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

December 06, 2006

SUBJECT: Environmental Assessment for National Security Test Range (R&D-NS-06-048)

Dear Citizen:

Thank you for your interest in the revised Environmental Assessment (EA) for the National Security Test Range.

Your comments on this project and the potential environmental impacts are important to us. Please submit your comments either by e-mail to michaeds@id.doe.gov or by mail to Don Michaelson, 1955 Fremont Ave., MS 1170, Idaho Falls, ID 83415. Comments will be received until January 12, 2007. Comments submitted by mail should be postmarked by January 10, 2007 in order to be received on time.

All comments will be addressed in a Response to Comment section of the final EA. At that time, either a Finding of No Significant Impact (FONSI) or a determination that an Environmental Impact Statement for the proposed action will be issued.

Again, thank you for your interest in this important endeavor.

Sincerely,

for Raymond A. Furstenau

Elizabeth D. Sellers
Manager

IDENTIFICATION OF SIGNIFICANT CHANGES

A number of formatting and editorial changes were made to provide a more readable document.

The current document has been revised to clarify that a 30x30 ft pad will be constructed to conduct very small scale tests free from dust.

Additional information concerning the purpose and need has been provided in Section 1.

Section 2.2 was revised to provide clarity regarding the criteria used to evaluate alternatives.

Figure 4 and text in Section 3.1.6 made reference to a five mile 'closure area' around the proposed test range, implying this area would be closed during any testing. The safe stand off distances will be determined for each explosive test individually, as described in the Operational Controls listed in Table 1. The revised document has changed Figure 4 and removed the text referring to a five mile closure area.

Information has been provided in Section 3.2 regarding radionuclide levels in soils. The information had previously been located in Section 3.4, Air Quality. Additional information concerning radionuclides in soils has also been provided in the text.

Specific requirements for the frequency and timing of breeding bird surveys was added to Section 4.1.1.3.

Additional information regarding ground motion and impacts to historical/cultural sites was added in section 4.1.2.

The original Section 4.1.1.4 on Ecological Monitoring and NERP Research Activities is now Section 4.1.6.

Additional references have been added to the references list.

DRAFT

Environmental Assessment

for the

National Security Test Range

DOE/EA-1557

December, 2006

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Environmental Assessment for the National Security Test Range

The objective of this environmental assessment (EA) is to evaluate the potential environmental impacts by evaluating alternative approaches to achieve the proposed action as well as a no action alternative. This document was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190), as amended, Council on Environmental Quality NEPA Regulations [40 Code of Federal Regulation (CFR) Parts 1500-1508], DOE Order 451.1, and DOE NEPA Implementing Regulations (10 CFR Part 1021). This EA would serve as the basis for issuance of a Finding of No Significant Impact or lead to a determination that an Environmental Impact Statement is required.

1. PURPOSE AND NEED

In today's world, the country needs effective security systems to protect people and facilities against potential threats. The potential for terrorist attacks against United States interests requires governmental agencies at the federal, state and local levels to constantly evaluate the types of threats and devise appropriate systems to protect against them. Potential adversaries may use a variety of methods to accomplish their objectives including the use of explosives and explosive devices. The bombing of the Murrah Federal Building in Oklahoma City, Khobar Towers in Saudi Arabia, American Embassies in Africa, and the daily use of improvised explosive devices in Iraq highlight the variety of ways explosives are used to destroy American facilities and harm U.S. citizens. The Department of Energy (DOE) must continually test, analyze, and fortify its security systems to protect the nation's energy producing assets such as nuclear power producing reactors, oil refineries, electricity-generating stations and grids, and hydropower-producing dams.

For a number of years the Idaho National Laboratory (INL) has conducted security systems testing and research. In 2002, the DOE directed the INL to be its' Vulnerability Assessment (VA) Center of Excellence. In this role, the INL's mission responsibilities include developing DOE wide courses of instruction on how to perform vulnerability assessments, review and validation of VA methodologies and supporting software, and research and testing to validate models and assumptions used in designing buildings, protective and security systems. A key aspect of validating the modeling and design assumptions is to perform tests. The INL performs tests to determine the effects of a variety of explosives and explosive devices on DOE security systems and facilities, as well as security systems and facilities for a number of other government agencies, and the private sector. Over the past decade, adversaries have shown their willingness and ability to use ever larger quantities of explosive materials in more sophisticated ways. The INL, in support of its mission as the VA Center of Excellence, must expand its ability to test against today's potential threats.

