EA is incomplete. Further the reviewer feels the assumption could have been easily confirmed if Idaho simply asked the NNSS.

1. Response

During the process of preparing the EA, INL confirmed that, in the past, NNSS has not received routine shipments of high-radiation waste of the type covered in this EA. INL determined that NNSS would need to adopt specific procedures, establish a decontamination area (including process and procedures), procure a new crane that can be operated remotely, perform special performance assessments, and rent other equipment in order to receive and dispose of this waste. Accordingly, the EA identified that there is a potential for such measures.

2. Comment

"Alternative 2 involves the transportation risk of shipping waste for disposal and operational risk of utilizing disposal capability at a location remote from the generator site and not under the generator's control." The generator is the United States Department of Energy, a federal agency. The US DOE controls both the INL and the NNSS. Please expand upon this statement and compare and contrast its apparent assertion that INL waste must remain under INL control with any INL actions or plans vis a vis other low level waste streams, TRU waste, high level waste, and spent fuel.

2. Response

The EA takes into consideration the fact that activities at NNSS are not controlled by generators located at INL.

3. Comment

Page vii. By what percentage would the 150 m^3 of RH LLW from INL increase the annual waste acceptance at NNSS? It would seem that the amount would be substantial enough to warrant analysis.

3. Response

A total of 15 million ft^3 is planned for disposal at NNSS over the 10-year period analyzed in the draft *Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security Administration Nevada National Security Site and Off-Site Locations in the State of Nevada* (EIS-0426). The 50-year inventory of remote-handled LLW to be disposed of from INL would total approximately 7,500 m^3 or 0.265 million ft^3, which is less than 2% of the planned 10-year disposal volume for NNSS.

4. Comment

Page 2-3. I note that operations at the NNSS are currently under NEPA review – in a full-scale environmental impact statement, no less. How might the draft EIS's alternative of expanding operations at NNSS affect the evaluation of Alternative 2 in the current EA?

4. Response

Expanding operations at NNSS would not affect the evaluation of Alternative 2 in the EA because there is sufficient capacity at NNSS under any of the alternatives in the draft EIS (draft *Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security*

Administration Nevada National Security Site and Off-Site Locations in the State of Nevada, DOE/EIS-0426D).

5. Comment

Alternative 2: It is not clear whether NNSS can dispose of RH LLW: "…it is assumed NNSS could accept remote-handled LLW from INL…" versus "It is possible that a disposal facility similar to that being considered in Alternative 1 would be required to be built at NNSS…" versus "Facility modifications at NNSS would likely be required…." There is a similar confusion in the slide show presented to the INL EM CAB on November 15, 2011: NNSS "would provide continuity of operations because it is currently an operating facility" versus "the NNSS is not configured to manage disposal of RH-LLW at this time."

As noted earlier, this uncertainty has a particularly poisonous effect on the current NEPA analysis: "The offsite [NNSS] disposal alternative, Alternative 2, would take place at an existing facility designed, approved, and operated to accept DOE remote-handled LLW. Therefore, impacts at NNSS were not evaluated for this alternative." Isn't that precisely why an agency conducts a NEPA analysis?

5. Response

DOE currently plans to close the NNSS disposal facility in the 2027 to 2028 timeframe. The timeframe for closure coincides with the planned completion of the Environmental Management mission. At this time, DOE has not made a decision to continue disposal operations at NNSS. Therefore, disposal of INL remote-handled LLW at NNSS beyond the 2027 to 2028 timeframe is uncertain, which increases the risk associated with this alternative.

As presented in Section 2.4.3, additional infrastructure and analysis will be required for NNSS to support disposal of INL remote-handled LLW. Facility modifications, similar to those proposed for Alternative 1, may be required for operational safety. Incorporation of infrastructure or facility modifications could be completed in time to provide continuity of operations for INL waste generators.

6. Comment

Page 2-13: This is another instance of skewing analysis to reach a desired conclusion. The draft EA clearly implies that the provision of appropriate nuclear waste shipment casks is an insurmountable obstacle. There must be a full discussion of that position in a draft EIS. How much does 3 m3 of activated metal weigh? The EIS discussion should include a comparison to the shipment scenarios outlined for the high-level waste repository.

6. Response

The EA (Section 2.4.3) includes the alternative of transport of the remote-handled LLW offsite for disposal at NNSS and describes the requirements for transporting the waste on public highways under that alternative. The weight of the existing 3 m^3 cask used for onsite shipment of activated metals is approximately 55 tons.

DOE prepared an EA because the potential for significant impact was not known and the type of action was not included in DOE's classes of actions that normally require EISs as set out at Appendix D to Subpart D of DOE's NEPA implementing procedures (10 CFR Part 1021). DOE analyzed a range of reasonable alternatives. DOE also considered the context (setting) and intensity (severity) of any potential environmental impacts before deciding on the appropriate level of NEPA review. DOE prepared the EA and included all information necessary to determine the potential for significant environmental impact. DOE used state-of-the-art science, technology, and expertise to assure quality in the impacts analyses. The analyses indicate that the proposed action will not have a significant impact and, therefore, an EIS is not required.

No Action Alternative

1. Comment

The EA drafts three alternatives. Alternative 1 (the preferred alternative) is for on-site disposal. Alternative 2 is for off-site disposal at the NNSS. Finally, the EA considers the No Action Alternative. Section 4.3, No Action Alternative, first paragraph, first sentence, states "Under the No Alternative, no on-site or off-site actions would be taken to provide remote-handled LLW disposal capacity." This is an absolute incorrect statement. Because Idaho RH LLW is simply LLW according to DOE Order 435.1, Idaho's RH LLW is simply LLW. Idaho already has and is using disposal capacity for its LLW at the NNSS.

Because Idaho already has and is using LLW disposal capacity at the NNSS, the NNSS should be part of the No Action Alternative vs. being Alternative 2 (i.e., a separate alternative) in the EA.

1. Response

DOE agrees with the comment that the INL Site has sent and continues to send a small quantity of remote-handled LLW to NNSS for disposal. At the same time, the DOE documents cited in response to the commenter's comment under Waste Description subject, Response 1, clearly show the handling requirements for remote-handled LLW differ considerably from those for contact-handled LLW.

The No Action Alternative in the final EA has been modified to clarify that the shipment of the ion-exchange resins, filters, and hardware from ATR would continue to be shipped to NNSS under the No Action Alternative as long as such disposal is available at NNSS. Approximately six shipments per year of ATR ion-exchange resins, filters, and hardware currently are disposed of at NNSS. ATR ion-exchange resins, filters, and hardware can be shipped in commerce using existing casks and would not require additional infrastructure or facility modifications at NNSS. Alternatively, INL remote-handled LLW activated metals (approximately 100 shipments per year) would require new casks, facility modifications, and additional infrastructure at NNSS.

2. Comment

Page 4-9. "Because NRF has an existing cask, it would continue shipments to RWMC until it is closed or filled." Do the other generating facilities have existing casks?

