



U.S. Department of Energy  
Idaho Operations Office

# Idaho National Laboratory Radiological Response Training Range Environmental Assessment

Final

October 2010





DOE/EA-1776

**Idaho National Laboratory  
Radiological Response Training Range  
Environmental Assessment**

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**Prepared for the  
U.S. Department of Energy  
Idaho Operations Office**

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## ACRONYMS

AGL	Above Ground Level
BEA	Battelle Energy Alliance
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
DoD	U. S. Department of Defense
DHS	U. S. Department of Homeland Security
DOE	U. S. Department of Energy
DoJ	U. S. Department of Justice
DOT	U. S. Department of Transportation
EOD	Explosive Ordnance Disposal
EA	Environmental Assessment
EDE	Effective Dose Equivalent
EPA	U. S. Environmental Protection Agency
ESA	Endangered Species Act
FHBC	Fort Hall Business Council
GHG	Greenhouse Gas
INL	Idaho National Laboratory
MFC	Materials and Fuels Complex
NAAQS	National Ambient Air Quality Standards
NERP	National Environmental Research Park
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standard for Hazardous Air Pollutants
NRAD	Neutron Radiography Reactor
NRC	U. S. Nuclear Regulatory Commission
PPE	Personal Protective Equipment
PSD	Prevention of Significant Deterioration
RRTR	Radiological Response Training Range
RWMC	Radioactive Waste Management Complex
SRPA	Snake River Plain Aquifer
STP	Sewage Treatment Plant
TAN	Test Area North
TSF	Technical Services Facility
UAV	Unmanned Aerial Vehicles
U. S.	United States

## GLOSSARY

Attainment Area: An area considered to have air quality as good as or better than the National Ambient Air Quality Standards (NAAQS) as defined in the Clean Air Act (CAA). An area may be an attainment for one pollutant and a nonattainment area for others.

By-Product Material: In this document, the term "by-product material" under the Atomic Energy Act) refers to any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material.

Cairns: Rock piles constructed historically and prehistorically to mark features on the landscape, such as travel corridors, caves, or campsites.

Clean Air Act (CAA): The Federal Clean Air Act, or "CAA," is the basis for the national air pollution control effort. Basic elements of the act include national ambient air quality standards for major air pollutants, hazardous air pollutants, state attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions.

Clean Water Act (CWA): The Clean Water Act is the primary federal law in the United States (U. S.) governing water pollution. Commonly abbreviated as the "CWA," the act established the goals of eliminating releases to water of high amounts of toxic substances, eliminating additional water pollution by 1985, and ensuring that surface waters would meet standards necessary for human sports and recreation by 1983.

Comprehensive Environmental Response, Compensation, and Liability Act: The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as "Superfund," created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases of hazardous substances that may endanger public health or the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous wastes; and established a trust fund to provide for cleanup when no responsible party could be identified.

Curie: A unit of radioactivity equal to  $3.7 \times 10^{10}$  disintegrations per second.

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, or EDE, includes the committed EDE from internal deposition of radionuclides and the EDE due to penetrating radiation from sources external to the body. The EDE is expressed in units of rem.

National Ambient Air Quality Standards (NAAQS): Standards established by the U. S. Environmental Protection Agency (EPA) under authority of the CAA that apply for outdoor air throughout the country. Primary standards are designed to protect human health with an adequate margin of safety, including sensitive populations (such as children, the elderly, and individuals suffering from respiratory disease). Secondary standards are designed to protect public welfare from any known or anticipated adverse effects of a pollutant.

National Environmental Research Park: Idaho National Laboratory (INL) is categorized as National Environmental Research Park, or NERP. NERPs are outdoor laboratories that provide opportunities for environmental studies on protected lands that act as buffers around U. S. Department of Energy (DOE) facilities. DOE uses these research parks to evaluate the environmental consequences of energy use and development, as well as strategies to mitigate these effects and demonstrate possible environmental and land-use options. The seven NERPs located in the U. S. are administered through their regional DOE Operations Offices and are coordinated and guided by the Office of Science.

National Emission Standards for Hazardous Air Pollutants for Radionuclides (Rad NESHAPS): The CAA requires the EPA to regulate airborne emissions of hazardous air pollutants (HAPs) (including radionuclides) from a specific list of industrial sources called "source categories." Each source category that emits radionuclides in significant quantities must meet technology requirements to control them and is required to meet specific regulatory limits. These standards are the National Emission Standards for Hazardous Air Pollutants for Radionuclides.

Nonattainment Area: The CAA and its Amendments of 1990 define a “nonattainment area” as a locality where air pollution levels persistently exceed NAAQS (see glossary), or that contribute to ambient air quality in a nearby area that fails to meet those standards. The EPA gives nonattainment areas a classification based on the severity of the violation and the type of air quality standard they exceed. EPA designations of nonattainment areas are only based on violations of national air quality standards for carbon monoxide, lead, ozone (1-hour), particulate matter (PM-10), and sulfur dioxide.

Prevention of Significant Deterioration: This term applies to new major sources or major modifications at existing sources for pollutants where the area the sources are located is in attainment or unclassifiable with the NAAQS. It requires the installation of Best Available Control Technology, air quality analysis, additional impacts analysis, and public involvement.

Radioactive Materials: For the purpose of this document “radioactive materials” include (1) sealed radioactive sources; (2) special form sealed radioactive sources; (3) contained (or unsealed) radioactive sources; and (4) dispersible radioactive material. Project personnel would use these materials to produce radiation fields for detection and training during exercises.

Sealed Radioactive Sources – These sources are small metal containers in which a specific amount of a radioactive material is sealed. Manufacturers of these devices must demonstrate protectiveness to receive a license to manufacture and sell them.

Special Form Sealed Radioactive Sources – Commercially manufactured sealed radioactive sources that meet the test requirements specified by the U. S. Nuclear Regulatory Commission (NRC) under 10 CFR 71.25. Special form sealed radioactive sources are preferred for temporary placement in outdoor areas due to their robustness of construction to simulate external radiation fields during tests.

Contained (or Unsealed) Radioactive Sources – A contained or unsealed radioactive source is encapsulated radioactive material that cannot escape to the environment and cause contamination but does not meet the regulatory standards (10 CFR 71.25) for sealed sources. Some radioactive materials that may be used must be produced at the INL for measurement. These include sources such as irradiated glass that contain trace quantities of isotopes that may be of interest to specific scenarios. INL must produce many of these sources, since they are not all available commercially. The adequacy of the source containment is evaluated on a case-by-case basis prior to use during training exercises. INL’s Radiological Protection Program would evaluate the adequacy of the containment and authorize the use during an exercise.

Dispersed Radioactive Material – Activated potassium bromide (KBr) that project personnel would disperse at the training sites. This is a short-lived radioactive by-product material that decays to background levels in about two weeks.

Radiological Work Permit: The RWP is an administrative mechanism used to establish radiological controls for intended work activities. The RWP informs workers of area radiological conditions and entry requirements and provides a mechanism to relate worker exposure to specific work activities.

Vadose Zone: The region of aeration above the water table, which extends from the top of the ground surface to the water table.

## EXECUTIVE SUMMARY

An important aspect of United States (U. S.) national security is to develop and maintain an effective response capability for major radiological incidents. Developing and maintaining the capability to identify the origin of material in response to one of these incidents is a national priority as noted in the Nuclear Forensics and Attribution Act of 2010 (Public Law 111-140). Idaho National Laboratory (INL) has the technical resources necessary to provide direct support to federal agencies responsible for the nuclear forensics mission. Further, INL has a unique capability to provide a large outdoor testing and training range where short-lived dispersed radioactive materials can be disseminated or radioactive sources (i.e., *sealed*, *special form sealed*, and *contained*, see glossary) placed to provide direct support to federal agencies responsible for the nuclear forensics mission.

The objective of this environmental assessment (EA) is to evaluate the potential environmental impacts of creating and operating a radiological response training range by evaluating two alternative approaches to achieve the proposed action and a ‘No Action’ alternative. The U. S. Department of Energy (DOE) reviewed several possible on-site and off-site alternatives and determined that the reasonable alternative included two on-site locations; no off-site locations met the site-selection criteria.

Alternative 1 (North and South Training Ranges) focuses radiological activities near Test Area North (TAN) (North Training Range) and near the Radioactive Waste Management Complex (RWMC) (South Training Range). DOE divided the on-site locations into two sub-alternatives: Alternative 1a, ‘Maximize Project Flexibility,’ and Alternative 1b, ‘Minimize Project Impacts.’ This EA describes the environmental impacts of the two sub-alternatives and the ‘No Action’ alternative on air, water, biological, and cultural resources.

These sites would be used to train personnel, test sensors, and develop detection capabilities (both aerial and ground-based) under a variety of scenarios in which *radioactive materials* (see glossary) are used to create a radioactive field for training in activities such as contamination control, site characterization, and field sample collection activities. A typical training exercise would include its own prepared plan and schedule, and involve up to 75 people and 15 vehicles at the range proper.

The dispersed radioactive materials source term was based on the dispersal of 1 *curie* (see glossary) of irradiated potassium bromide. The radiation dose from the release of this source term was modeled for airborne (inhalation), surface (ingestion, inhalation, and external exposure), and ground water (ingestion) release. The CAP88-PC Version 3.0 code was used to compute doses from the atmospheric pathway, GWSCREEN was used to compute groundwater concentrations and doses, and RESRAD Version 6.5 code was used to compute surface pathway doses to an individual living at the range after testing has been completed. The sum of the atmospheric, surface, and groundwater models show the public dose would be about 0.01% of the INL Administrative Control Level for the Public.

While activities would occur in relatively disturbed areas, the surrounding and nearby areas consist of natural vegetation containing wildlife and cultural resources. The impact on Greater sage-grouse and pygmy rabbits and their habitat differs between alternatives, including the sub-alternatives 1a and 1b. Alternative 1a would remove sage-grouse and pygmy rabbit habitat and cause fragmentation of the remaining habitat within the proposed training range. Alternative 1b would not remove sage-grouse and pygmy rabbit habitat or increase habitat fragmentation. Proposed operational controls would minimize potential impacts to sensitive resources, such as sage-grouse, pygmy rabbits, migratory birds, and cultural and archaeological resources.



# Idaho National Laboratory Radiological Response Training Range Environmental Assessment

## 1.0 PURPOSE AND NEED

An important aspect of United States (U. S.) national security is to develop and maintain an effective response capability for major radiological incidents. Developing and maintaining the capability to identify the origin of material in response to one of these incidents is a national priority as noted in the Nuclear Forensics and Attribution Act of 2010. Idaho National Laboratory (INL) supports training personnel, technology evaluation, and demonstration for federal agencies responsible for the nuclear forensics mission. INL support for these agencies is authorized under the Economy Act of 1932, as amended (31 U.S.C. 1535), and Section 309 of the Homeland Security Act of 2002 (Public Law 107-296, 2002). Under these authorities, the U. S. Department of Homeland Security (DHS) and other federal agencies may access and use the highly specialized expertise and unique capabilities and facilities resident at U. S. Department of Energy (DOE) national laboratories and sites in carrying out their missions.

In the event of an incident, U. S. agencies/authorities must be able to quickly gather and evaluate nuclear forensic information. To maintain this capability, the U. S. national security agencies need to be able to conduct safe, well-characterized, and orchestrated training exercises and technology demonstrations in controlled radiological environments. Responders to any major radiological incident must be able to use a variety of specialized equipment in an effective, timely, and integrated manner to characterize the event.

The INL has supported several exercises and training venues for the nuclear forensics and emergency response communities (i.e., DOE Radiological Assistance Program, DOE's Federal Radiation Monitoring and Assessment Center, DOE Aerial Measurements System, U. S. Department of Defense [DoD] and Department of Justice [DoJ] explosive ordnance disposal [EOD] teams, and National Guard Civil Support teams).<sup>a</sup> With the exception of a small exercise held at INL in 2008, training and exercises conducted by the forensics community have been limited to gamma radiation fields produced using large *special form sealed radioactive sources* (see glossary). Current training scenarios are deficient since they have not used dispersed radioactive materials to develop and test advanced response skills. These skills include radiological protection, decontamination and contamination control, field characterization, and sample collection.

This environmental assessment (EA) evaluates constructing and operating training ranges where field exercises would simulate conditions expected during a major radiological incident. INL has been the only DOE laboratory to conduct indoor and outdoor exercises using specifically designed and characterized radiation/contamination fields that used radioactive materials and sources to support the unique needs of agencies responsible for nuclear forensics. This range would also support larger-scale training, exercises, and technology development activities that emulate radiation and contamination fields that would be encountered by emergency responders.

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a. In addition, other Federal Agencies that deal with consequence management, such as the U. S. Environmental Protection Agency (EPA), have expressed interest in utilizing the Radiological Response Training Range (RRTR).

## 2.0 ALTERNATIVES

### 2.1 Background

DOE proposes to locate a Radiological Response Training Range (RRTR) on the INL Site. The INL, an 890-square-mile reservation in southeastern Idaho (see Figure 1), is managed and operated by Battelle Energy Alliance (BEA). INL hosts the materials, facilities, and people needed to accommodate a radiological response training and demonstration range. INL also has a large diverse inventory of radioactive sources and materials that, in conjunction with the ability to produce short-lived radioisotopes, would establish a well-characterized environment representative of agency-specified scenarios and training objectives.