The scope of security testing activities currently conducted by the INL includes evaluation and development of technology and protocols for the detection of trace explosives, detonation of bulk explosives, detonation of a variety of explosive devices, and the evaluation of protective measures against these threats. Testing includes the use of shoulder-fired rockets, breaching charges, and Vehicle Borne Improvised Explosive Devices. Currently, INL conducts explosive detonation activities at two locations: the Live Fire Range (LFR) with a maximum permissible limit of 200 lb Net Explosive Weight (NEW) and the Mass Detonation Area (MDA) with a limit of 500 lb NEW. Neither of these areas were designed as a testing location and each are used for other activities. The LFR is the principal location used to conduct weapons training for INL Security Forces. It is also used by state and local law enforcement for weapons training. The MDA is used to detonate unexploded ordnance found on the INL from its history

as a Naval Gunnery Proving Ground. In addition, the MDA is in close proximity to the Naval Reactors Facility (NRF) and large scale explosive tests would negatively impact the facility. Furthermore, there is a need for semi-permanent infrastructure (buried data acquisition cables, protective camera boxes and other such devices) which does not presently exist at the LFR or MDA. Installation and dismantling of this infrastructure for each test at the LFR and MDA increases the cost, preparation and dismantling time, and reduces the quality of the testing data.

Through the VA Center of Excellence, the INL is providing assistance to an increasing number of government entities. Currently INL is assisting the Department of Defense, Department of State, Secret Service, Department of Homeland Security, Nuclear Regulatory Commission, Bureau of Reclamation, the transportation departments of several states and private companies. These increasing programmatic needs require routine tests during the March-November timeframe. Most of these tests are small scale, less than 100 lb NEW. These frequent testing operations demand ongoing review, work, and daily involvement of a number of personnel with specialized expertise. These personnel define the test objectives, develop test articles, set up and calibrate test instrumentation and conduct the test. Larger scale tests require the assembly of complete systems, with larger data acquisition and instrumentation requirements. Larger scale tests also require a larger cadre of personnel to develop and conduct the tests. Therefore, there is a need for a single, readily accessible, National Security Test Range to accommodate the increasing scale and frequency of testing in support of the INL vulnerability assessment mission.

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2. ALTERNATIVES

DOE proposes to consolidate all INL explosive testing activities at one centralized location that can accommodate the increased explosives weights and eliminate scheduling conflicts. In addition, INL proposes to stop testing at the LFR and MDA.

DOE considered several alternatives for meeting its need to consolidate testing. Those included a preferred alternative and three additional alternatives: (1) consolidating test ranges on the INL into a new National Security Test Range (Preferred alternative), (2) consolidating testing at the LFR or MDA , (3) conducting testing at a non-INL location, and (4) taking no action, thereby continuing to perform testing activities at the LFR and MDA at current levels. DOE used the following criteria to determine if the preferred alternative and alternatives were reasonable. The preferred alternative or alternatives must accomplish the following:

- Provide a testing location that accommodates appropriate data collection systems.
- Provide the ability to test using a range of explosives and explosive type devices up to 20,000 lb NEW.
- Provide sufficient distance from the testing location to eliminate damage, disturbance, or injury by ground or air transmitted shock pressure and projectile fragments to buildings, structures, or the public.
- Provide an 8,750 yard safety fan.
- Be readily accessible on a continuing basis to INL personnel for their unique expertise to conduct cost-effective, secure and timely testing.
- Minimize conflict with other activities.
- Consolidate testing activities at one location.

Only one alternative meets all of the above criteria: Consolidate testing at the INL into a new National Security Test Range. This is DOE's preferred alternative.

2.1. Consolidate Testing on a New National Security Test Range at the INL (Preferred Alternative)

The preferred alternative is to develop a National Security Test Range at the INL. The proposed test range would be specifically designed and constructed to accommodate testing activities in support of analyzing the effects of explosives and explosive devices, munitions, and similar items on security systems, facilities, vehicles, structures and other materials.

Consolidation of existing activities includes relocation of ongoing and future explosives related testing at the INL. Semi-permanent infrastructure (buried data acquisition cables, protective camera boxes and other such devices) would be installed. A mowed test area would be created, as well as lay down areas for staging material, and road upgrades to allow for access to the area.

The proposed location is about 1.5 miles west of Road T-25, 7.1 miles north of the Materials and Fuels Complex (MFC), and 10 miles south of Test Area North (TAN). The proposed location is 10.9

miles to the closest INL boundary, 7 miles from the closest public road (Idaho State Highway 33 passes through the northern half of INL), 13 miles from the closest publicly inhabited building and 1.5 miles west of the Twin Buttes Grazing Allotment, where Bureau of Land Management issues grazing permits (see Figures 1 and 2).

The proposed location was selected because of its remote location on the INL with adequate separation from any surrounding population or facilities that could be affected by blast or sound and access to the area can be effectively controlled. Radiological materials have not contaminated the soil at the proposed test range and the proposed test range is in an area that does not contain unexploded ordnance.