2. Response

The Naval Reactors Facility uses an existing cask that is suitable for transport of waste onsite. Existing casks are available to support onsite shipments of remote-handled LLW generated at ATR and the Material and Fuels Complex. A Department of Transportation cask licensed by the U.S. Nuclear Regulatory Commission is available for in-commerce and onsite shipment of ATR resins, filters, and hardware (approximately six shipments per year). This cask does not provide the shielding needed for shipment of activated metals to NNSS. The proposed action (Section 2.3) includes the purchase of transport casks as needed to accomplish shipments of waste from the INL Site generating facilities to the disposal facility.

Alternatives Considered But Eliminated from Further Consideration

1. Comment

Section 2.4. The entire discussion of alternatives perfectly illustrates the Department of Energy's basic approach to environmental analyses: Decide what the agency wants to do and then skew every single bit of "analysis" to reach the desired conclusion. For instance, the final paragraph on page 2-4 seems to imply that the DOE is unable to develop new interim storage facilities. It is probably far more accurate to state that the DOE simply does not want to. Why not?

The draft EA goes on to discuss the storage of nuclear waste for…80…whole…years. Such facilities "do not exist." Furthermore, "disposal capability for 80 to 130 years in the future is uncertain." So let's just bury it until the end of time, okay? After all, though nothing can be expected to last for… 130… whole… years above ground, buried "concrete vaults are expected to maintain structural integrity for thousands of years" (page 2-8).

1. Response

DOE did not include the alternative of developing new interim storage facilities for this waste because that alternative does not meet the purpose and need for replacement disposal capacity for remote-handled LLW generated at the INL Site (see Section 2.4.1).

2. Comment

Page 2-5. "The programmatic risks of speculating when, where, and whether such a [disposal] facility would be open in time to support the need for uninterrupted disposal of INL and tenant-generated remote-handled LLW were regarded as too great…." This seems a prudent position, one that should be adopted by nuclear waste generators everywhere. What tenant?

2. Response

The tenant is the DOE Naval Nuclear Propulsion Program, which operates the Naval Reactors Facility at the INL Site.

Transportation

1. Comment

Potential For Significant Impact: Transportation impacts to Idahoans: Alternative 2 requires off-site transportation. This alternative could result in radiation exposure to the public, as well as workers from shipments and from accidents, in addition to the potential for non-radiological transportation impacts from vehicle emissions and collisions. The draft RH-LLW-EA reports that 117 shipments a year would be predicted across the Idaho and Tribal corridors. This contributes to the "significant Impact" of this project.

1. Response

DOE disagrees with the comment. "Significantly" is defined in 40 CFR 1508.27. As shown in Sections 4.2.2 and 4.2.3 of the EA, the impacts of transportation of remote-handled LLW to NNSS are not significant; therefore, an environmental impact statement is not required.

2. Comment

Potential For Significant Impact: Transportation impacts to Tribes: Alternative 2 requires transportation. This alternative could result in radiation exposure to the public, including the Shoshone-Bannock Tribes, as well as workers from shipments and from accidents, in addition to the potential for non-radiological transportation impacts from vehicle emissions and collisions. The draft E.A. reports that 117 shipments a year would be predicted across the Tribal corridor. This contributes to the "significant Impact" of this project.

2. Response

See response to Transportation Comment 1 above.

Accidents and Intentional Destructive Acts

1. Comment

Potential For Significant Impact: Accidents and Intentional Destructive Acts: While the draft RH-LLW-EA indicates that the probability of an accident or destructive act is low, as DOE adds more and more projects that include transportation and radioactive waste handling, it increases the risks of a release. A full EIS could detail the preventative measures expected to be deployed to protect the Idahoans and public population from accidents and releases. Alternative No. 1 is to store the waste above the Eastern Snake River Aquifer of Idaho in casks and storage vaults that have not previously been tested or used. Accidents are a fact of life at DOE sites and just this last week (beginning 11-7-2011) two accidents occurred at the MFC, one involving exposure of Plutonium to 17 workers. The draft E.A. has under-estimated the risks of releases in each of the alternatives. A Full EIS would enable the DOE to more fully assess these risks and possibly explore other alternatives.

1. Response

DOE used established standards to analyze the consequences of potential accidents and intentional destructive acts. The analyses indicate that over the life of the project, no transportation accidents and no traffic-related fatalities are expected to occur. There is no risk of an acute cancer fatality under any of the accident scenarios (see Sections 4.1.5 and 4.2.3 of the EA).

2. Comment

Potential For Significant Impact: Accidents and Intentional Destructive Acts: While the draft E.A. indicates that the probability of an accident or destructive act is low, as DOE adds more and more projects that include transportation and access to the public, it increases the risks of a release. A full EIS could detail the preventative measures expected to be deployed to protect the Shoshone-Bannock Tribal and public population from accidents.

2. Response

See response to Accidents and Intentional Destructive Act Comment 1, above.

Analysis Related – Groundwater

1. Comment

DOE Order 435.1, also requires the site building a LLW disposal facility to protect the groundwater (a fact, not mentioned in the EA). Review of the last paragraph of section 2.4.2, Alternative 1 – Develop Onsite Replacement Disposal Capability (Preferred Alternative), indicates eventually the onsite disposal Idaho's RH LLW facility will impact the groundwater (albeit, later the EA explains the impact will be insignificant). However, the NNSS' LLW disposal facility will never impact the groundwater.

1. Response

The remote-handled LLW facility at the INL Site will be constructed to meet all DOE order requirements, including protection of the aquifer. The analyses of the impacts to the SRPA conducted by DOE indicate the proposed action would not produce significant impacts. In addition, the information related to the NNSS alternative has been expanded to include information from the draft *Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security Administration Nevada National Security Site and Off-Site Locations in the state of Nevada* (EIS-0426D). That additional analysis states that no impacts to groundwater at NNSS have been associated with disposal of INL remote-handled LLW.

2. Comment

Potential For Significant Impact: It would be difficult to conceive of a resource more significant than the Snake River Plain Aquifer, one of the largest aquifers in the United States, one that is critical for drinking water and agriculture in Idaho, one that overlies the INL site and the preferred alternative, where handling and storage of radioactive waste is proposed.

2. Response

DOE disagrees with the comment. "Significantly" is defined in 40 CFR 1508.27. The term "Significantly" in NEPA refers to the effect the action would have on the environment (42 USC § 4332(2)(C)). As shown in Section 4.1.2 of the EA, impacts to the SRPA are not significant; therefore, an EIS is not required.

3. Comment

Water Resources - "Most of INL is underlain by the ESRPA. The depth to the top of the ESRPA is approximately 480 ft below the two candidate sites. The geology above the ESRPA, the vadose zone, is generally comprised of basalt (95%) with a layer of soil (loess) or sediment on top of the basalt with thin layers of sediment (1 to 20-ft intervals) between basalt flows. The ESRPA has similar geology as the overlying vadose zone and is generally 250 to 900-ft thick."