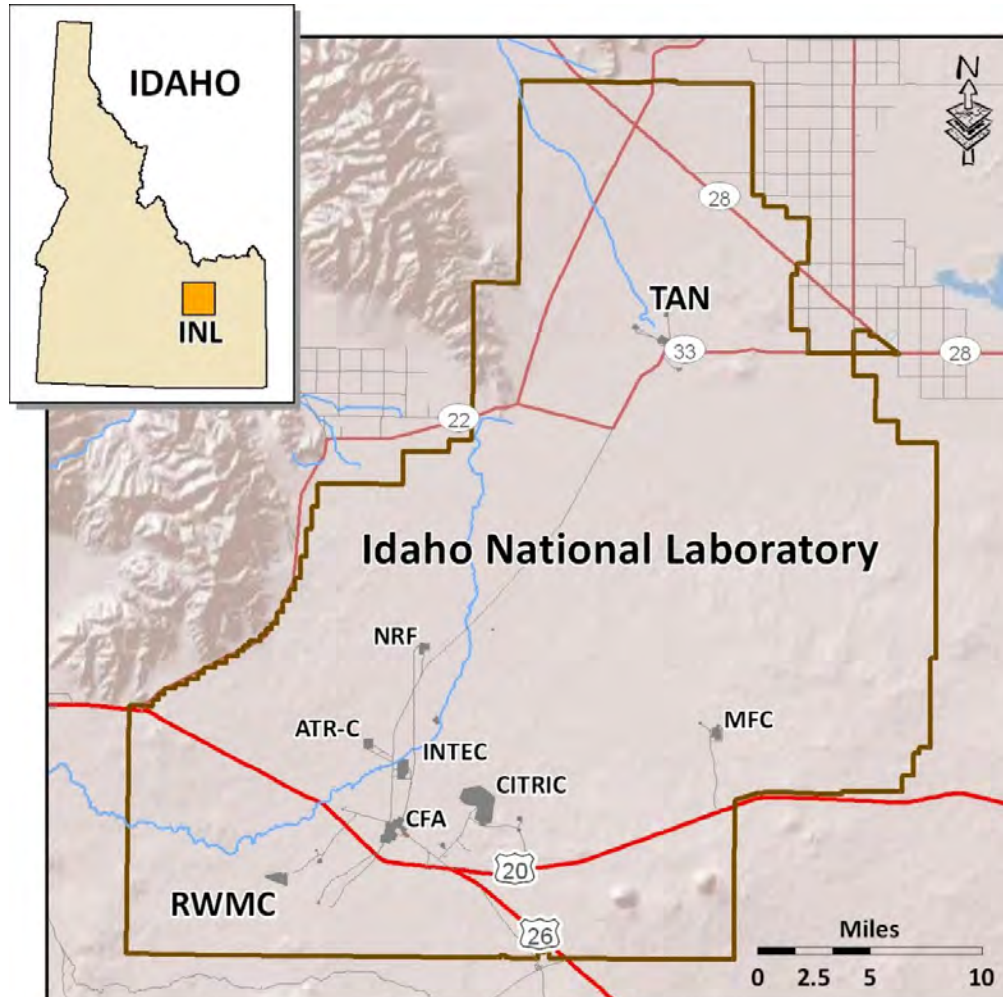


Figure 1. Idaho National Laboratory.

As used in this document, the term “dispersed radioactive material,” is a general reference to radioactive “byproduct material” governed by the Atomic Energy Act and regulated by DOE (specifically, potassium bromide [KBr]) that decays to background levels in about two weeks. KBr, when irradiated in a reactor such as INL’s Neutron Radiography (NRAD) reactor, will produce a number of radioactive isotopes that are considered “short-lived” radioactive isotopes. The irradiation will also produce an ultra-trace quantity of three long-lived isotopes (i.e., Ar-39, K-40, and Cl-36). All three occur naturally (Clark and Fritz, 1997). Ar-39 is a noble gas that dissipates in air, while K-40 and Cl-36 occur in such small amounts that they are not distinguishable from the natural background radiation. The

short-lived isotope with the longest half-life produced by the irradiation of the salt, excluding Ar-39, K-40, Cl-36, is Br-82, which has a half-life of 1.47 days (35.3 hours). Br-82 contributes the most to the overall decay rate of the activated compound and defines the period of time that the compound remains radioactive—as a rule of thumb—10 half-lives can be used to estimate the amount of time that the Br-82 will take to decay to the stable isotope Kr-82. For KBr, after 353 hours, or about 15 days, the quantity of radioactive material remaining from use in the training exercises will be no longer measurable from natural background radiation.

The objective of this EA is to evaluate the potential environmental impacts of creating and operating a radiological response training range by evaluating and comparing alternative approaches to achieve the proposed action and ‘No Action’ alternatives. This document was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (Public Law 91 190), as amended; the Council on Environmental Quality’s (CEQ) NEPA Regulations (40 Code of Federal Regulations [CFR] Parts 1500 1508); DOE Order 451.1; and DOE NEPA Implementing Regulations (10 CFR Part 1021).

INL has an extensive inventory of radiological material and sources, and has the unique ability to produce the high purity short-lived radioisotopes (i.e., KBr) that will be necessary to support the envisioned radiological exercises. The NRAD reactor and Analytical Laboratory at INL’s Materials and Fuels Complex (MFC) are assets that can readily prepare and produce the irradiated KBr on demand and without introduction of unwanted isotopes with longer half-lives.

## 2.2 Range of Reasonable Alternatives and Siting Analysis Criteria

The CEQ’s NEPA regulations require agencies to identify and assess reasonable alternatives (40 CFR 1500.2(e)) when proposing new activities. DOE has developed a set of site-selection criteria, based on programmatic objectives to help identify alternatives, meet the purpose and need, and satisfy program requirements (see inset box on the next page). DOE searched for an appropriate training range site at INL because one of the most important criteria is access to a facility capable of producing short half-life radioactive material<sup>b</sup>. DOE also looked at other DOE facilities, but found that such facilities did not meet the program expectations of conducting and supporting the described training that can be accomplished at INL. Further, no other DOE location satisfies all of the listed criteria.

With respect to the INL Site, DOE looked for areas that would minimize potential environmental impacts from these proposed activities. DOE considered disturbed sites at INL, including legacy-contaminated areas such as *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (see glossary) sites, gravel pits, other “ranges” or test areas, and recently demolished facility areas. DOE eliminated using CERCLA sites because: (1) the program required an accurate determination of the radionuclide inventory in an area for a broad range of radionuclides and the characterization data does not meet project requirements due to the presence of legacy radionuclides that are stratified at different soil depths and may confound test activities; (2) the background contamination may complicate quantifying the activated KBr; and (3) they would not represent sites with only fallout and radioactive materials dispersed on surfaces.

DOE chose to analyze a set of three locations as the proposed alternative that would accomplish the agency’s purpose and need and meet all of the siting criteria (see Section 2.3). In addition, based on biological and cultural resource surveys, DOE chose to expand alternative 1 to two sub-alternatives related to the north location: (1) ‘maximizing training flexibility’ and (2) ‘minimizing project impacts.’ In addition, per CEQ regulations, this document analyzes a ‘No Action’ alternative (see Section 2.4) as well.

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b. **Note:** Because the materials needed for testing decay quickly, it is essential to have the reactor producing and the laboratory confirming the purity of the short-lived isotopes close to the training location. INL personnel have unique expertise and training in producing and handling radioactive materials to support the described activities.

## 2.3 Alternative 1 – North and South Training Ranges

Alternative 1 establishes two outdoor Radiological Response Training Ranges—a North Training Range and a South Training Range. The North Training Range consists of a short section (<1 mile) of T-28 (north of the gravel pit), a section (~0.4 miles) of access road (south of the gravel pit), an arching road across the top of the area (~1.0 mile), the T-28 Gravel Pit (9 acres), a berm/ditch structure (0.75 miles), a large area (825 acres) surrounding the gravel pit, the TAN parking lot (~2.5 acres), and an area consisting of the old TAN Facility (23.5 acres) (see Figure 2). The South Training Range consists of a radiological work area (~7.5 acres), a smaller area (~3.0 acres) just adjacent to and west of the radiological work area, two small areas (~3.4 and 0.3 acres) along the access road, and the parking area (~5.0 acres) just south of INL's Radioactive Waste Management Complex (RWMC) (see Figure 2). INL would continue to use the gravel pit to mine gravel for on-site uses; however, access may be restricted during and after training exercises while radioactive levels decay to pre-test background levels.

These sites would be used to train personnel, test sensors, and develop detection capabilities (both aerial and ground-based) under a variety of scenarios using (1) sealed radioactive sources (see glossary), (2) *Special Form Sealed Radioactive Sources* (see glossary), (3) *Contained (or Unsealed) Radioactive Sources* (see glossary), and (4) *dispersed radioactive material* (see glossary). Training would include: (1) evaluation of command and control protocols; (2) site characterization with aerial surveys and remote radiation measurements on well-defined gamma emitting radiation fields; (3) activities that support ground-based sample collections; and (4) contamination control and decontamination operations. The different locations allow range users flexibility in planning their training activities. INL personnel would conduct training and demonstrations on an as-needed basis and incorporate the respective areas that best satisfy the specific training objectives. Project activities include: (1) preparing the site; (2) operating the site; (3) performing training exercises at the site; and (4) post training and post exercise activities (see Table 1 for specifics). Table 2 (in Section 2.5) describes “operational controls” necessary 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.

### Site Selection Criteria

- Location in close proximity to facilities that produce the radioactive materials:
  - to minimize shipping distances
  - to minimize loss of activity from radioactive decay of the materials.
- Location in close proximity to facilities that can produce a diverse inventory of radioactive materials.
- Locations must not have legacy radionuclides that may confound sample collection and field characterization activities.
- Locations must have specialized infrastructure and expertise to handle these materials in choreographed training and exercise scenarios.
- Test areas must be able to tailor the environment to required scenarios by varying contamination levels, patterns, and emplacement of radioactive sources with varied dispersal methods.
- Locations must be remote and isolated from the public.
- Locations must be semi-arid to minimize the likelihood of short-lived dispersed contamination being diluted or washed away.
- Locations must be able to accommodate aircraft (both manned and unmanned) for aerial surveillance and characterization.
- Locations must be able to restrict access until radiation levels have returned to background levels (about two weeks).
- Locations must provide for sufficient staging area to support assembly and command post operations.
- Locations must provide readily accessible radiological facilities (i.e., hot cells, radioanalytical laboratories, etc.) and forensics expertise necessary to design and choreograph, setup, and execute a variety of exercise scenarios and demonstrations.

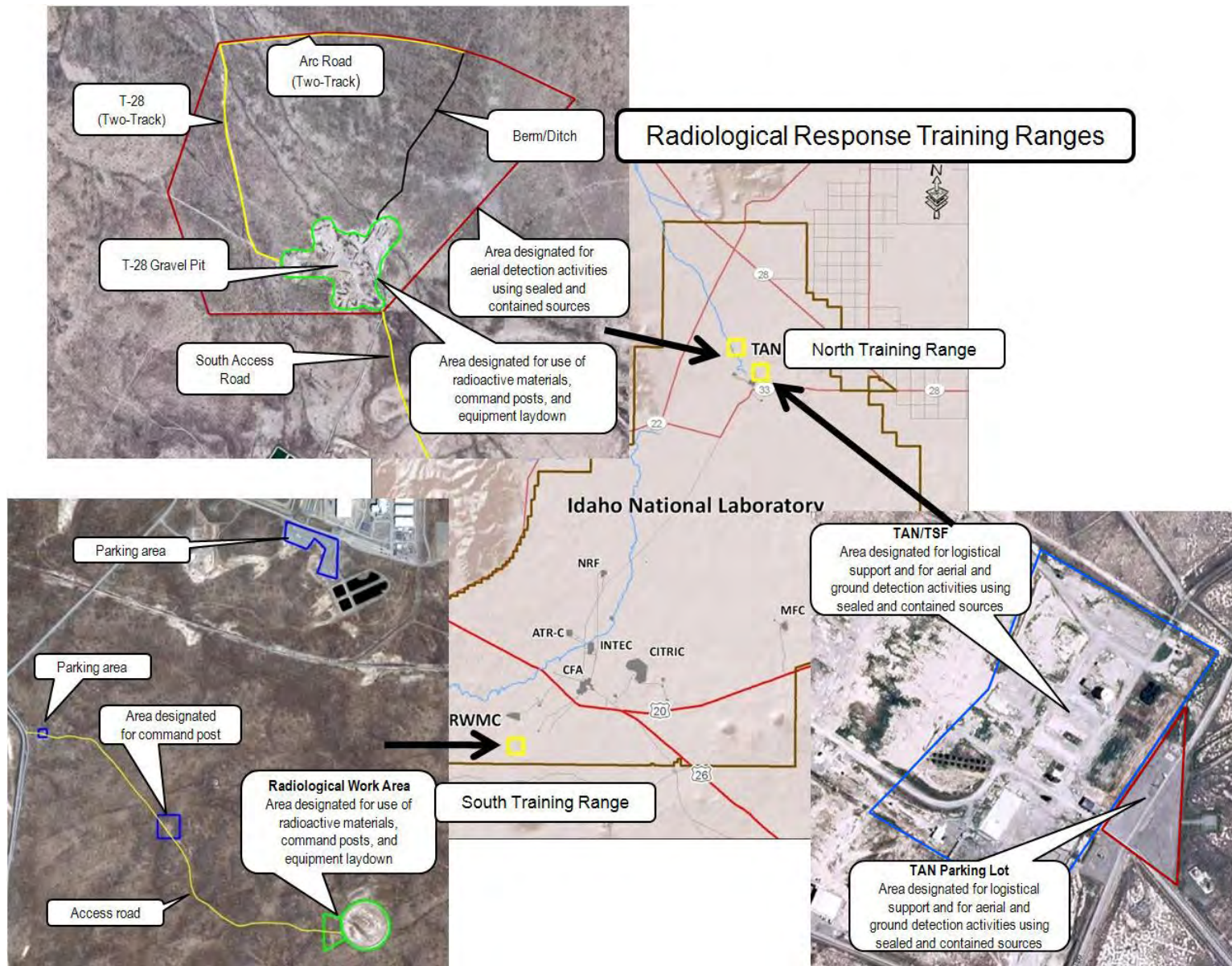


Figure 2. INL's Radiological Response Training Range.

Table 1. Project activities related to (1) preparing, (2) operating, (3) training, and (4) post training and post exercises activities at the sites.