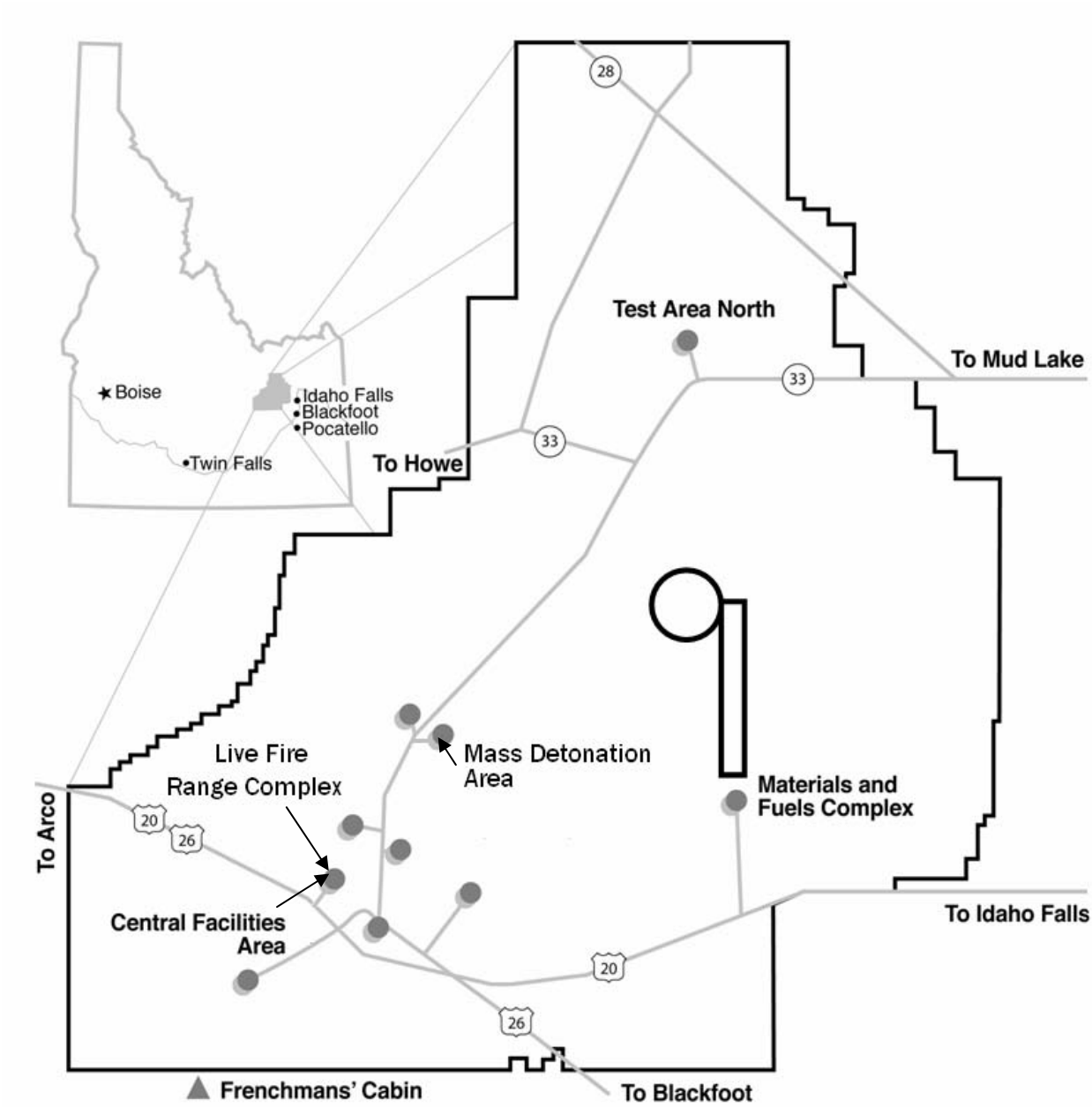

Figure 11. INL and Approximate Location of Proposed Test Range (Circle) and T-25 Road Upgrade Corridor (Rectangle).