The above description from the draft RH-LLW-E.A. fails to describe perched zones in the area. Perched zones could be either more protective or less protective of the water resources. Perched water has been detected beneath the ATR complex. Does the perched zone risk the release of contaminants to surface water during wet years? Has the DOE developed deed restrictions to ensure future excavation, such as gravel pits, or other construction cannot ever be allowed to reach perched zones? Does the perched zone delay, but not protect, releases to the lower vadose zone of the ESRPA? What are the infiltration rates estimated to be at the Alternative sites? None of these issues are adequately covered in the E.A. and full EIS should be developed to provide more in depth descriptions of the water resource risks/benefits at the INL.

3. Response

Perched water zones and infiltration rates used in the analyses are addressed in the *Evaluation of Groundwater Impacts to Support the National Environmental Policy Act Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project* (INL/EXT-10-19168, Revision 3), which is referenced in the EA.

As explained in the groundwater impacts analysis, there are no permanent perched water zones under the two INL candidate sites. Formation of permanent perched water zones is associated with large surface water discharges from industrial facilities. The perched water under the ATR Complex does not underlie either of the two INL candidate sites. Perched water zones would not result in a release of contaminants to surface water.

Institutional controls will be maintained for at least 100 years, post closure, to prevent future excavations or other constructions that could create locally ponded water at land surface near the facility.

4. Comment

Page 4-2 of the draft EA states that potential ground water impacts were analyzed for the 2 on-site locations and references INL 2011a. It is unclear how the numbers in Table 4-1 on page 4-3 of the draft EA were obtained after reviewing the tables in the referenced document, INL 2011a. The EA should explain the source of the data in Table 4-1 and how it correlates with the data in the referenced document, INL 2011a.

4. Response

DOE will improve its process for ensuring that all documents referenced in NEPA documents are the desired versions and available for reviewers. The most up-to-date versions of the documents were subsequently provided and the comment period was extended.

5. Comment

We are also very concerned about the long term potential impacts to the Snake River Aquifer. We understand that every precaution has been made to ensure the long term integrity of the facility, but no amount of planning can replace reality. A section needs to be added to address monitoring activities and a course of action if a failure is detected at any time. Do not wait until a failure is detected to create a course of action to correct or mitigate the failure.

5. Response

Short-term monitoring, long-term monitoring, and maintenance activities are included as part of the alternative for onsite disposal. Response actions will be documented in the final monitoring plan.

6. Comment

Page vi. There is a contradiction in the statement that there are no significant impacts to groundwater but that the establishment of either candidate site, particularly site 2, would contribute to potential cumulative impacts. All impacts to the Snake River Aquifer are significant.

6. Response

DOE disagrees with the comment. "Significantly" is defined in 40 CFR 1508.27. As shown in Sections 4.1.2 and 4.4 of the EA, impacts to the SRPA are not significant from either an onsite candidate location perspective or from a cumulative impacts perspective. Future potential radionuclide concentrations in the aquifer are predicted to be well below National Drinking Water Standards (maximum contaminant levels) and predicted doses are well below limits established by DOE Order 435.1-1. The DOE reference/support document *Evaluation of Groundwater Impacts to Support the National Environmental Policy Act Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project* (INL/EXT-10-19168 Revision 3) provides analysis details.

Analysis Related – Archaeological and Cultural Resources

1. Comment

Intensive archaeological surveys have been conducted, according to section 4.1.1. of the Draft Environmental Assessment (EA) and no subsurface archaeological resources have been reported. The archaeological surveys conducted do not necessarily mean that there are no archaeological resources present; there may be a likelihood of sensitive material discovery. The land involved is inherent ancestral lands of The Shoshone- Bannock Tribes. Sensitive information remains in this area and that information must be protected. The Shoshone-Bannock Tribes have an agreement with you, as a land manager, to protect these irreplaceable materials. So much has already been lost due to lack of protection in the past.

Construction of the proposed facility will consist of major ground disturbing activities which would include further expansion that would eventually involve an even greater amount of ground disturbance due to a fifty year projection period (2017-2067). I have concerns in regards to the natural and cultural resources. Section 4.1.1.(Cultural Resources), of the Draft EA also illustrates, "Ground disturbance associated with facility construction and associated infrastructure (e.g., utilities, access roads, and telecommunications) has the potential to impact any archaeological sites and natural resources of importance to the Shoshone-Bannock Tribes in the chosen footprint of the project." I believe there should be no potential impacts of cultural or natural resources on inherent ancestral lands of the Shoshone-

Bannock Tribes. The original cultural and the integrity of these native lands should be preserved in their original context.

According to the Draft EA Section 4.4 (Cumulative Effects), "The onsite disposal alternatives have the potential to affect cultural, ecological, and groundwater resources by their activities, which include groundwater and waste disposal." These original ancestral inherent lands of The Shoshone-Bannock Tribes should not be utilized as a waste dump that could impact the water source in the future. Our grandchildren will still be around for years to come and they should not be subjected to any cumulative effects that may affect the water. The Draft EA in section 4.4 describes other recently approved projects and minimizes the impacts to cultural resources. Even though the likelihood of the impact is described as small; I feel there should be no potential of cumulative effects on inherent ancestral lands of The Shoshone and Bannock Tribes.

1. Response

DOE acknowledges Shoshone-Bannock tribal concerns. The facility will be designed, located, constructed, operated, and closed in a manner that minimizes impacts to the natural and cultural resources.

According to the INL Cultural Resource Management Plan and the Agreement-in-Principle with the Shoshone-Bannock Tribes, tribal representatives have been and will continue to be provided with opportunities to participate in future planning and implementation of archaeological surveys, impact assessments, and protection strategies for the archaeological sites identified in the onsite disposal facility location. DOE expects that construction and operational controls included in the EA (Section 2.4.2) will minimize adverse impacts to plant species documented to have been used by indigenous groups of the Eastern Snake River Plain, as well as identified wildlife and ecological resources in the project area. These controls include limiting soil disturbance, weed control, seasonal timing of activities, and cultural awareness training for construction and operations personnel. The Tribes will be notified in the event that cultural resources are discovered during project implementation. In addition, location and construction of the remote-handled LLW disposal facility footprint within either of the two INL candidate sites would be undertaken to avoid disturbing identified archaeological resources (Section 4.1.1).

DOE used state-of-the-art science, technology, and expertise to assure quality in the impacts analyses. The analyses indicate that the proposed action will not have a significant impact to the environment.

2. Comment

Potential For Significant Impact: Cultural Resources: Any construction, especially, sub-surface construction such as the preferred alternative, is a significant issue to the Shoshone-Bannock Tribes because of the cultural resources present in the INL, and the potential for destroying these important resources. The draft E.A. is too vague about the operational efforts by DOE to protect these resources and a full EIS is necessary to address the details.

2. Response

The INL Cultural Resource Management Office has and will continue to work with the Shoshone-Bannock Tribes to identify cultural resources that may be present within either of the two INL candidate sites. Although no subsurface archaeological resources have been identified, cultural resource monitoring will occur during all ground-disturbing activities to prevent inadvertent damage to subsurface archaeological resources (Section 4.1.1). Further, operational controls included in the EA (Section 2.4.2) will minimize adverse impacts to plant species documented to have been used by indigenous groups of the Eastern Snake River Plain, as well as identified wildlife and ecological resources at the selected site.