<b>Activities to Prepare Sites</b>
<ul style="list-style-type: none"> <li>• Contour the gravel pit area to grade/compact the earth.</li> <li>• Mow vegetation (grasses and brush) where project activities would place command posts or laydown areas.</li> <li>• Use about 600 gallons/test water to apply the KBr. Store water in several 200–500 gallon polyethylene containers on-site. Apply about 1000 gallons/day of water for dust control on roadways and parking lots.</li> <li>• Construct small temporary structures or appropriate props to simulated urban environments.</li> <li>• Establish tent set-up areas for decontaminating personnel and equipment.</li> <li>• Establish a base area for tents or trailers to support equipment storage, mission planning and data assessment activities, communication activities, and sleeping and eating accommodations.</li> <li>• Conduct pre-survey (i.e., soils, etc.) for legacy radioactive contaminants and as appropriate surveys for cultural and biological resources (i.e., archaeological and nesting bird surveys). <b>Note:</b> Surveys for radioactive contaminants and cultural resources only occur once; however, nesting bird surveys may need to occur throughout the nesting season depending on the frequency of project activities in the area.</li> </ul>
<b>Operating Activities</b>
<ul style="list-style-type: none"> <li>• Control site access for security in accordance with a project security plan</li> <li>• Irradiate KBr at an irradiation facility (project personnel receive a 'purity statement' attesting to the purity of the isotope, assuring that project personnel know the isotopes produced during irradiation).</li> <li>• Determine the maximum amount of KBr salt (up to 500 grams, but less than 1 curie, [see glossary]) to be used for each test and identify/quantify any chemical contaminants present.</li> <li>• Transport the KBr to the testing site using U. S. Department of Transportation (DOT) approved methods and transport containers.</li> <li>• Verify the curie content and isotopic distribution.</li> <li>• Disperse the short-lived KBr in accordance with scenario requirements. It is expected that 12 or fewer tests would occur annually. These tests may include:             <ul style="list-style-type: none"> <li>○ Application as powders using spreaders</li> <li>○ Dissolving in water and applying with sprayers (for precise control of KBr levels and deposition pattern)</li> <li>○ Using CO<sub>2</sub> or compressed air gas jet to disperse the KBr radionuclide as a powder with a specified particle size without explosive residues</li> <li>○ Using explosives, such as C-4 or equivalent (about ½-pound), to disperse the KBr radionuclide and the materials.</li> </ul> </li> <li>• Radioactive sources may be used to calibrate instruments and radioactive materials may be used as training materials. The following list is representative, but not a comprehensive sampling, of isotopes that may be used for training: <sup>137</sup>Cs, <sup>60</sup>Co, <sup>192</sup>Ir, <sup>75</sup>Se, <sup>226</sup>Ra, and isotopes of U, Pu, Am, and Th (<i>Note: Source material under the Atomic Energy Act is uranium, thorium, or any other material which is determined by the Commission to be source material; or ores containing one or more of the foregoing materials, in such concentration as the Commission may determine from time to time</i>). Project personnel would use the INL radiological control and work permit process with other hazard identification and mitigation procedures to select and control the isotopes used for training events.</li> <li>• Dispersal of KBr would occur <u>only</u> when wind speeds are less than 10 miles per hour. Wind speed would be monitored and dispersal of KBr would be terminated if wind speeds exceed 10 miles per hour. Project personnel will use a hand held anemometer, such as the Speedtech Windmate 300. These hand held instruments have an accuracy within three percent. The height for wind speeds will be at 5 feet from ground level at the point of release. Project personnel will record wind speed and direction for each release, and will monitor at the time of release, or for spraying applications, the duration of the spraying period.</li> <li>• Project activities at the T-28 Gravel Pit would not occur during high water.</li> </ul>

**Training Exercise Activities**

- Use gasoline/diesel generators for electrical power.
- Use ground robots for sample collection and site surveillance activities.
- Use portable toilets or sanitary facilities.
- Place cargo containers, old vehicles, and similar objects in the training range to test sample collection methodologies.
- Use stakes to anchor equipment and spray paint, stakes, and rope to mark areas as appropriate.
- Collect ground soil samples and surface smears off objects located in the training range.
- Use surrogate materials (CaCl<sub>2</sub> etc.) to test application methods (~200 grams per test).
- Transport personnel and equipment in all-terrain or utility (gators) vehicles (ATVs) along approved roads, berms, T-28 Gravel Pit in the North Training Area, and the Radiological Work Area in the South Training Area for characterization and sample collection.
- Practice decontamination procedures on personnel and equipment with cloth and wet (water spray) methods.
- Dismantle, store, and dispose of temporary structures following testing.
- Store contaminated equipment and clothing until all detectable radionuclides are decayed then disposed as conditional waste or surveyed as free for release and reuse. Large contaminated equipment and structures will remain within the Test range until the INL Radiological Control personnel clears them for release. Contaminated clothing will be stored in radiation bags in cargo containers at the Test Range until disposed as low-level waste (MFC).
- Dispose cold waste through Waste Generator Services.
- Training personnel will collect samples as part of the exercise.
- Conduct interrogation and characterization of surrogate suspect packages and devices using a variety of high-energy techniques including X-ray, flash x-ray, portable isotopic neutron spectroscopy, and radiation generating devices.
- Use aerial platforms, including fixed or rotary wing (including fueling the helicopter) aircraft or unmanned aerial vehicles, to fly over the RRTR (T-28 Gravel Pit and surrounding area). These aircraft would have onboard sensor platforms to detect radioactivity and provide mapping of the area. Aircraft would fly over the range at varying altitude above ground levels. The flights may involve multiple flyovers in patterns or a single flyover. The number of flights per exercise would vary with the training requirements. Not all exercises would require aircraft activity.

**Post-Training and Post Exercise Activities**

- Radiation levels (as measured with a micro-rem meter) will be monitored after release of activated KBr, which is done to limit access to the area until released by Radiation Control.
- The continued use of the gravel pit to mine gravel will be on-going. Access would be controlled during and after training and exercises until the area is released for unrestricted use.
- Perform a Radiological Assessment (see Table 2).

**Waste Management:**

Operations at the RRTR would generate several types of waste: (1) common trash; (2) low-level radioactive waste; and (3) liquid waste. Common trash would consist of routine office trash, non-radioactive personal protective equipment (PPE) (i.e., gloves, etc), and PPE which was initially radioactive, but was stored until radioactive constituents decayed to background levels. Routine office trash and non-radioactive PPE would be disposed at the state-regulated INL landfill.

Non-liquid low-level radioactive waste would include PPE used to enter the training area and sample material generated during training (i.e., analytical waste, soil, and wipes). All non-liquid low-level radioactive waste would be stored in accordance with INL procedures to allow decay of the radioactive constituents. After decay, the non-soil solid waste would be disposed at the state-regulated INL landfill, and soil samples would be returned to the training area.

Liquid low-level radioactive waste would include water used to decontaminate personnel exiting the training area, liquid laboratory analytical waste, and sewage. All low-level decontamination water would

be stored in accordance with INL procedures to allow decay to background levels of the radioactive constituents.

After decay, the decontamination wastewater would be disposed to INL's Central Facilities Area (CFA) Sewage Treatment Plant (STP), since requirements do not allow disposal of decontamination wastewater off the INL Site. Project personnel would obtain approval from INL Facilities and Site Services for disposing decontamination wastewater to the CFA STP. Laboratory analytical waste would be solidified, allowed to decay if radioactive, and disposed at the state-regulated INL landfill; none of the laboratory waste is expected to be classified as hazardous waste.

A commercial vendor, holding a valid State of Idaho permit, would supply and pump portable toilets for the use of those participating in the training exercises at the remote locations (i.e., North and South Training Ranges). Wastewater pumped from the portable toilets must be discharged to the CFA STP. The CFA STP must be included on the commercial vendors' State of Idaho approved list of disposal sites prior to discharge. INL Facilities and Site Services must grant project personnel approval to dispose wastes to the CFA STP.

Project personnel would manage any hazardous waste generated in accordance with state regulations and disposed at a permitted off-INL facility.

### **Typical Training Exercise:**

Each training exercise could include up to 75 people and 15 vehicles at the range and conducted according to its own carefully prepared plan and schedule. Before the exercise, project personnel would perform a radiation background check and place monitoring equipment (such as air samplers for radiation monitoring) to verify initial conditions. Support equipment would include items such as radios, generators, and cargo containers, and command tents would also be set up as required. The radiological materials to be used would be carefully packaged and transported to the training ground and placed and/or dispersed according to the previously approved plan. The entire area would be carefully controlled in accordance with the security plan to prevent unauthorized persons from inadvertently entering. INL personnel would thoroughly brief training participants before each exercise about what is to take place, any potential hazards that may exist, and the expected course of the exercise events.

For some exercises, INL personnel would place sealed radioactive sources, special form sealed radioactive sources, and contained (or unsealed) radioactive sources in approved areas. The sealed and contained sources will be removed from the exercise area on a daily basis and before the training event has concluded. For other exercises, INL personnel would disperse minute quantities of material in a liquid sprayed on the ground, spread dry, or in the air (through aerosol or small explosive dispersal). Trainees would use specialized equipment (see Table 1, 'Training Exercise Activities') to characterize the radiation fields or areas, obtain radiation readings, train with disablement tools, and collect samples in the test area to gain proficiency in using instruments and techniques to characterize an incident scene. Laboratory personnel will take measurements on samples of KBr obtained from the field or radioactive source materials and will store samples in locked containers that are appropriately shielded. When possible, non-toxic shielding (i.e., tungsten, bismuth) will be used in place of lead shot/shielding.

The activities would continue for several days, depending on the exercise being conducted, and may include aerial-based monitoring of the test area. After each exercise, project personnel would remove and store test equipment and any sealed and contained source materials, and continue monitoring the test area until background radiation levels return to normal pre-test levels. DOE would then release the test area for unrestricted use.

This EA analyzes two sub-alternatives: Alternative 1a 'Maximizing Training Flexibility' (see Section 2.3.1, refer to Figure 2) and Alternative 1b 'Minimizing Project Impacts' (see Section 2.3.2, refer to Figure 2), as well as the following descriptions.



### 2.3.1 Alternative 1a – Maximizing Training Flexibility

This alternative gives DOE the maximum training flexibility in conducting training exercises, as described above and below at the following locations.

#### North Training Range:

- *T-28 Gravel Pit:* Project personnel would use the T-28 gravel pit for radiological work (i.e., dispersing irradiated KBr via mechanisms such as spraying [liquid] on the ground or dispersing [aerosol] through the air using explosives or other mechanisms [i.e., gas, guns, etc.], and placement of sealed radioactive sources, special form sealed radioactive sources, and contained (or unsealed) radioactive sources. Mowing, grading, and leveling of small areas of the pit to remove or reduce vegetation for command centers, radiological source preparation, decontamination areas, and equipment storage. Project activities would not extend beyond the obvious boundaries of the gravel pit; in cases where the boundary is not clearly defined, project personnel would work with those responsible for the pit to place markers to identify the boundary.
- *T-28 Road (North of the T-28 Gravel Pit):* Project personnel would use T-28 for placement of the command centers and for travel to the west side of the larger area. Project personnel would identify two locations (100 x 100-feet each) to place command centers along the road (some adjustments would occur to protect sensitive cultural resources or wildlife). Project personnel would place sealed radioactive sources, special form sealed radioactive sources, and contained (or unsealed) radioactive sources in the approved exercise areas. To meet wildland fire requirements, mowing may occur to allow for a 30-foot buffer within the area for the command posts; however, mowing will not occur in culturally sensitive areas.
- *T-28 Road and Access Road (South of the T-28 Gravel Pit) and the arc road and the berm/ditch structure (Northeast of the T-28 Gravel Pit):* Project personnel would use the berm leading out of the northeast part of the gravel pit, the arch road across the top of the area, and T-28 to travel around the area on small vehicles to place and detect sealed sources. Project personnel would leave vehicles on the road and travel on foot to place sealed sources within the larger area. Further, there would be no off-road vehicle travel, or any extended stay, along those two-track roads or berm/ditch (see Figure 3). Project personnel would limit travel on the berm/ditch to ATVs, but may use light trucks on T-28 and the arc two-track roads. In addition, project personnel would use the small disturbed areas just outside the south boundary of the gravel pit (right and left of the entrance road) as equipment laydown/storage areas along the southeast road for placement of command posts (100 x 100 feet).
- *Large area surrounding the T-28 Pit:* Project personnel would use this area to place sealed and contained sources; no other radiological work, other than allowed by the above description, would occur within this boundary. Entry to this area would be via foot traffic only.
- *Fly Over:* Project personnel would conduct flyovers of the North Training Range (T-28 Gravel Pit and surrounding area) to detect irradiated isotopes and sealed sources up to 12 week-long exercises per year:
  - Project activities may include using aerial platforms (such as fixed or rotary wing aircraft or unmanned aerial vehicles [UAV]) to fly over the RRTR. These aircraft would have sensor platforms to detect radioactivity and provide mapping of the area. Aircraft would fly over the range at varying above ground levels (AGL), possibly as low as 100 feet AGL or higher. The



Figure 3. Berm/Ditch, Looking from north to south from the ‘Arc’ road toward the T-28 Gravel Pit.

flights may involve multiple flyovers in patterns using paths determined by the trainees (e.g., along a north-south grid followed by an east-west grid on 100-meter flight line centers at multiple locations and speeds) or a single flyover. The number of flights per exercise would vary with the training requirements. Not all exercises would require aircraft activity. Some exercises may require multiple daily flyovers or flights during the exercise period. Fixed or rotary wing aircraft or UAVs may be leased and/or controlled by DOE or the group undergoing training (e.g., a military aircraft).

- Overflights would be restricted to North and South Training Ranges. Overflights of occupied facilities at the INL would not occur in relation to the RRTR activities without a separate evaluation. Some rotary wing aircraft may land at the INL for refueling. In addition, project activities involving UAV's may use INL's UAV landing strip.
- All aircraft operational activities would require extensive INL coordination and review processes, including flight planning, refueling plans, frequency reviews, security planning, and associated concerns.
- *TAN/TSF Area:* Project personnel would use the TAN/TSF area as equipment laydown and storage, including the storage and placement of sealed and contained sources for aerial and ground surveys.
- *TAN Parking Lot:* Project personnel would use the parking lot area to place sealed and contained sources; no other radiological work would occur in this area. Aerial and ground surveys to detect sealed and contained sources would occur in this area as well.

#### **South Training Range:**

- *Parking lot near RWMC:* Project personnel would use this area of the South Training Range for parking and non-radioactive equipment storage only. To meet wildland fire requirements, mowing may occur to allow for a 30-foot buffer within the current disturbed area; however, mowing will not occur in culturally sensitive areas. Project personnel would not use radioactive material in the parking lot.
- *Road to Radiological Work Areas:* Other than the —West Gate Area” and the —Center Area,” project personnel would only use the road to travel to and from the Radiological Work Area. Project personnel would not use areas along the road, other than those identified below, for purposes other than travel. Project personnel would not conduct any radiological work, including the use of sealed sources, in this area.
- *West Gate Area:* Project personnel would use this area for parking and the placement of command centers. Parking and the placement of the command centers would occur only on previously disturbed parts of the area. To meet wildland fire requirements, mowing may occur to allow for a 30-foot buffer within the current disturbed area; however, mowing will not occur in culturally sensitive areas. There would be no radiological work done at this area.
- *Center Area (along road to radiological work areas):* Project personnel would use this area for parking and the placement of command centers. Parking and the placement of the command centers would occur only on previously disturbed parts of the area. To meet wildland fire requirements, mowing may occur to allow for a 30-foot buffer within the current disturbed area; however, mowing will not occur in culturally sensitive areas. Project personnel would not conduct any radiological work, including the use of sealed sources, in this area.
- *Radiological Work Area:* Radiological work would occur within the radiological work area (see Figure 2 & Figure 4) Project personnel would use the radiological work area to prepare and disperse irradiated KBr via mechanisms such as spraying [liquid] on the ground or dispersing [aerosol] using other mechanisms and placement of sealed radioactive sources, special form sealed radioactive sources, and contained (or unsealed) radioactive sources. Project personnel would

restrict their activities in the area adjacent to and west of the radiological work area to previously disturbed areas. To meet wildland fire requirements, mowing may occur to allow for a 30-foot buffer within the current disturbed area; however, mowing will not occur in culturally sensitive areas. No work with sealed and contained sources would occur at this site outside the Radiological Work Area boundaries. Project personnel would place a camera (with a sealed source) on the berm, but would not go farther out beyond the berm.



Figure 4. South Training Range area during initial testing activities.