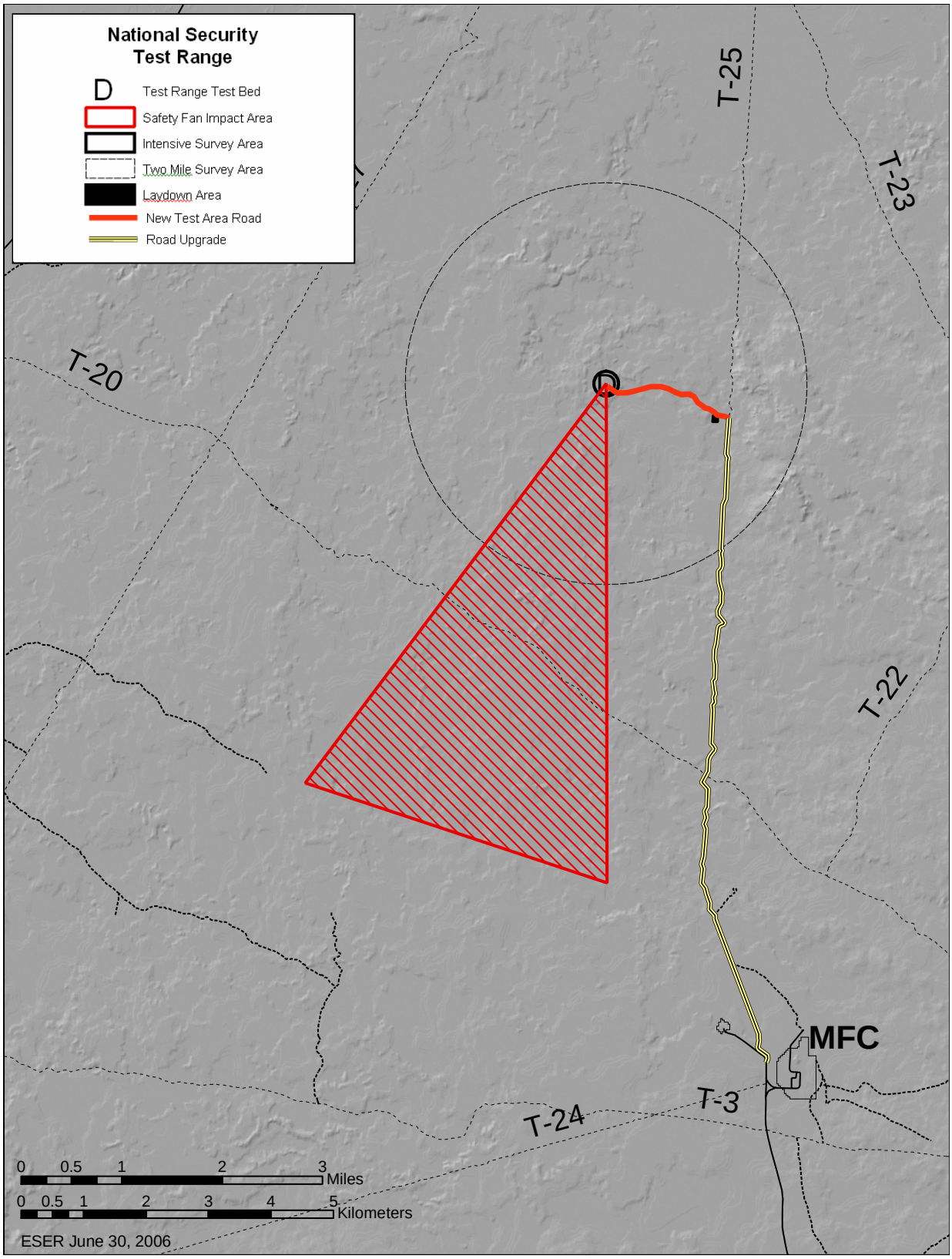

Figure 22. Proposed Test Range and Access Road T-25, (north to the top of the map).

2.1.1 Construction Activities

Proposed construction activities would include the following (see Table 1):

- Upgrading road T-25.
- Constructing a new access road and buried cable route.
- Preparing the new test range.
- Creating an earthen berm.
- Creating two lay down and administrative areas.

Project activities would not require installation of water wells, septic, or waste systems. Project personnel would use bottled water and portable sanitary facilities. In addition, portable generators would provide power for electrical needs.

2.1.2 Operational Activities

Test activities would use a variety of conventional explosive materials (see Table 2), depending on the type of testing being conducted. Typical test articles would include chain link fencing, concrete barriers, electronic sensors (microwave sensors, balanced magnetic switches, closed circuit television, etc.), security vehicles (drained of all fluids and tires removed), reinforced concrete walls, armor plates, and masonry walls. No depleted uranium will be used.

Testing conducted at the proposed range could present certain safety, health, and environmental concerns due to fragmentation, air blasts, ground shock, and projectiles. Calculated effects from a 20,000 lb NEW test at selected points of interest are shown in Table 3.

2.2 Alternatives Considered, but Eliminated from Detailed Analysis

2.2.1 Consolidate Work at One of the Current Ranges at the INL

Consolidation of work at the LFR or MDA fails to meet the following criteria:

- The ability to test using a range of explosives and explosive type devices up to 20,000 lb NEW.
- Provide sufficient distance from the testing to eliminate damage, disturbance, or injury by ground or air transmitted shock pressure and projectile fragments to buildings, structures, or the public.
- Provide an 8750 yard safety fan.
- Minimize conflict with other activities.

2.2.2 Consolidate Work at an Off-Site Facility

The performance of the INL mission as the DOE VA Center of Excellence depends upon a wide range of laboratory resources. These resources include technical experts, safety and testing support personnel, specialized data acquisition equipment, and associated materials used in testing. Project personnel are engaged in all aspects of research and testing activities at the INL and are essential and

limited resources. Removing those resources from their daily activities and programmatic responsibilities at the INL to conduct work at a distant location is not acceptable, as it would have adverse impacts upon overall program execution. The time required for transportation, test setup, analysis and after test demobilization using a distant location would be substantial.

There are currently two other DOE sites that conduct testing using explosives that were considered, the Nevada Test Site (NTS) and Sandia National Laboratory (SNL). Two Department of Defense sites, Mountain Home Air Force Base (MHAFB) and Hill Air Force Base (HAFB) were also considered as possible alternatives. Relocation of ongoing and proposed work to an off site location would not allow INL to maintain the proposed schedule of operations in an effective manner.

NTS does not meet the following criterion:

- Be readily accessible on a continuing basis to INL personnel for their unique expertise, in order to conduct cost-effective, secure and timely testing.