Analysis Related – Cumulative Effects

1. Comment

According to the information provided the Department of Energy prefers to develop an onsite replacement disposal capability facility (Alternative 1) and onsite location (Candidate Site 1). I disagree with the Department of Energy's preference and feel that the proposed construction of the facility will be detrimental to natural and cultural resources and contribute to cumulative environmental impacts.

1. Response

Your disagreement is respectfully noted. DOE deployed natural and cultural resource experts to survey the two INL candidate sites. The data collected during field investigations were analyzed and DOE determined that the predicted impacts to resource realms will be insignificant. Based on the findings for potential impacts associated with previous projects (Section 4.4), in addition to the overall state of preservation of the site as a whole, the cumulative impacts of the proposed facility are not significant.

2. Comment

Page 4-10. The draft EIS must include a full discussion and analysis of the "new facilities for spent fuel handling and examination at…the ATR Complex." Why does this section, cursory though it is, not include any mention of MFC?

2. Response

Discussion in the EA is relevant to cumulative impacts to cultural and ecological resources, which DOE considered and determined there would be minimal impacts. Since the publication of the Notice of Intent for the NR EIS, 75 Federal Register 42082, Naval Reactors has determined that the Material and Fuels Complex is no longer included in their range of reasonable alternatives.

3. Comment

Page 4-12. "DOE considers the potential for greater-than-Class C waste disposal at INL to be speculative and not a reasonably foreseeable action at this point." How much less speculative and more reasonable are DOE's plans for nuclear research, development, and testing in 2067?

3. Response

The draft Greater-Than-Class C (GTCC) EIS considers alternatives for disposal at six federally owned sites and at generic commercial sites. The Draft GTCC EIS did not include a preferred alternative; however, DOE will include a preferred alternative in the Final GTCC EIS. Congressional action is required before DOE can issue a Record of Decision selecting a disposal alternative to be implemented for GTCC waste. Therefore, assuming the GTCC disposal facility will be sited at Idaho is speculative, while nuclear research development and testing are currently part of INL's mission. Activities related to the INL mission are expected to continue into the reasonably foreseeable future.

National Environmental Policy Act Process

1. Comment

The Snake River Aquifer is the sole source of drinking water for 300,000 people. Any plan to bury nuclear waste above this crucial water supply must be subjected to thorough analysis and broad public review. The discussions and analyses in the current environmental assessment are cursory. The preferences seem predetermined and arbitrary. The Department of Energy must produce a full environmental impact statement on this plan.

1. Response

DOE prepared an EA because the potential for significant impact was not known and the type of action was not included in DOE's classes of actions that normally require EISs as set out in Appendix D to Subpart D of DOE's NEPA implementing procedures (10 CFR Part 1021). DOE analyzed a range of reasonable alternatives. DOE also considered the context (setting) and intensity (severity) of any potential environmental impacts before deciding on the appropriate level of NEPA review. DOE prepared the EA and included all information necessary to determine the potential for significant environmental impact. DOE used state-of-the-art science, technology, and expertise to assure quality in the impacts analyses. The analyses indicate that the proposed action will not have a significant impact and, therefore, an EIS is not necessary.

The public has been provided a reasonable length of time to comment on the analyses in the EA and point out incorrect or insufficient data. DOE acknowledges that many different perceptions are represented in the comments received, but no comments were received that indicate any of the impact data presented in the EA should be reconsidered based on technical or scientific reasons. Given DOE's thorough analysis and the lack of any scientific or technical deficiencies identified by the comment process, DOE has issued a Finding of No Significant Impact (FONSI).

2. Comment

I read the above draft EA. As potential environmental impacts that would be associated with the proposed and preferred action would be below state and federal thresholds, there seems to be no need for preparation of an EIS.

2. Response

The commenter's preference has been noted.

3. Comment

However, I would like to suggest that the final EA include a discussion on public involvement, permits (Federal, State, and County) that might be required, and information on who to contact for further information or questions about the project.

3. Response

The FONSI includes a summary of the public involvement associated with the EA. Section 5 of the EA includes identification of permits that might be required. The FONSI provides information on who to contact for further information or questions about the project.

4. Comment

The DOE's environmental assessment for Remote-Handled Low-Level Waste (hereafter "RH-LLW-EA") errors in significant ways from NEPA Laws and guidance as described below:(1) The Project meets the NEPA requirements for a full EIS – The DOE should carry out a full EIS of this large and significant project which may have adverse impacts to Idaho and additional risks to the Snake River Plain Aquifer. NEPA requires that DOE prepare a full EIS if: The proposed action (a) is federal, (b) qualifies as "major," and (c) have a significant environmental impact. Here is an examination of the three requirements that support a full EIS:

(a) **Federal**: This is a large Federal project which will be undertaken by the U.S. DOE.

(b) **Major**: The project qualifies as "major" for the following reasons: It is a multi-million dollar project that will handle and store radioactive waste for between 20 and 30 years, followed by at least a century of monitoring and up-keep. Remote-Handled LLW is a waste that requires special handling, more robust transportation and disposal design and construction, compared to other LLW. In the case of Alternative no. 1 the design and testing of the casks and storage vaults will be a major decision that requires preparing, screening, and shipping the waste, it includes cask and vault design and construction, along with long-term sampling and monitoring. In reviewing all of these factors together the project qualifies as a "major" one.

Alternative 2 includes transportation risks and unresolved Nevada waste acceptance criteria, screening and then handling and final storage in Nevada. (This in itself should trigger a full EIS)

4. Response

DOE disagrees with the comment. An EIS is required when there are "major Federal actions significantly affecting the quality of the human environment" (42 USC § 4332(2)(C)). In this case, DOE prepared an EA because the potential for significant impact was not known and the type of action was not included in DOE's classes of actions that normally require EISs as set out in Appendix D to Subpart D of DOE's NEPA implementing procedures (10 CFR Part 1021). DOE analyzed a range of reasonable alternatives. DOE also considered the context (setting) and intensity (severity) of any potential environmental impacts before deciding on the appropriate level of NEPA review. As identified in the Council on Environmental Quality regulations in 40 CFR 1500.1, the Council on Environmental Quality advises "most important, NEPA Documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail." DOE prepared the EA and included all information necessary to determine the potential for significant environmental impact. DOE used state-of-the-art science, technology, and expertise to assure quality in the impacts analyses. The analyses indicate that the proposed action will not have a significant impact and, therefore, an EIS is not necessary.

The public has been provided a reasonable length of time to comment on the analyses in the EA and point out incorrect or insufficient data. DOE acknowledges that many different perceptions are represented in the comments received, but no comments were received that indicate any of the impact data presented in the EA should be reconsidered based on technical or scientific reasons. DOE considers this to be an affirmation of its significance determination and has issued a FONSI.

5. Comment

It is controversial in the sense that although remote-handled waste is more radioactive, more difficult to handle and requires more robust casks and disposal methods, it has not previously been reviewed as a separate category of waste in earlier Programmatic EIS documents, even though its characteristics warrant separate Programmatic EIS review.