### 2.3.2 Alternative 1b – Minimizing Project Impacts

This alternative restricts project activities in the areas surrounding the T-28 Gravel Pit to minimize impact to biological and cultural resources. The project activities at the other locations (i.e., TAN/TSF, TAN Parking Lot, and the South Training Range) would remain the same as described in Alternative 1a.

#### **North Training Range:**

- *T-28 Road (North of the T-28 Gravel Pit):* Project personnel would not use T-28 for placement of the command centers; however, project activities would use T-28 (north of the gravel pit) to place and detect sealed sources in the larger area around the gravel pit. No activities along T-28 (north of the gravel pit) would require mowing to protect against wildland fire.
- *All other activities around the T-28 Gravel Pit would remain unchanged from Alternative 1a, including:*
  - *T-28 Gravel Pit*
  - *T-28 Road and Access Road (South of the T-28 Gravel Pit) and the arc road and the berm/ditch structure (Northeast of the T-28 Gravel Pit)*
  - *Large area surrounding the T-28 pit*
  - *Flyovers*
  - *TAN/TSF Area*
  - *TAN Parking Lot.*

#### **South Training Range:**

- Same as in Alternative 1a.

## 2.4 Alternative 2 – No Action

DOE must consider a no action alternative in all of its EAs; the selection of the no action alternative means that the proposed activity, as described in Section 2.3, would not take place. For this EA, that means personnel would not receive training at INL to execute effective responses to major radiological incidents, including developing and testing tools and field methodology under realistic scenarios.

‘No action’ does not meet the purpose and need for the RRTR, and would decrease the ability to respond to major radiological incidents and increase risks to first responders, characterization personnel, and the public.

INL would continue to use the gravel pit to mine gravel for various on-site uses. The TAN/TSF and parking area and areas south of RWMC would be available for other uses or reclamation activities.

## 2.5 Operational Controls

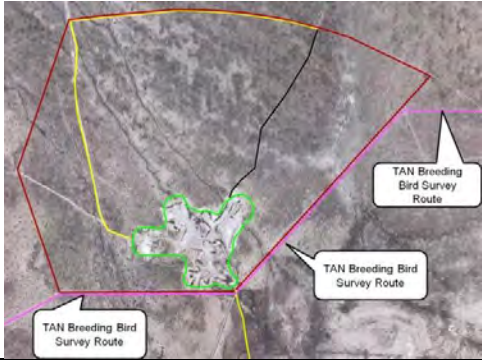
If DOE selects the proposed action, they would adopt operational controls as an integral part of its plan to help reduce the impacts of the action, and lower the potential for significant impacts (see Table 2).

Table 2. Operational controls to avoid or lessen impacts to natural, ecological, and cultural resources.

Activity	Control
Vegetation removal or soil disturbance	<ul style="list-style-type: none"> <li>• Conduct nesting bird surveys before vegetation removal or disturbance between May 1 and September 1.</li> <li>• Conduct pygmy rabbits surveys before removing vegetation or disturbing likely rabbit habitat.</li> <li>• Limit size of areas disturbed.</li> <li>• Revegetate project-related disturbed area with native species when closing the training range.</li> <li>• Project personnel will follow INL's Sitewide Noxious Weed Management Plan (Plan 611) to protect against the spread of noxious and invasive weeds—Soil and vegetation disturbing activities, including those associated with mowing, blading, and grubbing, 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." Project personnel would follow the applicable requirements to manage undesirable plants in the project areas, including spraying for noxious and invasive weeds.</li> </ul>
Release of radionuclides to the environment	<ul style="list-style-type: none"> <li>• Periodically (no less than five years) perform a biota dose assessment at the North and South Training Range (see Section 4.1.2.1, 'Radiological Assessment' for details of methodologies, measurements and species assessed).</li> <li>• Project personnel will use signs posted on sawhorse type mounts or fence posts at the entrances to the training ranges and other access points to the radiologically controlled areas. The entrance areas are already highly disturbed with gates, roads, ditches, and so forth. Project personnel will control access at the North Training Range by locking the gate at the entrance to the radiation areas and placing radiation/contamination boundary signs. In addition, project personnel will notify INL Security for periodic patrols of the area.</li> <li>• Verify the curie content and isotopic distribution—both of the curies of the major, intended isotopes, and any from tramp contaminants<sup>c</sup> (maximum of 1 curie at time of dispersal—see inset table for isotope breakdown) (ECAR-334, 2008).</li> </ul>

Radionuclide	Curies	Half-life (Years)
P-33	1.357E-12	6.95E-02
Cl-36	2.258E-10	3.01E+05
Cl-38	2.890E-12	7.07E-05
Ar-39	1.479E-6	2.69E+02
Ar-41	2.106E-6	2.07E-04
K-40	3.803E-9	1.28E+09
K-42	4.260E-2	1.41E-03
K-43	1.133E-9	2.58E-03
Se-81	5.417E-14	3.52E-05
Se-81m	3.669E-14	1.09E-04
Br-80	2.500E-1	3.31E-05
Br-80m	2.339E-1	5.04E-04
Br-82	4.731E-1	4.03E-03
Br-82m	000E+00	1.17E-05
Br-83	1.936E-8	2.73E-04
Kr-79	9.409E-12	4.00E-03
Kr-83m	6.532E-8	3.48E-06
<b>Total</b>	<b>1.00E+00</b>	<b>--</b>

c. Unwanted or unneeded trace or minor constituents.

<p>Limiting access to the TAN Breeding Bird Survey route</p>	<ul style="list-style-type: none"> <li>Coordinate range operation to allow access to conduct the TAN Breeding Bird Survey route at the appropriate time.</li> </ul>  <p><i>Inset: Part of the 'TAN' Breeding route runs along the eastern and southern boundary of the North Training Range, then across the southern part of the 'sealed and contained source area'.</i></p>
<p>Soil disturbance at the following project area:</p> <ul style="list-style-type: none"> <li>Parking Lot near RWMC</li> <li>Road to Radiological Work Area</li> <li>West Gate Command, Storage, and Parking Area</li> <li>Center Command, Storage, and Parking Area</li> <li>Radiological Work Area</li> <li>TSF Administrative Area</li> <li>Parking Lot east of TSF Area</li> <li>T-28 South Gravel Pit</li> <li>T-28 Road Corridor</li> <li>Project Boundary surrounding T-28 South Gravel Pit</li> </ul>	<ul style="list-style-type: none"> <li>Minimize ground disturbance.</li> <li>Project personnel would notify and receive approval from Cultural Resource Management personnel before setting up and staging temporary command post to avoid impacts to cultural resources.</li> <li>Periodically (or as needed to assure project activities do not cause adverse impact) complete cultural resource monitoring in sensitive areas with authority to redirect work to avoid any sensitive materials discovered.</li> <li>Implement a stop work procedure to guide the assessment and protection of any unanticipated discoveries of cultural materials.</li> <li>Complete cultural resource sensitivity training for project 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.</li> <li>Minimize disturbance to wildlife species important to the Shoshone-Bannock Tribes by using appropriate methods, which could include seasonal or time-of-day restrictions, good housekeeping, and awareness training.</li> </ul>

### 3.0 AFFECTED ENVIRONMENT

INL consists of eight major facilities, each less than 2-square miles, situated on an 890-square-mile expanse of otherwise undeveloped, cool, desert terrain, and with most INL buildings and structures occurring within these developed site areas and separated by miles of primarily undeveloped land. DOE controls all INL Site land (see Figure 1), which occupies portions of five Idaho counties: Butte, Bingham, Bonneville, Clark, and Jefferson. Population centers in the region include large cities (>10,000) such as Idaho Falls, Pocatello, Rexburg, and Blackfoot, located greater than 30 miles to the east and south, and several smaller cities/communities (<10,000) located around the site (about 1-30 miles away), such as Arco, Howe, Mud Lake, Fort Hall Indian Reservation, and Atomic City (see Figure 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, WY are located more than 70 miles northeast. No permanent residents exist on the INL Site.

The five Idaho counties that are part of the INL Site are all in *attainment area* (see glossary) or are unclassified for National Ambient Air Quality Standards (NAAQS) status under the *Clean Air Act (CAA)* (see glossary). The nearest *nonattainment area* (see glossary) is located about 50 miles south of INL in Power and Bannock counties. INL is classified under the *Prevention of Significant Deterioration (PSD)* (see glossary) regulations as a Class II area—an area with reasonable or moderately good air quality.

Surface waters on the site include the Big Lost River and Birch Creek; both streams carry water on an irregular basis, with the majority of the flow diverted for irrigation before entering INL. During high water years or during the shutdown of the diversion, Birch Creek has the potential to flow down its

historic channel and through parts of T-28 and the gravel pit. Most of INL is underlain by the Snake River Plain Aquifer (SRPA), which lies between 220 feet (at TAN) to 610 feet (at the South Training Range) below the site. The geology above the SRPA, the *vadose zone* (see glossary), is generally comprised of basalt (95%) with a layer of soil (loess) and/or sediment on top of the basalt with thin layers of sediments (1 to 20-foot intervals) between basalt flows. The SRPA has similar geology as the overlying vadose zone and is generally 250 to 900-feet thick.

The natural vegetation of the INL consists of a shrub overstory with a grass and forbs understory. The most common shrub is Wyoming big sagebrush, where basin big sage may dominate or co-dominate in areas with deep or sandy soils (Shumar and Anderson 1986). Other common shrubs include green rabbitbrush, winterfat, spiny hopsage, gray horsebrush, gray rabbitbrush, and prickly phlox (Anderson et al. 1996). The shrub 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., tabertip hawksbeard, Hood's phlox, hoary false yarrow, paintbrush, globe-mallow, buckwheat, lupine, milkvetches, and mustards) (Anderson et al. 1996). In a 1999 proclamation, the Secretary of Energy designated a portion of INL as the Sagebrush Steppe Ecosystem Reserve with a mission to provide research opportunities and preserve sagebrush steppe habitat. Representatives of the Bureau of Land management, U. S. Fish and Wildlife Service, and the Idaho Department of Fish and Game co-signed the proclamation. In addition, the INL Site is designated as *National Environmental Research Park* (NERP) (see glossary).

A wide range of vertebrate species are located within the site; several species are considered sagebrush-obligate species, meaning that they rely upon sagebrush for survival. These species include sage sparrow, Brewer's sparrow, northern sagebrush lizard, Greater sage-grouse, and pygmy rabbit.

There are currently no species that occur on the INL that are listed as Endangered or Threatened; however, several Species of Concern or Candidate Species, including sage-grouse, long-eared myotis, small-footed myotis, Townsend's big-eared bat, pygmy rabbit, Merriam's shrew, sage-grouse, long-billed curlew, ferruginous hawk, northern sagebrush lizard, and loggerhead shrike, do occur on the site.

Geographically, INL 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 also many kinds of natural resources as well, such as traditionally used plants and animals. Finally, features of the natural landscape, such as 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* (see glossary), 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 the INL to test fire ordnance used by the Pacific Fleet and evidence of this era remain. Finally, many scientific and technical facilities have preserved important information on the historic development of nuclear science in America (DOE-ID, 2009).

The proposed ranges are intentionally located at or near previously disturbed sites to minimize further disturbance to the natural and cultural environment. Much of the proposed test locations (see Figure 2) have been subjected to disturbance, such as construction and demolition activities, gravel pits, roads and other infrastructure, or previous research activities; however, a portion of the area north of the TAN gravel pit is primarily undisturbed (see Figure 2).

## 4.0 ENVIRONMENTAL CONSEQUENCES

The following sections evaluate direct, indirect, and cumulative environmental impacts that are likely to occur from the alternatives described in Section 2. Section 4.1 discusses the environmental impacts associated with Alternative 1, with discussion on environmental impacts divided between the two sub-alternatives as described in Sections 2.3.1 and 2.3.2. Section 4.2 discusses the environmental impacts associated with no action.<sup>d</sup> Each section discusses cause and effect relationships, including cumulative impacts, of the proposed actions on INL's natural, biological, and cultural resources; mitigative measures needed to lessen impacts; and those permits and regulations required to protect the resources.

During the EA scoping meeting, resource personnel identified that air, water, biological, and cultural resources are most likely to be affected by the proposed actions. Therefore, the environmental consequences of those resource areas are the focus of this EA. The following sections discuss the environmental impacts of both alternatives on the above resources: Risk Analysis (air/water), Biological Resources, and Cultural/Historical Resources.

### 4.1 Alternative 1 – North and South Training Range

#### 4.1.1 Risk Assessment

The risk assessment uses three environmental transport and dose assessment models to analyze dose to the public and employee from dispersed radioactive material. These models estimate transport and radiological dose from the atmospheric, surface, and groundwater pathways. Risk for this assessment is quantified in terms of radiological dose. Radiological dose is quantified in terms of the effective dose equivalent (EDE)<sup>d</sup> and includes the dose from external radiation and the 50-year committed dose from radionuclides ingested or inhaled. The EDE is the weighted sum of the dose equivalent to each organ of interest and has units of rem. The dose equivalent is the adsorbed dose (i.e., the energy imparted to tissue by ionizing radiation) to a given organ times a quality factor which is a measure of the relative biological effect of the radiation type.

This risk assessment evaluates the radiological doses to human associated with the use of dispersed radioactive materials for this training exercise. Atmospheric, surface, and groundwater pathway dose codes were used to calculate the EDE to hypothetical individuals for several exposure scenarios.

Interrogation activities such as a variety of high-energy techniques including X-ray, flash x-ray, portable isotopic neutron spectroscopy, and radiation generating devices would occur within the T-28 Gravel Pit and TAN/TSF area in the North Training area and the Radiological Work Area in the South Training Area when workers are present. Interrogation techniques such as these are already in use at INL location and would not result in additional risk to the environment or the worker. Worker exposure would be controlled in accordance with the radiological work permit (see glossary); there would be no exposure to the public from sealed radioactive sources, special form sealed radioactive sources, and contained (or unsealed) radioactive sources.

#### **Atmospheric Pathway:**

This section discusses the methodology used to determine the EDE to the maximum exposed individual at the site boundary and to employees located at facilities near the training grounds. Refer to ECAR 1109 (2010) for details on methodology, source terms, and radionuclide specific information. Federal regulation 40 CFR 61 Subpart H establishes a dose limit to the public of 10 millirem/yr EDE from DOE activities. The estimated EDE to the public from the proposed work would be far below the allowed limit.

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d. Effective dose equivalent is expressed in units of rem/year.

In accordance with Federal regulations 40 CFR 61 subpart H (*Radiological NESHAP*, see glossary), the atmospheric transport and radiological dose code, CAP88 PC Version 3 (EPA 2007), was used to calculate EDEs to a maximum exposed individual located at the nearest site boundary using the methodology described in the 2009 Radiological NESHAP report (DOE-ID 2010). EDEs were calculated by assuming the total releases from 12 exercises over a period of a year. EDEs were calculated for the maximum exposed individual at the site boundary (public) and for an employee located 1,384 meter from the North Training Range at TAN and 1,480 meter from the South Training Range at RWMC. These distances represent the distance to the nearest facility from the training grounds where a employee may potentially be exposed. In this document, EDEs to the maximum exposed individual at the site boundary and the employee are reported separately for the two proposed training ranges.