The NTS has a long and distinguished history of conducting very large explosives tests and has several test beds it has developed within the NNSA National Center for Combating Terrorism that would serve to adequately stage such tests. However, the logistics of developing target materials and other devices at INL, transporting such items and associated materials to NTS, conducting the necessary tests and returning to INL is overly time consuming and cost prohibitive. The travel time is not reasonable for consolidation of INL explosive testing/research activities at a centralized location at the expected testing frequency.

SNL does not meet the following criteria:

- The ability to test using a range of explosives and explosive type devices up to 20,000 lb NEW.

- Provide sufficient distance from the testing to eliminate damage, disturbance, or injury by ground or air transmitted shock pressure and projectile fragments to buildings, structures, or the public.

- Provide an 8750 yard safety fan.

- Be readily accessible on a continuing basis to INL personnel for their unique expertise, in order to conduct cost-effective, secure and timely testing.

Although SNL has historically conducted tests up to 2000 pounds NEW, the current explosives limit is 450 pounds NEW and cannot support the level of proposed activity. The logistics of developing target materials and other devices at INL, transporting such items and associated materials to SNL, conducting the necessary tests and returning to INL is overly time consuming and cost prohibitive. The travel time is not reasonable for consolidation of INL testing at a centralized location at the expected testing frequency.

Hill Air Force Base (HAFB) does not meet the following criteria:

- Be readily accessible on a continuing basis to INL personnel for their unique expertise, in order to conduct cost-effective, secure and timely testing.

- Minimize conflict with other activities.

The logistics of developing target materials and other devices at INL, transporting such items and associated materials to HAFB, conducting the necessary tests and returning to INL is overly time consuming and cost prohibitive. The travel time is not reasonable for consolidation of INL testing at a centralized location at the expected testing frequency. Additionally, the range area at HAFB is to support Air Force mission requirements.

Mountain Home Air Force Base (MHAFB) does not meet the following criteria:

- The ability to test using a range of explosives and explosive type devices up to 20,000 lb NEW
- Be readily accessible on a continuing basis to INL personnel for their unique expertise, in order to conduct cost-effective, secure and timely testing.
- Minimize conflict with other activities.

The explosives limit at the base is set at 200 pounds for both use and storage and cannot support the proposed type or level of activity. The Squadron personnel have stated that they are not able to support this type of activity on their base.

2.3 No Action Alternative

The No Action Alternative would not allow the INL to meet the mission requirements of the VA Center of Excellence. Specifically, the INL would not be able to collect test data about the effects of larger scale explosive detonations on facilities or security systems, nor would the INL be able to conduct testing at the frequency required. Under this alternative, INL would continue to conduct explosive detonation activities at the LFR and the MDA. However, no action would result in INL not consolidating activities, nor expanding capabilities to meet DOE's purpose and need to expand its testing activities to address current and future threats. The No Action Alternative would not require upgrading current roads or building new roads, or creating new lay down areas.

Table 1. Proposed Construction and Operational Activities and Controls

Proposed Construction Activities	Proposed Construction Controls
T-25 Road • Widen and gravel road T-25 from MFC to the Test Range (6.7 miles) , to accommodate the increase in traffic and make maintenance easier to complete. New Access Road/Cable Route • Construct new gravel road from T-25 to the new test range (about 1.5 miles); following land contours to the extent practicable. • Lay underground cable to the new test range along the new access roadway. • Construct small stations along the road to house monitoring and signal boosting equipment. New Test range • Mow a 900-ft diameter test range. • Install a concrete or asphalt test pad, approximately 30 feet by 30 feet, near the perimieter of the 900 ft diameter mowed area. The test pad would be used for small scale tests to provide an area free of dust for high resolution photography of effects. • Install structures to house and protect sensor and monitoring equipment. New Earthen Berm and Safety Fan • Construct a 30 ft long and 16 ft high earthen berm inside the test range as an impact area for ballistic testing. • Obtain soil for the berm by excavating the area immediately behind the berm. • Establish and mark a test range safety fan 8,750 yards long. Administrative and Lay down Areas • Construct and gravel an administrative and equipment lay down area for temporary storage of targets, equipment, and portable/temporary facilities (about 1.7 acres in size). • Construct and gravel an alternate administrative, lay down, and turnaround area within 50 ft of either side of Road T-25 for use when the size of a test prohibits use of the primary area.	• Complete the archaeological survey by surveying the perimeter of the safety fan. • Revegetate areas of soil disturbance using native seeds or wildings. • Control invasive and noxious weeds at all disturbed areas, including mowed areas, lay-down areas, the earth berm, and along access roads by implementing the Site's Plan 611 'Sitewide Noxious Weed Management'. • Provide training in cultural resource protection for all test range personnel. • Escort visiting personnel to prevent accidental disturbance of cultural artifacts. • Halt work if project personnel discover any unusual materials (i.e., bones, obsidian flakes, "arrowheads," etc.) during construction activities, and contact the INL Cultural Resource Management (CRM) Office. • Coordinate work with an INL archaeologist to avoid blading and leveling activities inside the boundaries of identified archaeological sites. • Place gravel on access roads and lay down areas to reduce fugitive dust and control erosion. • Control dust and erosion on the test range using water or soil stabilizers. • Locate the administrative area to avoid known archaeological resources. • Use ATV's when staking the safety fan. • Limit ATV travel and signage to areas outside the boundaries of any identified cultural resources to prevent disturbance.
Proposed Operational Activities	**Proposed Operational Controls**
General Activities • Coordinating all testing with INL site personnel and activities that could be affected. • Recording ground motion and air blast data at various locations both on and off the INL to document site-specific effects. • Notifications to state and local law enforcement and surrounding communities for tests of 3,000 lb NEW or larger. Testing Activities • Testing may include explosive effects, ballistic penetration, and explosive detection at the following levels of use: o The test range would be used most working days from March through November. o Use between December and February is expected to be sporadic. o Large explosive events (11,000 – 20,000 lb NEW) are expected to occur once every five years. o Mid-test range events (3,000 – 10,000 lb NEW) are expected to occur once or twice a year. o Small events (100 – 3,000 lb NEW) could occur once per month. o Very small events (less than 100 lb NEW) could occur weekly. o Small scale projectiles (30 mm or less) would probably be fired on a bi-weekly basis.	• Arrange for a breeding bird survey before each test exceeding 5,000 lb NEW during the months of February through June. • Review effects of tests on sage grouse in the area. • Monitor ground motion at nearby archeological sites during the first three experiments with greater than 5,000 lb NEW, and with every experiment at or exceeding 15,000 lb NEW, unless data indicates sites are not affected. • Limit travel to established roadways and limit speed to 15 mph to minimize dust and potential collision with and disturbance of wildlife. • Minimize disturbance by utilizing appropriate methods, which could include techniques such as seasonally timing activities, fencing, warning signs, reflectors, ultrasonic warning whistles, animal hazing, and/or awareness training. • Support yearly visits of known archaeological resources in the project area by the INL archaeologist and take additional protective