Alternative No. 1 is to store the RH-LLW above the Eastern Snake River Plain Aquifer of Idaho in casks and storage vaults that have not previously been tested or used. Even if the "No Action" alternative is selected this radioactive waste must be dealt with, at a large cost, and in a controversial way, above Idaho's largest aquifer.

5. Response

Section 2.2 of the EA discusses the programmatic EIS where this type of waste was evaluated. It identifies that remote-handled LLW refers to LLW that has a surface dose rate of 200 mrem/hour or more. The programmatic documents described in the comment address LLW, which includes the subsets of remote-handled and contact-handled LLW. The differences between contact-handled and remote-handled are explained in these documents. In addition, the *Waste Management Programmatic Environmental Impact Statement* (EIS-0200) evaluated and defined remote-handled waste. According to this EIS, LLW includes all radioactive waste that is not classified as high-level waste, spent nuclear fuel, or transuranic waste and does not contain hazardous waste constituents. Remote-handled waste is further defined as waste that exceeds 200 millirem per hour at the surface of a container. Therefore, such material must be handled remotely.

Alternative 1 of the EA involves construction of a new facility to provide onsite disposal capability for the mission need of 20 years with the ability to expand to 50 years. The conceptual design of the proposed facility is similar to the design of the Subsurface Disposal Area at the Radioactive Waste Management Complex at INL. Waste would be disposed of in stainless steel liners as described in Table 2-1 of the EA. INL has safely disposed of remote-handled LLW at this facility for more than two decades.

6. Comment

Potential For Significant Impact: Resources Impacted: After reviewing the draft E.A. this proposed project meets the "significant Impact" threshold, for a full EIS review. The draft EA lists the following resources that may be affected: Water Resources, Air Resources, Ecological Resources (both vegetative and wildlife), energy usage, and accidents and intentional destructive acts. The above list of resources, demonstrates that the proposed project may impact a large number of resources important to Idahoans.

6. Response

DOE disagrees with the comment. "Significantly" is defined in 40 CFR 1508.27. The term "Significantly" in NEPA refers to the effect the action would have on the environment (42 USC § 4332(2)(C)). As shown in Section 4.1 of the EA, the impacts to these resources are not significant; therefore, an EIS is not required.

7. Comment

To summarize the proposed project has "significant Impacts" and in order to meet NEPA and DOE guidance there needs to be a full EIS review of this proposed project. (Any final E.A. needs to either address these issues in detail, as well.)

7. Response

See response to National Environmental Policy Act Process comment 6 above.

8. Comment

Incomplete information in draft RH-LLW-EA:

In addition to the need for an EIS (or for more details in final E.A.) based on the aforementioned reasons, the DOE should undertake the EIS because the draft E.A. is devoid of the most basic information about the proposed project and does not meet the minimum requirements of NEPA in that regard.

The draft E.A. almost completely fails to address the site facility requirements and construction needs, perhaps the most important aspect of this project.

NEPA laws dictate that the draft EA would address following:

(a) The benefits of the Nevada site (NNSS) since it is already constructed and operating as compared to the costs at the INL where DOE must build an entirely new disposal facility.

(b) The benefits of the INL, with it being close to the source of the waste and reduced transportation costs and risks, compared with the need to rebuild a whole new handling and storage disposal facility.

(c) The uniqueness of Remote-Handled LLW and the need for special handling, storage and disposal of it, compared to other LLW.

Unfortunately the draft EA fails to discuss the benefits and cost savings of utilizing a facility already operating and with capacity to handle RH-LLW! Likewise, it fails to focus on the special facility needs of managing the "Remote-Handled" category of LLW.

The draft EA does briefly discuss the construction of the proposed disposal site if the INL is selected, but completely avoids the review of the Nevada site disposal facility. If the EA is to function to compare the two facilities, then the details of the constructed site at Nevada must be compared.

Here is the excerpt of the EA with the greatest detail of the infrastructure at NNSS:

"Facility modifications at NNSS would likely be required to receive the INL remote-handled LLW. INL remote-handled LLW would have to meet the NNSS waste acceptance criteria, or would require waste-specific performance assessments."

8. Response

DOE disagrees with the comment. Chapter 4 of the EA provides information regarding the substantive issues related to the alternatives to meet DOE's purpose and need. As identified in the Council on Environmental Quality regulations in 40 CFR 1500.1, "Council on Environmental Quality," advises "most important, NEPA Documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail." Environmental impacts are included in the final EA and summarized in Table 4-10. However, DOE agrees that additional information regarding the impacts of disposing of remote-handled LLW at NNSS is warranted and has included that information in the EA (please see Section 4.2). Costs are not an area of environmental impacts assessed under NEPA. Costs, along with technical feasibility, are relevant to the selection of the range of reasonable alternatives and are considered as part of all information the decision maker uses to make a decision on the proposed action. DOE considered the benefits and drawbacks of onsite and offsite disposal when making its decision.

9. Comment

No fair comparison of alternative 1 and 2. Without addressing the benefits of the NNSS, especially in the alternative discussion, the EA is not fairly comparing the two sites and this is in violation of NEPA and DOE guidelines.

9. Response

A comparison of the environmental impacts can be found in Table 4-10 of the EA. Potential benefits not related to environmental impacts are not part of an environmental assessment, but were considered by the decision maker in addition to the information in this EA. In response to other comments, additional information related to disposal of remote-handled LLW at NNSS has been incorporated into the final EA. Please refer to Section 4.2 of the final EA.

10. Comment

Costs - There is no real discussion within the draft RH-LLW-EA of the cost savings of using the NNSS, a site already approved for LLW handling and disposal. The final EA (or preferably an EIS) must address this. The draft EA Section 2.4.1 rejects several alternatives partly due to cost. But if costs have, indeed, been analyzed the results should be included in the NEPA document, and alternatives discussed in the context of project costs.

Is it possible that the INL site would also be rejected as an alternative if the cost of re-building a new facility INL were compared to the lower cost of NNSS accepting INL's RH-LLW?

10. Response

Costs are not an area of environmental impacts assessed under NEPA. Costs, along with technical feasibility, are relevant to the selection of the range of reasonable alternatives and are considered as part of all information the decision maker uses to make a decision on the proposed action. DOE considered the benefits and drawbacks of onsite and offsite disposal when making its decision.

<u>11. Comment</u>

Referenced Programmatic EIS documents are out of date and inaccurate- The two programmatic EIS's referenced in the draft RH-LLW EA, are disconnected from the actual conditions at INL and warrants a new Programmatic EIS. None of the cited EIS documents, including the Programmatic Spent Nuclear Fuel and Idaho National Engineering Laboratory Environmental Restoration Waste Management EIS (60 FR 28680), and the 2005 EIS Supplement, address Remote Handled Low-level waste specifically. Remote Handled- Low-Level waste is not defined in Programmatic EIS documents, and is barely mentioned in them. Except for Mixed LLW, the document groups all other LLW together. If there is a different characteristic between Contact-Handled, and Remote-Handled Low-Level waste in the referenced Programmatic Environmental Impact Statements, it certainly isn't mentioned. Hence the broad coverage of this proposed EA for Remote-Handled LLW is not addressed in the past programmatic EIS documents. The DOE needs a new programmatic EIS that actually covers Remote-Handled LLW because previous Programmatic EIS documents ignore the remote-handled category of low-level waste even though it obviously requires special handling, higher costs and increased risks compared to contact-handled LLW.