The EDE for the average annual release scenario<sup>e</sup> at the closest site boundary (EDE to the public) is 0.000588 millirem/year for the North Training Range (specifically the T-28 Gravel Pit), and 0.000706 millirem/year for the South Training Range (specifically, the radiological work area). Corresponding EDE values to the nearest site facility (EDE to the employee) is 0.0412 millirem/year for the North and 0.0365 for the South Training Ranges (see Table 3).

The maximum EDE to the public at the North Training Range location for the annual average release scenario is almost 17,000 times less than the 10 millirem/yr EDE limit (INL Administrative Control Level for the Public), and about 185 times less than the 10 millirem/yr EDE limit for the maximum release scenario. For the South Training Range location, the annual average release scenario is almost 14,000 times less than the 10 millirem/yr EDE limit and about 155 times less than the 10 millirem/yr EDE limit for the maximum release scenario<sup>f</sup> (see Table 3). The maximum site boundary is located 12,522 meters northeast of TAN and 7,976 meters southwest of RWMC.

### **Surface Pathway**

The second model uses a surface pathway code (RESRAD Version 6.5) that computes the EDE if a person were to move on to the training range after 15 years of dispersing the radioactive material on the ground with the assumption that 12 exercises were performed each year. The person is assumed to grow vegetables, raise beef, and ingest milk from livestock feeding on the contaminated ground. Other exposure pathways include direct external exposure, soil ingestion, and inhalation of re-suspended soil surface particulates. The surface pathway model calculated an EDE of 0.000164 millirem/yr to a person (see Table 3).

### **Groundwater Pathway:**

The groundwater pathway methodology used a 2-step screening process: (1) Radionuclides with a half-life less than a year were eliminated from groundwater pathway assessment because of the length of time it takes to get to the groundwater, and (2) Radionuclides with a half-life greater than a year and were not noble gases were evaluated with the GWSCREEN (Rood 2003) model.

Federal and state drinking water regulations establish a radioactive dose limit of 4 millirem/yr dose equivalent from man-made radionuclides. This limit applies to public drinking water sources. For the purpose of this evaluation, it was assumed that a public drinking water well was located at the testing ranges; the nearest off-site, down-gradient public well is actually located near Arco. In accordance with Federal and State drinking water regulations, groundwater concentrations and ingestion doses are based on drinking 2 liters of water per day for 365 days per year and 12 exercises each year for 15 years. The resulting estimated doses are substantially below the Maximum Contaminant Level for Cl-36 of 700 picocuries/liter (EPA 2000). Groundwater ingestion EDEs are less than 0.0002 millirem/yr (see Table 3).

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e. Annual average release scenario assumes 8-hour release rate times 12 exercises per year.

f. Maximum release scenario assumes experiments are continuous for 24 hours per day, 365 days per year.



## **Regulatory Requirements:<sup>g</sup>**

INL conducts radiological operations in a manner that ensures the health and safety of all general employees, contractors, and the public. To achieve this objective, the INL ensures that radiation exposures to its employees and the public and releases of radioactivity to the environment are maintained below regulatory limits; in addition, deliberate efforts are taken to further reduce exposures and releases as low as reasonably achievable (ALARA).

The proposed activities at the RRTR create a potential for multiple types of exposure. The handling of activated KBr and the placement of sealed sources at the training range generates dose. Surface contamination and airborne radioactivity is generated by the distribution of the KBr solution over the designated fields at the training range.

The rules in 10 CFR 835, “Department of Energy (DOE) Occupational Radiation Protection,” establishes radiation protection standards, limits, and program requirements for protecting employees and the public from all ionizing radiation resulting from the conduct of DOE activities. The dose limit from DOE sources to employees is 5000 millirem per year (millirem/yr) EDE. 10 CFR 835 also establishes a dose limit for the public entering a controlled area at 100 millirem/yr EDE. DOE Order 5400.5, “Radiation Protection of the Public and the Environment,” also establishes a dose limit of 100 millirem/yr EDE for the public.

The ALARA process is an approach to radiological control to further reduce and control individual and collective radiation exposures through appropriate control of radioactive material, contamination, and airborne radioactivity. The purpose of the INL ALARA Program is to reduce and maintain radiation exposures as far below the applicable controlling limits of 10 CFR 835 and the INL Radiological Control Manual (RCM) as is reasonably achievable. Therefore, laboratory management at INL has set an administrative control level for all activities to limit possible exposures to the public to 10% of the regulatory limit, which equates to 10 millirem per year. The INL administrative control level limit for possible exposures to employees is 14% of the regulatory limit, which equates to 700 millirem/yr.

## **Putting Calculated Dose In Perspective:**

The majority of radionuclides generated by the irradiated KBr have a short half-life and completely decay in about two weeks. The few remaining radionuclides with longer half-lives are at very low concentrations and have been modeled in extremely conservative environmental scenarios to determine the risk of exposure to employees and the public.

The sum of the atmospheric, surface, and groundwater models show the public dose would be about 0.01% of the INL Administrative Control Level for the Public. In addition, to put these doses in perspective, other radiation dose producing activities have been included in the table for comparison; for example, the average annual radiation dose to all of the U. S. general population from natural background radiation sources is approximately 310 millirem. (compare to ‘Regulatory Requirements’ and ‘Other Radiation Dose Producing Activities’ in Table 3.

### **4.1.2 Biological Resources**

Potential impacts to vegetation communities, such as sensitive plant species and species of ethnobotanical (the plant lore and agricultural customs of a people) concern, associated with the proposed activity would be minimized by limiting the footprint of the disturbance, revegetating the areas that have been disturbed, and implementing a weed management plan. Revegetating with a diverse mix of native species similar in composition to the existing plant community may help maintain the diversity of those communities. Revegetation in sagebrush steppe is generally successful in only one of three years because of the variability in availability and the timing of precipitation.

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g. Non DOE regulatory requirements are discussed under Section 4.1 (‘Atmospheric Pathway’ and ‘Groundwater Pathway’).

Certain proposed activities would have unavoidable impacts to wildlife, such as: (1) loss of ground-dwelling wildlife species and associated habitat, (2) displacement of certain wildlife species due to increased habitat fragmentation, and (3) an increase in the potential for negative interaction between wildlife and humans (Blew et al. 2010). The control measures that would reduce the impact on wildlife include seasonal timing of activities, nesting bird surveys, and awareness programs.

Wildlife species of concern include sage-grouse, all migratory birds (including raptors), pygmy rabbits, Great Basin rattlesnakes, and all large mammal species (Blew et al. 2010). Nesting bird surveys would be conducted before any soil or vegetation disturbance occurring between May 1 and September 1. No critical habitat for threatened or endangered species, as defined in the Endangered Species Act (ESA), exists on the INL Site. Sage-grouse is a Candidate Species for listing under ESA. It is likely that the proposed activity would have a direct impact on pygmy rabbits and indirect effects on sage-grouse, pygmy rabbits, or other sensitive species through habitat alteration (Blew et al. 2010). Impact from using interrogation devices (as described in Section 2 [see Table 3] and Section 4.1 (under Risk Assessment‘) would not result in additional risk to biological resources.

Table 3. Regulatory Dose Requirements, Calculated Project Dose, and Perspectives.

<b>Regulatory Requirements (Federal &amp; INL)</b>	<b>Effective Dose Equivalent (EDE) (millirem/yr)</b>	
Federal Regulatory Limit for Public (40 CFR 61 subpart H)	10	
40 CFR 141 Safe Drinking Water Act	4	
Federal Regulatory Limit for Employees (10 CFR 835)	5000	
INL Administrative Control Level for Employees	700	
Federal Regulatory Limit for the Public (10 CFR 835 & DOE 5400.5)	100	
INL Administrative Control Level for the Public	10	
<b>Project Calculated Dose</b>		
	<b>Average Annual Release Scenario</b>	<b>Maximum Release Scenario**</b>
<b>Atmospheric Pathway (Model 1 – Public)</b>		
Release to North Training Range	0.000588	0.0537
Release to South Training Range	0.000706	0.0645
<b>Atmospheric Pathway (Model 1 – Employee)</b>		
Release to North Training Range	0.0412	3.76
Release to South Training Range	0.0365	3.33
Surface Pathway Model Ingestion Dose (Model 2)	0.000164	
Groundwater Pathway Model Ingestion Dose (Model 3)	0.0002	
<b>Other Radiation Dose Producing Activities</b>		
	<b>Average Dose (millirem)</b>	
Dose to all US Population from <i>natural</i> background radioactive sources per year	310	
Airline Flight from New York to London	4	
1 Abdominal X-Ray	70	
Mammography	40	
X-Ray Spine series	500	
Abdominal CT Scan	800	
** The doses for this scenario assume KBr training is continuous over the year (i.e., 24-hours per day, 365 days per year). The total activity released in this scenario is 91 times the total activity released from the 12 releases expected for a year. The purpose of the scenario is to assure that it is not feasible to estimate a dose greater than 10 millirem/yr to the maximum exposed individual from operation of the KBr training facility.		

## ***Alternative 1a 'Maximizing Project Flexibility'***

### **Sage-Grouse:**

Surveys found suitable habitat for sage-grouse in the North and South Training Ranges. In the North Training Range sage-grouse habitat occurs along both sides of T-28 (North of the T-28 Gravel Pit). While the placement of command posts along the northern section of T-28 would remove vegetation, the impacts to sage-grouse and their habitat would be minimal due to the limited amount of disturbance (i.e., two 100-foot x100-foot areas for command posts) planned in the areas with habitat. Setting up and operating command posts may be disruptive to sage-grouse using the area along the road for rearing offspring. While placing command posts along the access road (South of the T-28 Gravel Pit) would not affect sage-grouse or their habitat, it could still disturb or destroy nesting migratory birds. At the South Training Range, project activities would be limited to the road and previously disturbed areas; therefore, training exercises conducted in that area would not impact sage-grouse habitat. Project personnel can minimize these impacts by limiting the disturbance footprint, implementing a weed management strategy to control invasive and noxious weeds, and following up with revegetation when the training ranges close. Any activity potentially disturbing vegetation or soils would require a nesting bird survey prior to disturbance.

### **Pygmy Rabbit:**

Pygmy rabbit habitat occurs in the North and South Training Ranges. Surveys found extensive pygmy rabbit habitat and signs at the North Training Range, areas west of the gravel pit, and along both sides of the T-28 road (North of the T-28 Gravel Pit), as well as numerous locations containing actual sightings, burrow systems, and scat. Due to the mature stands of basin big sagebrush along the road and ample cover and forage as well as deep soils, this becomes an ideal setting for the rabbits. Any vegetation disturbance to this section of the project area would result in a direct loss of habitat for pygmy rabbits and possible loss of individuals as well. Setting up and operating command posts may be disruptive to pygmy rabbits using the area along the road. At the South Training Range, project activities would be limited to the road and previously disturbed areas; therefore, training exercises conducted in that area would not impact pygmy rabbit habitat.

### **Habitat Fragmentation:**

Nearly all of the sites where the proposed activities would remove habitat have been previously disturbed. The exception is the portion of T-28 road extending north from the T-28 gravel pit. Although this road already exerts some force on fragmentation, the loss of vegetation at multiple locations along that road would likely increase fragmentation of sagebrush habitat. Project personnel can minimize these impacts by limiting the disturbance footprint, implementing a weed management strategy to control invasive and noxious weeds, and following up with revegetation when the training ranges close.

### **Radiological Assessment:**

Radiological impacts to plants and animals are unlikely due to the short radiological half-lives (most less than 24 hours) and low concentrations. In addition, the long-lived radionuclides in the dispersed radioactive material (Ar-39, Cl-36, and K-40) are naturally occurring in the environment (see Table 1), and the addition of the concentrations proposed are insignificant compared to those naturally occurring. Sealed radioactive sources, special form sealed radioactive sources, and the contained (or unsealed) radioactive sources would be in the area only when people are actively working; thus, lessening the opportunity of animals being present. However, to ascertain no impacts to animals and plants are occurring, a biota dose assessment would be conducted periodically as required by DOE Orders 450.1a (2008) and 5400.5 (1993) (see Table 2).

RESRAD Biota Dose Assessment Program (DOE 2004) will be used for the assessment of doses received and biota dose guidelines (DOE 2002, ICRP 2004) for the evaluation of impacts from those doses.

RESRAD Biota calculates a ratio for terrestrial plant and animal scenarios based on potential hazards associated with limits of 10 mGy d-1 (1 rad d-1) and 1 mGy d-1 (0.1 rad d-1) for terrestrial plants and animals respectively. The program assesses the impacts on small mammals that would likely receive the highest doses due to their small home ranges and the potential for them to reside consistently in a potentially contaminated area. If specific evaluations are needed for additional species, the program permits entering data to allow this. However, this scenario would only be used if the initial evaluations exceeded the guidelines (DOE 2002).

### **Ecological Research and Monitoring:**

Several long-term breeding bird surveys exist on the INL to help in monitoring breeding bird populations potential impacts of activities across the site. One of those routes travels along and through parts of the North Training Area (see Table 2). Limiting access to the large area at the North Training Range would adversely affect the continuity and utility of a long-term Breeding Bird Survey route. Coordinating timing of access to this route as an operational control would eliminate this impact. Continuation of the monitoring route would also provide information on the potential impacts the proposed action may have on local bird populations.

### **Cumulative Effects:**

Those resources that would be most at risk to cumulative impacts from project activities include native vegetation, sage grouse, pygmy rabbits, and cultural resources. These resources are found throughout the INL Site, including near the proposed North and South training ranges as described in this EA. The geographic boundaries of these species vary from locally to regionally: Sage-grouse on the INL migrate off site and travel many miles both on- and off-site. Pygmy rabbits also occur throughout the site, but likely move little. Both species are sagebrush obligates and closely associate with sagebrush on the INL Site. Cultural resources are found in very specific areas across the INL, including certain locations within the project areas.

The INL Site is (and has been) the home to different projects and includes several primary facility areas situated on an expanse of otherwise undeveloped, high-desert terrain. Most facilities are located within facility boundaries, and are generally contained within 2-square mile facility areas. Current facilities and activities located near the proposed ranges include the Specific Manufacturing Capability (SMC), Test Area North (TAN), and the T-28 gravel pit (near the North Training Range) and the Radioactive Waste Management Complex and EBR-I, a National Historical Landmark (near the South Training Range) (See Figure 2). SMC is an active facility, while DOE has demolished most of the TAN buildings. The T-28 gravel pit (part of the North Training Range) is active and project personnel would coordinate project-related activities with the need to mine the pit for gravel. RWMC and EBR-I are both active facilities near the South Training Range. In addition, the South Training Range is located within an area previously used for similar experiments, only on a much smaller scale.