o Large projectiles (40 mm to 120 mm) would probably be fired three or four times per year.	measures as necessary. • Provide training in cultural resource protection for all test range personnel involved with operations activities. • Escort visiting personnel to prevent accidental disturbance of cultural artifacts. • Halt work if project personnel discover any unusual materials (i.e., bones, obsidian flakes, “arrowheads,” etc.) during operating activities, and contact the INL CRM Office. • Coordinate with BLM and grazing allotment holders. • Mow the test range to reduce the probability of accidental range fires. • Limit vehicular traffic to established roadways (such as T-25 and the new access road), lay down and turnaround areas, and the test range. • Limit off-road travel to foot inside the safety fan and ATV traffic around the perimeter of the safety fan. • Limit vehicle speeds to less than 15 mph. • Verify all explosive material is consumed or removed and disposed leaving no unexploded ordnance on the test range. • Remove and dispose all explosives after each test. • Remove and dispose used test articles and debris from the test range and surrounding area on a routine basis. • Monitor the test range area at least every five years for deposition/accumulation of explosive residues. • Sound a siren, generating at least 140 dB at a range of 1 mile for three minutes before all explosions exceeding 500 lb NEW. • Exclude personnel from portions of the test range safety fan when conducting tests (such as firing projectiles); and determining the safe standoff distance and exclusion zones for each test based on the type of experiment and the size of the charge used. The explosive use supervisor would determine the safe standoff distance for primary and secondary fragmentation, air blast, and noise levels. • Establish personnel check points to prevent people from accidentally entering the exclusion zones and verify the exclusion zone is clear of unauthorized personnel before conducting a test. • Evacuate all nonessential test personnel to a location outside the 140 dB sound range. • Monitor weather conditions prior to testing to identify unfavorable environmental conditions, such as high winds, temperature inversions, and low cloud cover, and postpone the test if necessary. • Aim all projectiles fired on the test range along the centerline of the test range safety fan toward the earthen berm. A projectile missing the berm would land in the test range safety fan. No depleted uranium projectiles will be used. • Not firing projectile capable of traveling more than 8,750 yards and using the safety fan as an impact area for inert projectiles only.

Table 2. List of Explosive Material That May Be Used on the Proposed Test Range

- RDX Explosives
  - Bulk RDX
  - Plastic explosives, Composition C-4 or PE-4
  - Demx
  - Shaped Charges
  - Linear Shaped Charges (LSC)
  - Flexible LSC (FLSC)
  - Explosive Cutting Tape (ECT)
  - Shock Reflecting Tape (SRT)
  - SX-2 Primasheet 2000 Sheet Explosives
  - Plastic Bonded Explosives (PBX)
  - Shoulder Fired Rockets
- Pentaerythritol Tetranitrate (PETN) Explosives
  - Bulk PETN
  - Detonation Cord
  - Sheet Explosives, DetaSheet, SX-1, Metabel, Primasheet
  - Boosters, DetaPrime
- TNT Explosives
  - Bulk TNT
  - Cast Boosters
- Ammonium nitrate (AN) Explosives
  - AN and Fuel Oil (ANFO)
  - AN Slurries
  - AN Gels
- HMX Explosives
  - Bulk HMX
- Smokeless Powder
- Black Powder Devices
  - Bulk Black Powder
  - Time fuse, Safety fuse
  - Diversionary devices, Flashbangs
- Nitroglycerine Explosives
- Dynamite
  - Straight
  - Ammonia
- Detonators
  - Electric
  - Non-electric
  - Exploding Bridge Wire (EBW)
- Binary Mixtures
  - Binex 400
  - AN-NM
  - NM-Al
  - AN-Al
  - HMX-GAP
  - Al-IPN
- Mixed Explosives
  - Semtex (50% RDX, 50% PETN)
  - Composition B, Shaped Charges, Warheads (40% TNT, 60% RDX)
  - Octal, Shaped Charges, Warheads (TNT 30%, HMX 70%)
  - Pentolite (TNT 50%, PETN 50%)
  - Dexs (PETN 40%, AN 35%)
  - Baratol, Warheads (TNT 80%, Barium nitrate 20%)
  - Explosive D, Warheads
- Tetryol (TNT 30%, Tetryl 70%)