The 1995 Spent Fuel Programmatic EIS cites the Waste Experimental Reduction Facility (WERF) the Idaho Chemical Processing Plant (ICPP) as key beneficial components for LLW reduction, compaction and handling yet these two facilities are no longer operating in that capacity. The 1995 Spent Fuel Programmatic EIS lists the benefits of operating the WERF and Idaho Chemical Processing Plant because they reduce and compact LLW, and turn liquid waste into more manageable low-level solid waste. But when these two plants are shut down…the Supplemental EIS of 2005, only describes the benefits of them being closed and gone! That is, DOE states in 1995 Programmatic EIS that the two facilities help DOE manage LLW, but then in the subsequent EIS of 2005 there is only a reference to the adverse impacts of these two facilities (such as their air releases to the environment) with no mention of any replacement of their waste reduction or compaction benefits. What happened to the waste reduction benefits of WERF and ICPP in the 2005 Supplemental Programmatic EIS? There is no discussion of a replacement technology to deal with waste reduction provided; no risk analyzed; no discussion of affects of managing Low-Level Waste as a result of the shut-down of the two facilities listed as beneficial in handling Low-Level Waste described in the original 1995 Spent Fuel Programmatic EIS.

The 1995 Programmatic EIS at section 4.14.4 states the following:

"The INEL stores low-level waste awaiting treatment at the Waste Experimental Reduction Facility on asphalt or concrete pads at the radioactive waste storage containers and in radioactive waste storage containers at the generating facilities."

The supplemental EIS does not follow up with the fate of low-level waste that was stored at WERF, and certainly doesn't cover the Remote Handled Low-Level Waste change in storage operations after the WERF and ICPP LLW storage capacity closed. For that matter, this draft RH-LLW EA doesn't discuss any alternative for compaction or benefits of converting liquid LLW to solids, as was provided in the past by WERF and ICPP facilities and covered in previous programmatic EIS documents. This is clearly a gap that needs to be addressed in the next phase of the NEPA process.

Also, the infrastructure and facilities at INL have changed so much since these Programmatic EIS decisions were made that they are no longer relevant to the current focus of managing Remote-Handled LLW. Consequently, any reference in these EIS documents to the need for "on-site" disposal of RH-LLW at the INL should be dismissed until a programmatic EIS is re-issued that actually addresses Remote-Handled LLW. The DOE needs a new programmatic EIS that actually covers Remote-Handled LLW because previous Programmatic EIS documents ignore the remote-handled category of low-level waste even though it obviously requires special handling, higher costs, and increased risks compared to contact-handled LLW. The regulation 40 CFR 1508.27(b)(5) requires NEPA documents to address the degree to which the possible effects on the human environment may be highly uncertain or involve unique or unknown risks and Remote-Handled LLW certainly fits into this description as a "unique or unknown risk" and as such, requires DOE documents to be specific in the risks, management requirements, disposal and costs of each.

11. Response

The comment is correct in that much of the information in the programmatic documents is not relevant to the specific proposal in the EA; however, a discussion of remote-handled LLW is included in those programmatic documents (see also the response to National Environmental Protection Act Process comment 14 below). However, DOE concluded that a more detailed NEPA analysis of the specific proposal was warranted to provide the public and decision maker the most current and best information available regarding the environmental impacts of the alternatives to meet the purpose and need.

The EA identifies that remote-handled LLW refers to LLW that has a surface dose rate of 200 mrem/hour or more. The programmatic documents described in the comment address LLW, which includes the subsets of remote-handled and contact-handled LLW. The differences between contact-handled and remote-handled are explained in these documents (see *Programmatic Environmental Impact Statement for Managing Treatment, Storage and Disposal of Radioactive and Hazardous Waste,* EIS-0200, Volume I Summary, pages 1 through 25, and Chapter 14, glossary pages 14-9 and 14-30, and *Programmatic Spent Nuclear Fuel and Idaho National Laboratory Environmental Restoration and Waste Management Environmental Impact Statement*, Volume II, Chapter 12, Glossary). In addition, DOE is not using the information in the programmatic documents to make a decision on the specific proposal identified in the EA. The EA provides the most current, best available environmental data to the decision maker regarding the environmental impacts of several alternatives for obtaining disposal replacement capability.

The scope of the proposed action only addresses the need for a final disposal location for remote-handled LLW waste generated by various operations at various facilities at the INL Site. The environmental impacts from operating the facilities at the INL Site that will or may generate remote-handled LLW in the future are out of the scope of this EA.

12. Comment

NEPA not followed- The following are additional problems with the RH-LLW-EA adhering to NEPA rules for Environmental Assessments:

(a)The RH-LLW E.A. failed to follow 40 CFR 1508.27(a), the requirement for short-and long term affect analyses of the alternatives. This E.A. gave only a minimal analysis of transportation affects and of disposal vault systems. Nothing was provided on the short- and long-term impacts at NNSS site.

(b)Analysis of beneficial and adverse impacts are required at 40 CFR 1508.27(b)(1). The EA failed to provide details of the benefits of utilization of the existing site at NNSS, by only addressing the transportation aspect of any adverse impacts at NNSS. Adverse impacts and risks related storing RH-LLW above the Eastern Snake River Plain Aquifer, the drinking water source for thousands of Idahoans, was not adequately reviewed. In the case of the Nevada site (NNSS) the draft EA lacks an adequate facility description and lacks review of that site's capacity to manage RH-LLW, as well the costs at that location. But 40 CFR 1502.22 requires that even if DOE finds information and potential impacts incomplete or unavailable, the EA must indicate that such information is lacking or be in violation of that section of NEPA.

12. Response

DOE disagrees with the comment. In accordance with 40 CFR 1508.27(a), the substantive short-term and long-term impacts of the various alternatives are identified in Chapter 4 of the EA and summarized in Table 4-10 of the EA. For example, in Table 4-7, the cumulative effects to water resources at 5,500 years of 0.88 mrem/year is a long-term impact. Conversely, if all the waste was shipped to NNSS, there would not be a short-term increase in fuel use to build the facility.

The environmental impacts are included in the final EA and summarized in Table 4-7. However, DOE agrees that additional information regarding the impacts of disposing of remote-handled LLW at NNSS is warranted and has added that information into the EA (see Section 4.2).

Costs are not an area of environmental impacts assessed under NEPA. Costs, along with technical feasibility, are relevant to the selection of the range of reasonable alternatives and are considered as part of all information the decision maker uses to make a decision on the proposed action.

Section 2.4.3 of the EA describes the alternative of disposing of the waste at NNSS.