DOE is always planning for future projects on the INL Site. Recent and ongoing EAs are indicative of foreseeable future actions, such as the Low-level Waste Disposal Facility, Multipurpose Haul Road within the Idaho National Laboratory Site (DOE/EA-1772), and the proposed Stand-Off Experiment (SOX) Range (DOE/EA-1822). The SOX Range project is adjacent to the North Test Range. In addition, there are a number of non-paved (two-track) roads throughout the INL Site and adjacent to and within the proposed training ranges.

Section 3.0 'Affected Environment', Section 4.1 'Alternative 1', and the referenced report (Blew, et al., 2010) give a baseline for sage grouse and pygmy rabbits both on the INL and specific to the project areas. In addition, recent fires on the INL resulted in a substantial loss of sagebrush on the INL Site; however, the additional loss of sagebrush, as a result of this project (Alternative 1a or 1b), does not significantly increase the impact caused by that wildland fire.

DOE reviewed the resources at risk; their geographic boundaries; past, present, and reasonable foreseeable future actions; and baseline information in determining the significance of cumulative impacts. The impacts associated with Alternative 1a have a small footprint, low intensity, and are near areas with much larger impacts to ecological and cultural resources. Operational controls described in Section 2 (Table 2) would help keep direct and indirect impacts to sage-grouse, pygmy rabbit, migratory birds, and cultural resources small. Placing command posts along the access road (North of the T-28 Gravel Pit) would remove less than 0.5 acres (2-100 x100-foot areas along T-28) of sagebrush habitat, but could potentially adversely affect nesting migratory birds, but would avoid cultural resources. Project personnel would minimize these impacts by limiting the disturbance footprint, implementing a weed management strategy to control invasive and noxious weeds, and follow up with revegetation when the training ranges close. Additionally, by completing cultural resource sensitivity training, implementing stop work procedures, and including an archaeologist in pre-project planning activities with the objective to avoid known cultural resources would minimize the potential for cumulative impacts. Any activity potentially disturbing vegetation or soils would require a nesting bird survey before disturbance, and if nesting migratory birds are found, no disturbance will be allowed during the nesting season. Therefore, while impacts and cumulative effects to those species and their habitat are not zero, they are likely low given other habitat exists on the INL.

#### **4.1.2.2 Alternative 1b ‘Minimizing Project Impacts’**

Removing T-28 (North of the Gravel Pit) from consideration for command posts reduces the level of impacts to sage-grouse, pygmy rabbits, and habitat fragmentation. While some disruptive activities may still occur from traveling the road to place and detect radiological sources, those will likely be short-term. There would likely be no direct impacts to sage-grouse or pygmy rabbits or their habitat. While placing command posts along the access road (South of the T-28 Gravel Pit) would not affect sage-grouse or pygmy rabbits or their habitat, it could still disturb or destroy nesting migratory birds. Alternative 1b would continue to have similar potential for radiological impacts, and may limit access to ecological and monitoring activities. Project personnel would minimize these impacts by limiting the disturbance footprint, implementing a weed management strategy to control invasive and noxious weeds, and following up with revegetation when the training ranges close. Any activity potentially disturbing vegetation or soils would require a nesting bird survey before disturbance and if nesting migratory birds are found, no disturbance will be allowed during the nesting season. At the South Training Range, project activities would be limited to the road and previously disturbed areas; therefore, training exercises conducted in that area would not impact sage-grouse or pygmy rabbit habitat.

#### **Regulatory Requirements:**

Soil and vegetation-disturbing activities, including those associated with mowing, blading, and grubbing, 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.” INL would follow the applicable requirements to manage undesirable plants.

In analyzing the potential ecological impacts of the action alternative 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 may apply include the Fish and Wildlife Coordination Act (16 USC § 661 et seq.), the Bald Eagle Protection Act (16 USC § 668), and the Migratory Bird Treaty Act (16 USC § 715–715s). If a species such as the 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.

#### **4.1.3 Cultural Resources**

The proposed action described in alternative 1a or 1b would cause minor direct and indirect impacts on the cultural resources and archaeological sites at the North Training Range (near the T-28 gravel pit);

impacts at the South Training Range (near RWMC) are unlikely. Impact from using interrogation devices (as described in Section 2 (Table 2) and Section 4.1 (under Risk Assessment‘) would not result in additional risk to cultural resources.

#### **4.1.3.1 Alternative 1a ‘Maximizing Project Flexibility’**

The North Training Range is located within the Birch Creek Sinks where several historic channels of Birch Creek traverse the project area. The proposed project area is also adjacent to the historic shoreline of Pleistocene Lake Terretton. Given these factors and based on observations from past archaeological surveys, it has been determined that the area within and surrounding the North Training Range is highly sensitive archaeologically, except for the TAN/TSF and parking lot areas. Anticipated prehistoric archaeological resources could range from 13,500-year-old hunting camps to historic agricultural activities dating from 60 to 150 years.

Due to the nature and extent of cultural resources already identified that may be directly and indirectly impacted by project activities within the defined areas of potential effect, cultural surveys would be required before starting any soil disturbing activities. INL’s Cultural Resource Management Office would assess all newly recorded resources for eligibility to the National Register of Historic Places and for project effects (impacts to cultural or historic resources) in consultation with the Idaho State Historic Preservation Office and Shoshone-Bannock Tribes.

In addition, archaeological sites and Native American resources identified within the project area would also be subject to indirect impacts during project activities because of higher visibility on the landscape and overall increases in human activity levels in an area that has previously been somewhat remote. Artifacts may be subject to unauthorized collection or affected by unauthorized off-road vehicle use. Resident and migratory birds and animals of importance to the Shoshone-Bannock Tribes may be disturbed and noxious and invasive weeds may increase, to the detriment of native plant species with tribal value.

Three previous cultural resource investigations have been conducted in the general vicinities of the project areas under consideration for the RRTR; two in the T-28 gravel pit area (Miller 1985; Ross et al. 1986) and one at the South Training Range (INL CRMO Project Files: BEA-08-26). The two previous surveys conducted within the North Training Range identified eight prehistoric sites and four isolated finds within the administrative boundaries of the T-28 gravel pit; however, these past surveys are older than ten years. As such, Cultural Resource personnel would need to conduct new surveys in the area and along T-28 as described in Table 2. Preliminary investigations have shown extensive prehistoric land use dating to 11,000 years before present.

Cultural resource personnel previously surveyed the TAN/TSF, TAN parking lot, and the areas consisting of the South Training Range; therefore, no further cultural surveys would need to be conducted at those areas, unless soil disturbance uncovers items of interest.

Project activities would include operational controls before and during project activities to minimize the potential for adverse direct and indirect impacts to cultural resources using a tiered approach with initial efforts focusing on identification and assessment, followed by various protection strategies as discussed in Table 2. While there is the potential for cumulative impacts to cultural resources, operational controls, as described in the document would avoid adverse impact.

#### **4.1.3.2 Alternative 1b ‘Minimizing Project Impacts’**

Alternative 1b has the same impacts as Alternative 1a, with the exception that removing the placement of command posts along the northern portion of the T-28 road (north of the Gravel Pit) reduces the level of impacts to cultural resources in this sensitive area. While disruptive activities may still occur along this portion of roadway from traffic along the road and walking out into the sagebrush to place and detect radiological sources, those would likely be minimal. Project personnel would follow the

operational controls outlined in Table 2 to avoid adverse impacts to cultural resources. Mowing would not be required along the T-28 road (north of the gravel pit) to protect from wildfires.

### **Regulatory Requirements:**

A variety of laws, regulations, and statutes manage or protect cultural resources. Such resources include buildings, sites, structures, or objects; each of which may have historical, architectural, archaeological, cultural, and scientific importance. Most of these requirements have been tailored to the unique needs of the INL through Programmatic Agreement between DOE-ID, the Idaho SHPO, and the Advisory Council on Historic Preservation. The requirements include:

- Antiquities Act of 1906 (Public Law 59-209)
- Reservoir Salvage Act of 1960 (Public Law 86-523)
- National Historic Preservation Act of 1966 (Public Law 89-665); 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
- National Environmental Policy Act of 1969 (42 USC § 4321 et seq.)
- Protection and Enhancement of the Cultural Environment (Executive Order 11593)
- Archaeological and Historic Preservation Act of 1974 (Public Law 93-291)
- Archaeological Resources Protection Act of 1979 (Public Law 96-95)
- Native American Graves Protection and Repatriation Act of 1990 (43 CFR 10).

#### **4.1.4 Other Resources**

Section 4.1.1, Risk Assessment, considers the potential impacts to air, soil, and water resources (groundwater). This section briefly discusses potential impacts from greenhouse gas (GHG) emissions and climate change. Currently, INL estimates its contribution of GHG emissions to be about 100,000 metric tons annually. Those INL activities contributing to this value include purchased electricity (~65,000 Metric Ton CO<sub>2</sub>-equivalent), stationary combustion (gas boilers, non-emergency diesel generators) (~15,000 Metric Ton CO<sub>2</sub>-equivalent), and mobile combustion (car and bus fleet) (~10,000 Metric Ton CO<sub>2</sub>-equivalent). Project activities that would contribute to the GHG emissions include the use of light-duty vehicles, air transportation (fixed wing and helicopters), and portable generators. The intermittent use of ground and air transportation and use of generators during project activities (up to 12 exercises per year) is likely an insignificant portion of INL's total GHG emissions.

## **4.2 Alternative 2 – No Action**

The no action alternative means that none of the actions described in Alternatives 1a or 1b would occur at any of the locations. DOE would have to turn to other locations across the complex to meet the purpose and need described in Section 1. Environmental impacts, as described in Section 4, would not occur on the INL from actions described in this document. However, as with Alternatives 1a or 1b, DOE would continue to mine the T-28 gravel pit, clean up the TAN/TSF, and use the South Training Range for other purposes.

### 4.3 Summary of Proposed Impacts

Following is a summary of proposed impacts: Risk Assessment (air and water resources), Biological Resources, Cultural Resources, and Cumulative Impacts.

#### **Risk Assessment:**

The sum of the atmospheric, surface, and groundwater models show the public dose would be about 0.01% of the INL Administrative Control Level for the Public (see Table 3). These small doses would not produce any adverse impacts. In addition, the risk to workers would be managed and mitigated in accordance with the INL Radiation Protection Program.

#### **Biological Resources:**

The proposed actions described in Alternative 1a would likely impact some wildlife species by removing sage-grouse and pygmy rabbit habitat and causing disruptive activities along T-28. In addition, the disruptive behavior would magnify the habitat fragmentation already caused by the road and its use. Those activities described in Alternative 1b would have no or minimal impact on sage-grouse and pygmy rabbits along T-28, and would likely not contribute to any habitat fragmentation. Proposed operational controls would lessen impacts to these resources for both Alternatives 1a and 1b.

#### **Cultural Resources:**

The proposed action in Alternative 1a or 1b would cause minor direct and indirect impacts on the cultural resources and archaeological sites at the North Training Range (near the T-28 gravel pit); impacts at the South Training Range (near RWMC) are unlikely. To minimize potential impacts, project personnel would work with Cultural Resource personnel to complete required archaeological surveys, and locate areas along the south access road and around the T-28 gravel pit to place command posts and to avoid sensitive cultural resources.

#### **Cumulative Impacts:**

Project activities have the potential to affect cultural and biological resources by their activities, which includes traveling T-road, removing vegetation and disturbing soil, flying over the sites, and other disruptive activities. However, from a cumulative impact perspective, the incremental amount is likely not significant. The North and South Range are within 1 to 2 miles of INL facilities (SMC, TAN, and RWMC), situated along T-roads (which are traveled by security and other site personnel), and make up a small percentage of the total area of INL. The RRTR (both North and South) would use about 900 acres out of 569,600 acres, or less than 0.2% of INL land. The primary training area in the North Training Range is an operating gravel pit. Considering the widely spread nature of INL facilities and that most of the site remains pristine, the cumulative impact of the training ranges is likely small. Cumulative impacts to cultural artifacts, sage-grouse, pygmy rabbits, and other resources is low.

## 5.0 COORDINATION AND CONSULTATION

DOE-ID consulted with several federal, state, county, and tribal governments, including the U. S. Army Corp of Engineers, the Idaho State Historic Preservation Office, the Advisory Council on Historic Preservation, and the Shoshone-Bannock Tribes. DOE-ID conducted separate notifications and briefings to the Idaho Governor's and Congressional Delegation Offices, Butte County; Idaho Commissioners; and the Department of Environmental Quality (INL Oversight Program). In addition, two separate tours were provided: one to U. S. Fish & Wildlife Service personnel by DOE-ID, and one to a representative of the State of Idaho DEQ by a BEA representative. The RRTR North Training Range was visited and project activities were discussed during each tour.



### **U. S. Army Corp of Engineers:**

DOE contacted the U.S. Army Corp of Engineers, Idaho Falls, ID Regulatory Field Office, on June 15, 2010, to discuss the proposed establishment of the Radiological Response Training Range and the use of the two 'training ranges' on the INL: North Training Range and South Training Range (see Figure 2). The potential activities would not be subject to Section 404 Clean Water Act (see glossary) permit requirements administered by the U.S. Army Corps of Engineers as they would not result in discharges of dredged or fill material into waters of the U. S.

### **Idaho State Historic Preservation Office, the Advisory Council on Historic Preservation, and the Shoshone-Bannock Tribes:**

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" 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. A cultural resource protection plan would be developed for the RRTR project in consultation with the Idaho State Historic Preservation Office and Shoshone-Bannock Tribes.

### **Shoshone-Bannock Tribal Briefing:**

On July 7, 2010, the Department of Energy-Idaho Operations Office (DOE-ID) provided a detailed technical briefing on the Radiological Response Training Range (RRTR) project to the Fort Hall Business Council (FHBC) of the Shoshone-Bannock Tribes. This discussion talked about the scope of the activity, potential locations, and the need for this capability. It was discussed, and the FHBC recognized, that the Tribes' Cultural Resource personnel (Heritage Tribal Office) have worked with DOE-ID and BEA to assess impacts on cultural resources at the project sites. The land area for INL is within the Shoshone-Bannock Tribes' ancestral and aboriginal homeland. Therefore, they proclaim a vested interest in all activities at INL. DOE-ID has negotiated a series of Agreements in Principle that acknowledge the Tribes' interests and connectivity to this area and recognizes the viability of their 1868 Fort Bridger Treaty as a law of the land that establishes their sovereignty. The FHBC recognized the critical nature of this and any future related projects that support National Defense and Homeland Security and serve to protect the United States of America. The FHBC provides a consensual blessing and wishes that their support be acknowledged because of their spiritual and ancestral connection to this land. They support the project and the use of the land for these purposes, and wish to be considered as a helping partner and have these interests expressed to those who would use the RRTR and be trained. This briefing with the Tribes did not constitute formal government-to-government consultation.