Table 3. Calculated Effects at Selected Points of Interest for Tests Using 20,000 lbs NEW

Point of Interest	Distance from Test Range (Miles)	Sound Level (Decibels)	Ground Displacement (Inches)	Peak Ground Velocity (Inches/Second)	Acceleration (g)
Sage Brush Steppe	2.6	145	0.003	0.025	0.001
Closest Public Road	7.0	136	0.001	0.006	<0.001
MFC	7.1	136	0.001	0.006	<0.001
TAN	10.0	133	<0.001	0.004	<0.001
Nearest INL Boundary	10.9	132	<0.001	0.003	<0.001
NRF	11.6	131	<0.001	0.003	<0.001
Closest Inhabited Building	13.0	130	<0.001	0.002	<0.001
INTEC	14.8	129	<0.001	0.002	<0.001
RTC	15.8	128	<0.001	<0.002	<0.001

3. AFFECTED ENVIRONMENT

The INL is an 890 square mile DOE facility located in southeastern Idaho. The DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Program Final Environmental Impact Statement, DOE/EIS-0203-F, April 1995 (DOE 1995a), describes the physical and biological environment of the region, in general, and INL in particular. The following subsections describe specific information on ecological resources (fauna and flora), historical and cultural resources, and air and water quality as it relates to the proposed test range at INL.

The INL consists of several facility areas situated on an expanse of otherwise undeveloped, cool-desert terrain. Most buildings and structures at the INL occur within those developed site areas, which are typically less than a few square miles in size and separated from each other by miles of primarily undeveloped land. DOE controls all land within the INL. The INL 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, and Blackfoot, located to the East and South, and several small cities (<10,000) located around the site, such as Arco, Howe, Mud Lake, and Atomic City. Craters of the Moon National Monument is 40 miles to the west and Yellowstone and Grand Teton National Parks are located less than 60 miles to the Northeast. There are no permanent residents on the INL.

The proposed location has not been subjected to INL construction or project activities, however it is an area that was burned by a wildfire in 1999. Figure 3 depicts the general landscape of the location.

Figure 33. View of the Proposed Test Range (North to South).

3.1 Ecological Resources

The following sections provide site-specific information on the plant communities (including invasive and sensitive species), ethnobotany, and wildlife resources of the proposed range. Much of the information comes from a report prepared by S. M. Stoller, Inc. (Blew, et al, 2006)[1].

3.1.1 Plant Communities

Two distinct vegetation community types occur around the proposed test range. One plant community type occurs on basalt outcroppings and in the shallow soils on ridges immediately adjacent to those outcroppings. The second plant community type occurs in the deep, well-drained sandy soils in the basins and bowls around the basalt outcroppings. Additionally, nearly half of the two-mile radius survey area and nearly all of the intensive survey area burned in a 1999 wildfire; thus each of the vegetation communities are present in burned and unburned condition.

The vegetation communities of the burned portion of proposed test range are characteristic of excellent condition sagebrush steppe subsequent to wildland fire. Native perennial grasses with abundant native perennial and annual forbs dominate these communities. Some resprouting shrubs are also present within the vegetation communities. Data from a recent fire ecology study in the area indicate that the cover and density of native grasses and forbs are similar to other burns of the same age and are similar to cover and density of those species in unburned areas on the same soil type (R.D. Blew unpublished data).

In the burned area of the proposed test range, native perennial grasses that dominate the plant community on the ridges adjacent to basalt outcroppings include needle-and-thread grass (*Hesperostipa comata*) and Indian ricegrass (*Achnatherum hymenoides*). Sandberg bluegrass (*Poa secunda*) and bottlebrush squirreltail (*Elymus elymoides*) are also present in shallow soils on the ridges. Common perennial forbs on the basalt outcropping and on the adjacent ridges include ballhead ipomopsis (*Ipomopsis congesta*), turpentine wavewing (*Pteryxia terebinthina*), and cushion buckwheat (*Eriogonum ovalifolium*). Native annual forbs common in this community type include nodding buckwheat (*Eriogonum cernuum*), flatspine stickseed (*Lappula occidentalis*), and Pinyon Desert cryptantha (*Cryptantha scoparia*). Broom snakeweed (*Gutierrezia sarothrae*) and dwarf goldenbush (*Ericameria nana*) are abundant shrubs on outcroppings in this vegetation community, and green rabbitbrush (*Chrysothamnus viscidiflorus*) and gray horsebrush (*Tetradymia canescens*) are resprouting shrubs that occasionally occur along the ridges. Two species of non-native, weedy species, cheatgrass (*Bromus tectorum*) and musk thistle (*Carduus nutans*) also occur on the basalt outcroppings; cheatgrass can become quite abundant on some outcroppings.