13. Comment

Summary - The draft Environmental Assessment for Remote-Handled Low-Level Waste does not follow NEPA or DOE guidance with respect to presenting the minimum detail to evaluate the DOE's management of this waste and selection of alternatives. This is a special waste and DOE needs to carry out a full EIS for its handling and disposal. The project meets the guidance requirements of NEPA for carrying out a full EIS review.

13. Response

DOE disagrees with the comment. See response to National Environmental Policy Act Process comment 1, above.

14. Comment

The draft RH-LLW-EA lacks a review of the facility description and construction costs at the NNSS, even though it is one of only two alternatives presented (besides the no-action alternative). There is no real comparison between the alternatives for construction and start-up costs. The draft E.A. has important information gaps and lacks alternative selections. The Final RH-LLW-EA and EIS need to look at ways to get waste out of Idaho, including concentrating some of the waste to meet TRU waste definitions. GTCC waste should not be allowed to be handled or stored by the project proposed for RH-LLW and the final E.A. and EIS should address this issue. Previous Programmatic EIS documents are not specific in reviewing Remote-Handled LLW even though this category of waste is obviously more risky, more costly, and requires special handling and unique disposal requirements compared to other LLW. As a consequence, Remote-Handled LLW has not yet been adequately reviewed programmatically, and an EIS of this nature should precede this RH-LLW-EA. Most importantly, as outlined above, the management of this special Remote-Handled category of waste requires a full EIS review.

14. Response

The comparison of costs between alternatives is not an element of the NEPA review process. DOE identified a range of reasonable alternatives for waste disposal and is confident the alternatives identified and analyzed represent the most efficacious options for meeting the stated purpose and needs for this project. Removing waste from Idaho was not a specific selection criteria for alternative identification, although it is an understandable preference from the state citizen perspective. Embracing such a preference may be considered to be arbitrary by others. This is not a regulatory mandate and DOE must operate from a broad federal/national perspective. DOE will not embrace an alternative without a solid scientific and technical basis that meets the stated purpose and need.

Section 2.3 of the EA states that only remote-handled LLW generated at the INL Site will be disposed of as part of the proposed action. Processing waste to allow disposition as transuranic waste is not within the scope of this EA. The scope of the proposed action only addresses the need for final disposition of remote-handled LLW waste generated by various operations at various facilities at the INL Site.

15. Comment

With the INL currently cleaning up the site and reduction of the “footprint”, it seems that DOE is slowly increasing the footprint again by developing another waste site. What guarantee can you provide that this type of storage of waste would not migrate residual contamination to the INL aquifer? The Tribes have a concern of the long term integrity of the liners and vaults ensuring the protection of the aquifer and the environment against radioactive leaking or migration?

15. Response

DOE has the responsibility to carry out certain assigned missions on behalf of the citizens of the United States. Radioactive waste is unavoidably generated at INL by the completion of some of these missions, and this waste must be disposed of in an environmentally safe manner. The future INL need for disposal capacity for remote-handled LLW will not go away. This NEPA analysis presents the requisite hard look at disposal alternatives and their potential environmental impacts. DOE decision makers will use this and other relevant information to adopt the best plan.

DOE prepared the EA and included all information necessary to determine the potential for significant environmental impact. DOE used state-of-the-art science, technology, and expertise to assure quality in the impacts analyses. The analyses indicate that the proposed action will not have a significant impact.

16. Comment

The Air Quality Program recommends that a full EIS be prepared for this large and significant project which may have adverse impacts on the Shoshone-Bannock Tribes. NEPA requires that DOE prepare a full EIS if: The proposed action (1) is federal, (2) qualifies as “major,” and (3) have a significant environmental impact. Below we address each of these three requirements that support a full EIS:

(1) Federal: This is a Federal project which will be undertaken by the U.S. DOE.

(2) Major: Does the project qualify as “major”? It does for the following reasons: It is a multi-million dollar project that will handle and store radioactive waste for between 20 and 30 years, followed by at least a century of monitoring and up-keep. It is controversial in the sense that one of the alternatives is to store the waste above the Eastern Snake River Aquifer of Idaho. Even if the “No Action” alternative is selected this radioactive waste must be dealt with, at a large cost, and in a controversial way.

16. Response

See response to National Environmental Policy Act Process comment 4, above.

17. Comment

(3) Potential For Significant Impact: (e) Resources Impacted: After reviewing the draft E.A. this proposed project meets the “significant Impact” threshold. The draft EA lists the following resources that may be affected: Water Resources, Air Resources, Ecological Resources (both vegetative and Wildlife), energy usage, and Accidents and intentional destructive acts. The above list of resources, demonstrates that the proposed project may impact a large number of resources important to the Shoshone-Bannock Tribes.

17. Response

See response to National Environmental Policy Act Process comment 6, above.

18. Comment

Incomplete or sketchy information in draft E.A.: In addition to the need for an EIS (and for more details in final E.A.) based on the aforementioned reasons, the DOE should undertake the EIS because the draft E.A. lacks details on several important aspects of the project. One information gap is a more detailed account of the RH-LLW sources, including the annual production levels from the various DOE facilities. The answer to the question as to which facilities would be most affected, and what are their future missions, and schedules --is not answered in the draft E.A. If information is provided in the EA-EIS, reviewers may offer to DOE suggestions to reduce this production and storage of waste that may sit above the Eastern Snake River Plain Aquifer. More detail may allow reviewers to offer up more or better alternatives than that proposed by DOE in this draft E.A. For example the draft E.A. reports that the Naval Nuclear Propulsion Program would be impacted by the lack of storage if the no action alternative were selected, but offers no detailed information on this facility's production levels, processes, or on-going waste-reduction efforts there.

18. Response

See response to National Environmental Policy Act Process comment 8, above.

19. Comment

One important aspect that is lacking is an alternative to concentrate some of the RH-LLW to TRU waste so that it could be shipped out of Idaho. Another aspect could be to study other storage options than that proposed in the E.A. The lack of detailed information on Nevada's site makes it too difficult for reviewers to compare the alternatives, because the draft E.A. has incomplete information on the resource impacts at the Nevada site. Since the Nevada site has been approved for handling and storing this type of waste, wouldn't there be cost savings to ship the waste to Nevada? The costs of each alternative needs to be provided.

19. Response

A description of DOE operations and activities that generate remote-handled LLW is provided in Section 2.1. Waste characteristics and generation rates are based on years of historical data and existing waste inventories sufficient to analyze the environmental impacts of the proposed action.

The scope of the proposed action only addresses the need for final disposal location of remote-handled LLW waste generated by various operations at various facilities on the INL Site. The environmental impacts from operating the facilities at the INL Site that will or may generate remote-handled LLW in the future are out of the scope of this EA.

Regarding the suggested alternative of storage, as stated in Section 2.4.1 of the EA, storage is not an alternative that meets the need for dependable and predictable disposal capability. The EA relies on existing NEPA documents approving disposal at NNSS and does not revisit the disposal decision. The final EA has been modified to clarify that no impacts to groundwater at NNSS are anticipated from disposal activities.