## **6.0 REFERENCES**

- 10 CFR Part 835, —Department of Energy Occupational Radiation Protection," *Code of Federal Regulations*, Office of the Federal Register.
- 10 CFR Part 1021, —DOE NEPA Implementing Regulations," *Code of Federal Regulations*, Office of the Federal Register.
- 36 CFR 800, 2004, —Protection of Historic Properties," *Code of Federal Regulations*, Office of the Federal Register.
- 40 CFR 61, —National Emission Standards For Hazardous Air Pollutants", *Code of Federal Regulations*, Office of the Federal Register.

- 40 CFR Parts 1500-1508, —~~C~~ Regulations for Implementing NEPA,” *Code of Federal Regulations*, Office of the Federal Register.
- 43 CFR 10, 2010, —~~N~~ative American Graves Protection and Repatriation Regulations,” *Code of Federal Regulations*, Office of the Federal Register.
- 7 USC § 2814, 2006, —~~M~~anagement of Undesirable Plants on Federal Lands,” *United States Code*.
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- 16 USC § 668, 1940, —~~B~~ald Eagle Protection Act,” *United States Code*.
- 16 USC § 715-715s, 1918, —~~M~~igratory Bird Treaty Act,” *United States Code*.
- 16 USC § 1531 et seq., 1973, —~~E~~ndangered Species Act,” *United States Code*.
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## Appendix A: Public Comment and Response

DOE-ID published the draft EA on August 4, 2010, making it available to the public and agencies for review and comment through September 3, 2010. In addition, DOE-ID sent out news releases and posted the draft EA on DOE-ID's website and sent out postcards to stakeholders, including federal and state agencies (e.g., U. S. Fish & Wildlife Service, Bureau of Land Management, Idaho Department of Fish and Game, and the sage-grouse local working groups).

DOE-ID received six comment letters and/or emails: three from members of the public, two from government agencies, and one from the Shoshone Tribes. The following tables summarize the comments received on the draft EA and DOE-ID's response to those comments.

Comments and Responses
<b>Comments from Egon Lamprecht (Idaho Falls, Idaho) – Comment 1</b>
<b>Comment 1:</b> –I think the idea of a field training facility is a great (sic) for not only on site folks but those out in the world that could encounter a radiation emergency.”
<b>Response:</b> Thank you for your comment. DOE agrees that this project is important to our nation's security.

<b>Comment from Kevin L. Young (received before the start of the public comment period) – Comment 2</b>
<b>Comment 2:</b> –It's really good to see this concept is moving forward.”
<b>Response:</b> Thank you for your comment.

<b>Comments from Dr. Peter Rickards (Idaho Families for the Safest Energy) – Comments 3–9</b>
<b>Note:</b> Since Dr. Rickards' comments were numbered and punctuated, they are reproduced as received with <u>bold</u> and <u>underlined</u> emphasis.
<b>Comment 3:</b> –I) The EA, on page 6 (or webpage 14 of 33) quietly announces that C-4 explosives can be used to disperse the radioactive KBr. <u>Yet nowhere in the dose analysis details does this explosion appear analyzed.</u> I FOIA'd the documents of dose analysis referenced in the EA, ie, ECAR 1109 & 334. These documents speak only of spreading the KBr in a water sprayer. <b>No explosions are mentioned to estimate the dust plume height nor width these C-4 explosions will produce.</b> This plume from the explosions can leave INL easily. This analysis is essential to documenting the true environmental impacts that planned events, and accidents can expose the public to.”
<b>Response:</b> This assumption is conservative because any initial dispersal of material will result in lower air concentrations and thereby lower doses to the public. This analysis can be done by utilizing a non-point source emission. However, the radiation dose would only decrease, or at the worst, remain the same from what has already been calculated. The dose analysis assumed a ground level release with no initial dispersion of the material from either the C-4 or water sprayer dispersal techniques; resulting in a maximum dose to the public.
Since considering the plume height and width in the analysis for maximum dose to the public would have potentially decreased the potential dose to the public, DOE chose to be conservative in its assumptions and concludes that these parameters are covered within the bounding analysis that was performed.
<b>Comment 4:</b> –II) ECAR 334 (webp 3/7) states –The area uses the infiltration pond that is a bermed area and provides a good ground level barrier to excessive winds. The training event period was selected in late August where winds typically do not exceed 8 mph historically.”
Certainly the August wildfires at INL had winds exceeding 8 MPH, and the bermed area did not deter that wind. While the EA mentions they won't test if the winds exceed 10 MPH, and will stop if that wind changes, once the

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dirty bomb simulation test explosion has been detonated, it can not (sic) be retrieved if the unpredictable winds exceed 10 MPH.

Analysis of a fetus and a pregnant women changing a tire on Rt 20 during a common inversion layer should be done for if she is caught in this plume that is emitting gamma x-rays shortly after explosion, ie, external air bath dose, inhalation, and ingestion of undissolved KBr salt particles, from the powder form planned for dispersion on p 6 (wp 14/33). **Only dilute dissolved single atoms of KBr are analyzed, hiding the larger dose from larger particles.**

One curie release per explosion is a lot of gamma emissions from these very short lived radionuclides, making the exposure much higher than the diversionary analysis done of someone living on the site after years of testing these short-lived radionuclides.

**The EA claims to do an analysis of someone directly in the plume all year long, but the details shared only analyze other scenarios”**

**Response:** The analysis considered that all activated KBr is dispersed and transported into the atmosphere, and that all of the activity can be inhaled. In reality, some of the KBr will deposit on the ground and some will be attached to particles too large to inhale. The conservative (and bounding scenario) assumes that exercises take place every 8 hours for 365 days/yr, and that a person is located at the site boundary for 365 days/yr. This scenario overestimates the potential doses because only twelve exercises per year will take place. Nevertheless, this scenario was run to bound any single release where a person would be located in the path of the plume. Doses were still well below regulatory limits.

**Comment 5: →) The FOIA’d ECAR 1109 specifically avoiding listing the separate inhalation doses, and the external air bath doses.** While this is claimed to be a “conservative” estimate that greatly exceeds any real dose, note on page 10 they eliminate the high dose of the one curie short lived radionuclides, and bury the remaining 2 isotopes 15 cm deep in the soil. The Surface Pathway analysis of growing food there AFTER the tests conclude is absurdly inappropriate, and an intentional diversion, for the short-lived radionuclides dispersed.”

**Response:** The dose analysis for the short-lived radionuclides are in the atmospheric dose assessment. The atmospheric doses include submersion and inhalation doses. The objective of the surface pathway assessment is to assess impacts from long-lived radionuclides, which are assumed to be on the surface, but are later mixed to a depth of 15-cm to assess food-chain uptake because the soil must be tilled in order to grow crops.

**Comment 6: →) ECAR 334 dismisses the need for criticality analysis but only details the uranium sealed source used.** However, the EA quietly admits the staff may chose (sic) to use plutonium during the testing. No plutonium isotope is specified either. **No accidental misplacement of pu and the C-4 is analyzed. No disgruntled employee scenario is analyzed.** INL is NOT immune from disgruntled employees, starting with the SL-1 reactor criticality’s rumored lover’s triangle gone awry. In modern times, despite psychological screening, an armed INL “Security” guard barricaded themselves in a NO-GO area, and another employee intentionally put a plutonium laden HEPA filter in an unsecured garbage can hoping to expose unprotected workers.

These are real potential environmental impacts that need to be honestly analyzed (sic). This is not a windmill INL is testing. They are handing employees C-4 and plutonium, and both accidents and intentional sabotage (sic) require analysis.”

**Response:** The quantity of uranium or Pu used in the irradiated source material is less than 1 gram U-235 equivalent, several orders of magnitude less than the minimum critical mass for Uranium and does not warrant a criticality analysis. Larger quantities of U or Pu will be packaged in special form containers or contained in DOT shipping containers approved for these kinds and quantities of radioactive material. The INL implements stringent source control requirements. These source control requirements have a specific process for procurement, registration, labeling, transfer, storage, movement, use, and a semi-annual inventory and accountability process. Each accountable sealed radioactive source is identified by a Manufacturer’s ID number and INL unique identification number. These source control requirements were developed to meet the requirements of Part 835 of the Code of Federal Regulations. They are also implemented in accordance with the

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INL Radiological Controls Manual and detailed procedure documents. The probability of losing or misplacing a source is very low. In addition, the EA states —sealed and contained sources will be removed from the exercise area on a daily basis and before the training event has concluded,” thus making misplacing of the source highly unlikely (see Section 2.3, page 8, ‘Typical Training Exercise’). The only radioactive material that will be exposed to explosive or other dispersal actions will be the irradiated KBr. Sealed sources will not be part of or affected by dispersal actions.

All explosives stored on site, including C-4, are protected in magazines that are alarmed or patrolled or both by INL security personnel. In addition, the use and movement of explosives is monitored by security across the INL Site with appropriate safeguards in place depending on the type and amount of explosives to protect the misuse of the explosive. These administrative controls, including the precautions taken by INL Security, render a scenario of misplacing or misusing explosives an extremely low probability and not a reasonable scenario to analyze.

**Comment 7: –5) The ECAR 334 (p5/7) claims to have done soil samples at INL, and claims it only found Cesium-137. It is impossible not to have found plutonium in the soil at INL, and other radionuclides! This is an outright lie. The plutonium already in the soil needs specific analysis.** Any pu-238 particle made airborne by the explosions can greatly exceed the legal limit of 10 mrem exposure. I paste below the DOE worker dose paper by Dr Scott, which is peer-reviewed and published. While Dr Scott is very pro-nuclear, his paper admits that a worker who inhales 3 particles of pu-238 will exceed his 5,000 mrem annual limit, meaning if a citizen inhales one pu-238 particle, they exceed over 1,700 mrem. This all calls for an honest EIS!”

**Response:** Soil samples for the project were analyzed using gamma spectroscopy because the radionuclides in the KBr experiment are gamma emitters. Gamma spectroscopy would not detect Pu-238 or Pu-239. However, historical sampling at the INL has shown Pu-238 and Pu-239 to be present in INL soils. The commenter is correct in that the dose from inhalation of a few particles of Pu-238 can exceed 5 rem, as confirmed by our own calculations and those of Scott and Fencel (1999 Rad Protection Dosimetry 83(3) 221-232). However, the commenter does not recognize the main point of the Scott and Fencel paper; that is, with the inhalation of such particles, the probability of inhalation needs to be accounted for because very few discrete particles would be present in the air. Additionally, the paper discussed plutonium aerosols in the workplace and not an environmental setting.

To receive the dose discussed in the Scott and Fencel paper, one would have to inhale a 10 μm aerodynamic equivalent diameter (AED) particle of pure Pu-238 in the oxide form. The AED is defined as:

$$AED = \frac{d_p}{\sqrt{\rho_u}}$$

where  $d_p$  is the physical diameter of the particle (μm) and  $\rho_u$  = the density of the particle divided by a unit density of 1 g/cm<sup>3</sup>. The density of a plutonium oxide aerosol particle reported by Scott and Fencel was 10 g/cm<sup>3</sup>. Therefore, the physical diameter of the particle would be:

$$d_p = AED \sqrt{\rho} = 10 \mu\text{m} \sqrt{10} = 3.16 \mu\text{m} = 3.16\text{E-4 cm}$$

Assuming a sphere, the mass of this particle would be:

$$M = \frac{4}{3} \pi \left( \frac{3.16 \times 10^{-4} \text{ cm}}{2} \right)^3 10 \frac{\text{g}}{\text{cm}^3} = 1.65 \times 10^{-10} \text{ g}$$

The specific activity for Pu-238 is 17.119 Ci/g. Therefore, the activity of one 10 μm AED Pu-238 particle is 17.119 Ci/g × 1.65 × 10<sup>-10</sup> g = 2.82 × 10<sup>-9</sup> Ci or 2,828 pCi.

Rood et al. (1996) provides summary statistics and upper confidence intervals for Pu-238 concentrations on the INL site. The mean concentration from Table 23 was 0.0014 pCi/g with a minimum of less than zero and a

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maximum of 0.0056 pCi/g. The upper 95% and 99% tolerance limits with 95% confidence for composite and grab samples was 0.0061 pCi/g for composite samples and 0.012 pCi/g for grab samples. Assuming our source term is composed of these Pu-238 particles then the mass of soil that would hold one of these particles would be:

$$2,828 \text{ pCi} / 0.0061 \text{ pCi/g} = 463.7 \text{ kg} \sim \frac{1}{2} \text{ ton.}$$

Therefore, about ½ ton of soil would have to be ejected in order to get one particle of plutonium-238. Assuming only about 10% of this soil mass can be inhaled and remain airborne long enough for inhalation to occur, then the mass fraction of Pu-238 in air is  $1.65 \times 10^{-10} \text{ g} / 4.637 \times 10^4 \text{ g} = 3.55 \times 10^{-15}$ . Therefore, it is very unlikely that even if a particle was emitted a person would inhale that single particle. Furthermore, if the soil contained discrete particles of Pu-238, then the sampling would show much larger variance than indicated by the results in Rood et al. (1996). That is, the difference between the mean and maximum concentration would be much greater than what was observed.

The dose from plutonium isotopes emitted from soil from detonation of C-4 can be conservatively evaluated by:

$$D = C_s M L F B R D C F$$

where  $D$  = dose (mrem),  $C_s$  = soil concentration (pCi/g),  $MLF$  = mass loading factor ( $\text{g/m}^3$ ),  $BR$  = breathing rate ( $\text{m}^3/\text{hr}$ ), and  $DCF$  = dose conversion factor (mrem/pCi). For this exercise, the model conservatively assumes the dust remains airborne for 1 hour, a person is present at the site for 1 hour, and breathes  $1 \text{ m}^3/\text{hr}$  (based on RESRAD default breathing rate of  $8400 \text{ m}^3/\text{yr}$ ). Mean soil concentrations for Pu-239 and Pu-238 were taken from Table 23 in Rood et al. (1996). The mass loading factor was conservatively assumed to be 100 times the RESRAD default value of  $1 \times 10^{-4} \text{ g/m}^3$  (i.e.,  $0.01 \text{ g/m}^3$  or  $10,000 \mu\text{g/m}^3$ ). Visibility would be impaired at dust concentrations this high. This value is not realistic and was conservatively selected to be an over estimate of actual conditions one may experience. Dose conversion factors were taken from Federal Guidance Report 11 (EPA-520/1-88-020, September, 1988). The dose calculation is for a person in the vicinity of the exercise. Doses for members of the public would be orders of magnitude lower because of air dispersion. The calculated Effective Dose Equivalent (EDE) (see Table 1) is well below 0.001 mrem and therefore should not be a concern for a worker or member of the public.

Table 1. Dose calculations for Pu-239 and Pu-238 in soil ejected during an exercise.