In response to other comments, additional information related to disposal of remote-handled -LLW waste at NNSS has been incorporated into the final EA.

Costs are not an area of environmental impacts assessed under NEPA. Costs, along with technical feasibility, are relevant to the selection of the range of reasonable alternatives and are considered as part of all information the decision maker uses to make a decision on the proposed action.

20. Comment

The draft EA does not specifically describe such variables we might see with each alternative selected from the Navy recapitalization EIS that is pending.

20. Response

As noted in the cumulative effects Section 4.4, the potential for increased remote-handled LLW generation from the Navy recapitalization project is bounded by the groundwater analysis and accident scenarios used in this EA.

21. Comment

In summary, we strongly advocate for a full EIS, as this Federal project is a major undertaking and one that has significant impacts. The draft E.A. has important information gaps and lacks alternative selections. The Final E.A. and EIS needs to look at ways to get waste out of Idaho, including concentrating some of the waste to meet TRU waste definitions.

21. Response

DOE disagrees with the comment. See response to National Environmental Policy Act Process comment 1, above.

22. Comment

The proposal to build a new nuclear waste dump at the Idaho National Laboratory must be analyzed in a full environmental impact statement. The current environmental assessment is not adequate for a facility that might receive very radioactive waste for up to fifty years for disposal above the Snake River Aquifer, a sole source aquifer for 300,000 people, until the end of time.

The National Environmental Policy Act is set up to analyze the effects of major federal actions to help agencies make better decisions. The heart of the process is the analysis and comparison of the effects of reasonable alternatives. In this case, the Department of Energy is considering the disposal of enough highly radioactive waste to fill 50 two-car garages above one of the largest aquifers on the North American continent. Such an action would be a major federal action. Furthermore, the NEPA process is a public process. Its analyses and comparisons must take place within the four corners of a NEPA document that is available to the public. Much might be known about the proposed action, its alternatives, and their impacts, but it is not sufficient under NEPA if it is not presented to the public.

22. Response

See response to National Environmental Policy Act Process comment 1, above.

23. Comment

The current EA deliberately avoids evaluating the impacts of one of the alternatives: disposal of remote-handled low level waste at Nevada National Security Site. It is therefore not possible to compare those impacts with disposal at one of two sites at INL. The current EA makes assertions about the physical characteristics (e.g., debris) of waste streams produced more than fifty years from now but it has no details about what processes, projects, or facilities generate the waste. There is mention of cumulative impacts to Idaho's drinking water without information about what the current impacts are or how they are produced or how long they will continue. As already noted, there is no mention of groundwater impacts at NNSA, the alternative, at all.

There's a strong implication that the nuclear navy (and the other INL generators?) are unable to ship RH LLW, but also a bit of analysis of the impacts of transportation to the NNSS, which leads to some lingering confusion. There are some (very) conceptual renderings of a disposal facility at INL, which is more than is offered for the NNSS. There's no discussion of what RH LLW is generated at INL now, so it's not clear whether the Radioactive Waste Management Complex closure is the trigger for the current proposal or if it is based on fairly speculative projection of future waste generation. There are no cost comparisons. All in all, there were as many details about the proposed action in a slide show (11.

15.2011) the DOE presented to the INL Environmental Management Citizen Advisory Board as there are in the current draft EA.

23. Response

DOE disagrees with the comment that it deliberately avoided evaluating impacts of the NNSS alternative. However, DOE has noted in the final EA (see Section 4.2) that there would be no groundwater impacts from waste disposal at NNSS.

Chapter 1 describes the types of programs that generate remote-handled LLW and that the closure of the Active Low-Level Waste Disposal Facility at the Radioactive Waste Management Complex is the trigger for the need for disposal replacement capacity.

Cumulative impacts to groundwater were analyzed in Appendix A of the *Evaluation of Groundwater Impacts to Support the National Environmental Policy Act Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project* (INL/EXT-10-19168, Revision 3), which is summarized in Table 4-6 in Section 4.4 of the EA. There would be no groundwater impacts from waste disposal at NNSS (see Section 4.2.1 of the EA).

The scope of the proposed action only addresses the need for a final disposal location of remote-handled LLW waste generated by various operations at various facilities on the INL Site. The environmental impacts from operating the facilities at the INL Site that will or may generate remote-handled LLW in the future are out of the scope of this EA.

DOE disagrees with the comment that there is a strong implication that waste is unable to be shipped to NNSS. The discussion in Section 2.4.3 of the EA details how DOE estimated the number of shipments needed for Alternative 2 and what actions would be necessary to accomplish the alternative. This is no different than detailing what construction needs to occur at the INL Site to implement Alternative 1.

Costs are not an area of environmental impacts assessed under NEPA. Costs, along with technical feasibility, are relevant to the selection of the range of reasonable alternatives and are considered as part of all information the decision maker uses to make a decision on the proposed action.

24. Comment

Even an adequate EA would not be sufficient for the current proposal. A full environmental impact statement is required.

24. Response

See response to National Environmental Policy Act Process comment 1, above.

25. Comment

The above named proposed project located at the INL is within the inherent ancestral lands of the Shoshone and Bannock people and holds important cultural properties of the Shoshone and Bannock People. Wildlife reign freely through the INL lands and provide subsistence value to tribal member hunters off the INL lands. Cumulative impacts of subsistence game crossing the INL and seepage of contamination into the aquifer cause for concern for the Tribes.

25. Response

Based on the findings for potential impacts associated with previous projects, in addition to the overall state of preservation of the site as a whole, the cumulative impacts of the proposed facility are anticipated to be small. Although construction and operation of the remote-handled LLW disposal facility would increase habitat loss and fragmentation, it is unlikely that this would have a substantial effect on wildlife because Candidate Sites 1 and 2 are adjacent to or near existing industrial infrastructure in areas that are presently not dominated by sagebrush (Section 4.4). During the 50-year operational period, the facility will be fenced and will not provide suitable habitat. After facility closure, the disposal vaults will be covered with an earthen cap, which will allow re-establishment of native vegetation and provide a buffer from the waste to provide protection for the deepest burrowing animals and plant roots.

Regarding concerns about seepage into the aquifer, DOE prepared the EA and included all the information necessary to determine the potential for significant environmental impact to the aquifer. The science, technology, and expertise applied to arrive at this determination were state-of-the-art and rigorously administered to produce data of assured quality. The analyses indicate that the proposed action, including cumulative impacts, will not have a significant impact. These analyses considered the reality that many thousands of years into the future, DOE expects that the closed disposal facility will degrade and lose its integrity. Modeling of potential contaminant migration into groundwater to determine impacts from disposed waste after the disposal vaults have lost their integrity shows that predicted radionuclide concentrations in the groundwater would be much less than regulatory maximum contaminant levels. The all-pathways dose to a hypothetical maximally exposed individual (residing 100 meters from the disposal facility) peaks several thousand years in the future and is demonstrably insignificant.

Please also refer to the DOE response to Analysis Related – Groundwater comment 2.