Radionuclide	Soil Conc. (pCi/g)	Air Conc. (pCi/m <sup>3</sup> )	1-hr intake (uCi)	DCF (mrem/uCi)	EDE (mrem)
Pu-238	0.0014	0.000014	1.16E-11	3.92E+05	4.57E-06
Pu-239	0.024	0.00024	2.0E-10	3.08E+05	6.16E-05

**Comment 8:** —. I want to add we need analysis of a pregnant women & her fetus who is taking a tour of INL inhaling and ingesting the particle size of the powder KBr et al. and her dose with all the aforementioned scenarios. Thank you...Peter”

**Response:** See response (Comment #4).

**Comment 9:** —. meant to say the full EIS is required, and if explosion of radionuclides is really deemed SOOOOO important it must be done, a comparative analysis should be done for moving this open air experiment to Nevada Test Site, and hopefully, not only from NTS when the wind is blowing toward idaho (sic), as Idaho downwinders (sic) regret from all the previous explosions aimed at the “low population use” people of Idaho, the greatest State in the Greatest nation...Peter”

**Comments from Dr. Peter Rickards (Idaho Families for the Safest Energy) – Comments 3–9**

**Response:** U. S, Department of Energy (DOE) (10 CFR 1021.300-322) requirements state that “DOE may prepare an EA on any action at any time in order to assist agency planning and decision making.” DOE prepared this EA to help answer questions on environmental impacts and significance related to the use of radionuclides and disturbance of biological and cultural resources. Based on the results of the EA, and after review of this and other comments, DOE determined that the project would not result in significant environmental impacts. DOE concluded that preparation of an Environmental Impact Statement (EIS) is not required; therefore, we instead prepared a Finding of No Significant Impact (FONSI) [(10 CFR 1021.400(d)(1)(2)]. The FONSI is in the front of this EA.

DOE considered other DOE facilities, including the Nevada Test Site, but found that other sites did not meet the program expectations of conducting and supporting the training requirements that be accomplished at INL. The INL was the only site that met all of the site selection criteria (see Section 2.2, page 4, ‘Site Selection Criteria’). Specifically, the Nevada Test Site did not meet several criteria, such as (1) proximity to facility that produces a diverse inventory of radionuclides, including the dispersed radioactive material, (2) previous experience with KBr irradiation and dispersal, and (3) lack of expertise in National Technical Nuclear Forensics exercise planning or training.

**Susan Burke, INL Coordinator, Department of Environmental Quality (State of Idaho) – Comments 10–15**

**Comment 10:** “Please note that any that any (sic) activities at a CERCLA site will require completion of a Notice of Soil Disturbance.”

**Response:** The proposed North Range is adjacent to a CERCLA site. The site is under institutional controls and entry is restricted. The proposed RRTR project does not intend to enter, use, or otherwise disturb the CERCLA site. Project personnel will conduct briefings as an administrative control to those involved in training exercises on the location of CERCLA sites and the requirement to not enter those restricted sites.

**Comment 11:** “Under Table 1, *Activities to Prepare Sites*, it is unclear what amount of KBr will be at a range at any one time. The EA states that DOE will use “about 600 gallons/test water to apply the KBr”. Does that mean there will be 600 gallons of KBr present at the exercise? Is there secondary containment for the KBr mixed with test water? Will the KBr be transported on public highways in liquid form?”

**Response:** The total amount of KBr at the range can be up to 500 grams, containing a total activity of 1 Ci. The KBr (up to 500 grams) will be mixed with up to 600 gallons of water to allow the material to be dispersed appropriately. There is no secondary container; the sprayer is loaded in the test site and is the primary container. No radioactive liquids are shipped over the road.

**Comment 12:** “Please clarify how often wind speeds will be measured and monitored. Also clarify where the wind speeds will be measures, i.e. at ground level or at some predetermined height.”

**Response:** Project personnel will use a hand-held anemometer, such as the Speedtech Windmate 300. These hand-held instruments have an accuracy within three percent. The height for wind speeds will be at 5 feet from ground level at the point of release. Wind speed and direction will be recorded for each release. They will only be monitored at the time of release, or for spraying applications for the duration of the spraying period.

**Changes to EA:** See changes to Section 2.3, Table 1, under Operational Activities, page 6.

**Comment 13:** “Under Table 2, *Releases of radionuclides to the environment*, the EA states that periodic biota does (sic) assessment will be performed at either the North or South Training Range. It is not clear why this assessment would not be performed at both the North and South Training Range. Also, please clarify where specific information on the biota assessments (methodologies, types of measurements, list of species, etc.) can be found.”



**Susan Burke, INL Coordinator, Department of Environmental Quality (State of Idaho) – Comments 10–15**

**Response:** The INL will conduct biological assessments at both the North and South Training Range.

**Changes to EA:** See changes to Section 2.5, Table 2, page 12 and Section 4.1.2.1, page 19, Radiological Assessment and Section 6.0, page 25, References DOE 2002; DOE 2004; and !CRP 2004.

**Comment 14:** The EA states that contaminated equipment, temporary structures, and clothing will be stored until radionuclides are decayed to levels below detection but it does not address where the items will be stored ... Will the items be shipped as low-level radioactive waste to some location?"

**Response:** Large contaminated equipment, structures will remain within the Test range until the INL Radiological Control personnel clears them for release. Contaminated clothing will be stored in radiation bags in cargo containers at the Test Range until disposed as Low level waste (MFC).

**Changes to EA:** See changes to Section 2.3, Table 1, under Training Exercise Activities, page 7.

**Comment 15:** –The EA should identify any physical controls and their effects. For example if fencing will be used, the impact on soils and wildlife should be addressed. It is also unclear how control will be established around a working gravel pit.”

**Response:** Project personnel will use signs posted on sawhorse type mounts or fence posts at the entrances to the training ranges and other access points to the radiologically controlled areas. The entrance areas are already highly disturbed with gates, roads, ditches, and so forth. Project personnel will control access at the North Training Range by locking the gate at the entrance to the radiation areas and placing radiation/contamination boundary signs. In addition, project personnel will notify INL Security for periodic patrols of the area.

**Changes to EA:** See changes to Section 2.5, Table 2, page 12.

**Christine B. Reichgott, Manager, Environmental Review and Sediment Management Unit,  
U. S. Environmental Protection Agency, Region 10 – Comments 16–20**

**Comment 16:** –The DEA does not currently quantify impacts (sic) to these habitat and wildlife resources [sage-grouse and pygmy rabbit and their habitat] making it difficult to clearly distinguish between the proposed sub-alternatives. Under NEPA, the EA document should contain supporting data and references that convincingly show the proposed action would not significantly affect environmental and other resources within and around the analysis area.”

**Response:** DOE believes the information given in the draft EA gives sufficient information to distinguish between sub-alternatives and convincingly support the conclusion that neither sub-alternative would result in significant environmental impacts. The draft EA does quantify and summarizes current survey data gathered specifically for this project (see Section 4.1.2, 4.1.2.1 and 4.1.2.2, pages 17-21) and the referenced document Blew, et al., 2010, discusses survey results over the INL Site. The draft EA specifically mentions the loss of 2-100 x 100 foot sagebrush areas north of the gravel pit (Alternative 1a), and no loss of habitat south of the gravel pit (Alternative 1b).

The data contained in the draft EA (see Sections 4.1.2, 4.1.2.1, & 4.1.2.2, pages 17-21) gives sufficient information to state that neither sub-alternative would result in a significant loss to sage grouse or pygmy rabbit populations or their habitat on the INL (see above paragraph). The loss of 2-100 x 100 foot areas of habitat due to sub-alternative 1a is minimal in context to the overall populations and habitat on the INL and within the region. In addition, direct impacts to sage grouse, pygmy rabbits and cultural resources would be unlikely because the EA requires surveys for nesting bird, pygmy rabbits, and cultural resource surveys before disturbing areas to place command centers (see Section 2.5, Table 2, page 12).

**Comment 17:** Given the usage of the project area by sage-grouse, pygmy rabbits and other sensitive wildlife species (p. 18) and lack of current survey data for the species, it is important that DOE work with the U. S. Fish and

**Christine B. Reichgott, Manager, Environmental Review and Sediment Management Unit,  
U. S. Environmental Protection Agency, Region 10 – Comments 16–20**

Wildlife Service (USFWS) and the Idaho Department of Fish and Game (IDFG) to determine the level of risk to the species and identify effective ways to reduce the risk.”

**Response:** The draft EA does summarize current survey data gathered specifically for this project (see Section 4.1.2, page 17). In addition, the referenced document, Blew, R.D. et al., 2010, discusses survey data for sage-grouse and pygmy rabbits from across the INL.

As described in Section 5 of the EA, DOE notified the U. S. Fish and Wildlife Service and the Idaho Department of Fish and Game through the public notification of all stakeholders. In addition, the U. S. Fish and Wildlife Service and DOE visited the North Training Range and discussed project activities. DOE also sent a personal invitation for the Sage-Grouse local working group, of which the Idaho Department of Fish and Game is a member to review and comment on the draft EA (see lead-in paragraph to this Appendix). In addition to the stakeholder notifications, DOE and the U.S. Fish and Wildlife Service are working on a Candidate Conservation Agreement to help protect and reduce risk to sage-grouse and pygmy rabbits and their habitat.

**Comment 18:** –EPA also encourages DOE to select the Sub-alternative 1b and South Training Range for implementation of the project because these options would result in the least impacts to biological resources”

**Response:** DOE also recognizes the difference in potential impact between the two sub-alternatives. However, neither alternative represents an adverse or significant impact on cultural or biological resources when considering the operational controls placed on project activities.

**Comment 19:** –The final EA should evaluate cumulative effects consistent with the EPA guidance mentioned above.”

**Response:** DOE concurs and added additional information in the EA to address (1) those resources that may be affected by cumulative impacts; (2) their geographic boundaries, (3) past, present, and reasonable foreseeable activities; (4) baseline conditions, and (5) thresholds.

**Changes to EA:** See Section 4.1.2.1 Alternative 1a ‘Maximizing Project Flexibility’ under ‘Cumulative Impacts’ on page 20.

**Comment 20:** –We recommend expanding public involvement to other potentially interested and affected entities such as IDFG and private citizens. The final EA should then include a summary of issues raised by these entities about the project, and a discussion on how the issues will be resolved.”

**Response:** DOE believes there was sufficient involvement with public entities and the public through briefings, tours, and stakeholder notifications. As described in Comment #17, the U. S. Fish and Wildlife Service, Idaho Department of Fish and Game, and the Sage-Grouse Local Working group, as well as other public agencies received copies of the EA for comment. In addition, DOE gave briefings to the Idaho Department of Environmental Quality, the Army Corps of Engineers, and the Shoshone-Bannock Tribes. DOE received comments from Idaho DEQ and the Tribes (See Section 5 of the EA). The FWS and Idaho DEQ took the opportunity to tour the parts of the RRTR locations.

**Mr. Willie Preacher, Shoshone-Bannock Tribal/DOE Director & Ms. Christina Cutler, Shoshone-Bannock Tribal DOE Environmental Specialist – Comments 21–28**

**Comment 21:** “... we want to reiterate the utmost protection of the environment (flora, fauna, and the aquifer), the safety of training range personnel, INL workers, or others that may be impacted by this training range. Tribes sometimes utilize some of the areas on the INL and the concern for contamination outside of the training range may impact them.”

**Response:** DOE will take the utmost precautions when conducting training exercises to protect the environment, the public, and the worker. The EA describes project controls that project personnel will follow to protect resources and people. Appropriate notifications and barriers will make individuals coming on site aware of ongoing training exercises and contamination areas.

Also see response to Comment #15.

**Comment 22:** Is there a possibility [of the Tribes] taking some baseline soil samples and analyze for background contamination and do so periodically on or near the training range.”

**Response:** Yes, the Tribes would have the opportunity to conduct co-sampling activities at the RRTR Training Ranges pursuant to the Agreement in Principle and as provided by the Cooperative Agreement. Tribal co-sampling would occur as part of INL’s monitoring and sampling program in support of the RRTR to help verify data and maintain quality assurance. DOE will provide sufficient advance notice of opportunities for Tribal representatives to participate in co-sampling efforts at the range, in conjunction with project sampling activities for short and long-lived radionuclides.

**Comment 23:** The Tribes would also like to have a periodic update on the progress of the training range and the results and how this will assist in the safety of the United States national security.”

**Response:** DOE appreciates the Tribes interest in knowing that the RRTR is being effectively used to further our national security interests. DOE will provide updates on the use of the RRTR upon request in coordination with the DOE Tribal Liaison as appropriate opportunities and the level of use warrant.

**Comment 24:** “After the training range’s mission is complete what will be done to “cleanup” this area and is there a plan [to] restore the area to its original state back prior to the development of the training range.”

**Response:** Before using the range(s), DOE’s M&O Contractor will sample the soil located within the range as well as downwind from the range(s). When use of the ranges has ceased, DOE will again sample soils, analyzing for short- and long-lived radionuclides. Based on the small amounts of material released and the short half-lives of most of the material, it is expected the ranges will be released for unrestricted use. In other words, it is expected that the concentration of radioactive material will be very similar to what was present before testing. No remediation or Long Term Stewardship is anticipated.

**Comment 25:** “Will there be a need for a long term stewardship plan for this area?”

**Response:** See response to Comment #24.

**Comment 26:** “Will the Tribes Emergency Response personnel get to participate in the training activities?”

**Response:** DOE appreciates the Tribes interest in having their emergency response personnel participate in training activities at the RRTR. Training activities will be uniquely tailored to satisfy sponsor requirements. It is envisioned that some activities will provide opportunity for joint training with cooperating organizations. In these cases, DOE will communicate the opportunity and coordinate that participation through the DOE Tribal Liaison.

**Mr. Willie Preacher, Shoshone-Bannock Tribal/DOE Director & Ms. Christina Cutler, Shoshone-Bannock Tribal DOE Environmental Specialist – Comments 21–28**

**Comment 27:** —Can the Tribes conduct multimedia environmental sampling in this area?

**Response:** Consistent with the response to Comment 22 the Tribes would be allowed to co-sample in conjunction with environmental sampling conducted in support of the RRTR. In addition to soil samples, INL will periodically conduct biological assessments (see response to Comment 13) for which the Tribes would be welcome to conduct co-sampling activities. As analyzed in the EA there is no potential for the activity to impact water resources as a result no additional environmental sampling will be performed.

**Comment 28:** —What is the agencies (sic) preferred alternative and why isn't there a section on this in the draft handout from August 2010?"

**Response:** The "Proposed Action" may be the same, but not necessarily the agencies' "Preferred Alternative". Because DOE's intent was to determine if the proposed action had the potential for significant environmental impact and either Alternative 1a or 1b would meet the purpose and need. DOE believed it was not necessary to declare either option as the "Preferred Alternative". DOE believes that while Alternative 1b may be the "Environmental Preferred" alternative, both alternatives can achieve the purpose and need without significant impacts to natural, cultural, or biological resources or create significant health risks to a member of the public or worker.