The deep, sandy soils of the basins and bowls in the burned area are dominated by needle-and-thread grass and thickspike wheatgrass (*Elymus lanceolatus*). Patches of Douglas' sedge (*Carex douglasii*) also occur occasionally throughout this community type. This plant community has a very high diversity of native perennial forbs. Abundant perennial forb species include painted milkvetch (*Astragalus ceramicus*), lemon scurfpea (*Psoralidium lanceolatum*), sand dock (*Rumex venosus*), fernleaf biscuitroot (*Lomatium dissectum*), thorn skeletonweed (*Stephanomeria spinosa*), pale evening primrose (*Oenothera pallida*), and tapertip hawksbeard (*Crepis acuminata*). However, many additional forb species occur regularly and may be locally abundant. Introduced species are relatively rare in this plant community and occur occasionally. Introduced species include Russian thistle (*Salsola kali*) and desert alyssum (*Alyssum desertorum*).

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[1] Unless otherwise noted, information given on ecological resource of the proposed project area comes from a S. M. Stoller, Inc. report (Blew, et al, 2006).

Vegetation communities found in the project area include Sagebrush Steppe, Sagebrush/Rabbitbrush, Rabbitbrush, Native Grasslands, Crested Wheatgrass, and Annual/Playas/Disturbed Area (Blew, et al. 2006; BLM, 2003, Anderson et al., 1996; and McBride et al., 1978).

An extensive, but not exhaustive, species list including species from both community types in the burned and unburned areas is found in Blew, et al. 2006.

3.1.2 Invasive and Non-Native Species

Eleven Idaho noxious weeds have been identified on the INL . Of those, only musk thistle (*Carduus nutans*) and Canada thistle (*Cirsium arvense*) presently occur in the project area. Other significant non-native and/or invasive plants found on or near the proposed road corridors include cheatgrass, Russian thistle (*Salsola kali*), halogeton (*Halogeton glomeratus*), tumble mustard, and crested wheatgrass.

Musk thistle and Canada thistle are both very common noxious weeds on the INL . Canada thistle appeared only once in the survey, along T-25. Musk thistle was found within the intensive survey area at the proposed test range.

Cheatgrass is present on most of the road segments and dominates some areas along T-25. Halogeton is present on many of the road segments as well.

3.1.3 Sensitive Plant Species

A list of sensitive plant species that potentially occur within the area affected by the proposed test range and the road upgrades was compiled using data from the Idaho Conservation Data Center (CDC 2006). All sensitive species known to occur in Butte, Custer, Jefferson, Bonneville and Bingham counties were considered. Species with habitat requirements similar to the conditions occurring in and around the proposed test range are included in Table 4.

Table 4. Sensitive Plant Species Potentially Occurring on or Around the Proposed Test Range

Scientific Name	Common Name	State	USFS Reg. 4	BLM
Astragalus aquilonius	Lemhi milkvetch	GP3	S	TYPE 2
Astragalus ceramicus	painted milkvetch		W	
Astragalus diversifolius	meadow milkvetch	GP2	S	TYPE 3
Camissonia pterosperma	wing-seeded evening-primrose	S		TYPE 4
Eriogonum capistratum var. *welshii*	Welsh's buckwheat	GP2	S	TYPE 3
Ipomopsis polycladon	spreading gilia	2		TYPE 3
Silene scaposa var. *lobata*	Lost River silene	M		

3.1.4 Ethnobotany

Vegetation plot data collected along T-25 and the proposed access road were analyzed for the frequency of occurrence of several species of ethnobotanical interests. Additionally, a vegetation plot was

surveyed in the proposed lay down area and a vegetation plot was surveyed at the center of the proposed test range (Blew, et al., 2006). Anderson et al. (1996) compiled a list of species thought to be of historical importance to local Native American tribes from Plant Communities, Ethnoecology, and Flora of the Idaho National Engineering Laboratory. The list includes those species documented to have been used by "indigenous groups of the eastern Snake River Plain" (Anderson et al. 1996).

Twenty-five species of ethnobotanical concern were documented in the vegetation survey plot at the center of the proposed test range, and 16 species were documented in the plot surveyed at the lay down area. With the exception of *Lygodesmia grandiflora*, most of the species found in the plots at the center point and lay down area are common across the INL . *Lygodesmia grandiflora* can be found elsewhere on the INL but its populations are much more restricted in abundance and distribution than the other species of ethnobotanical interests found in those plots. As with the species of ethnobotanical concern found at the center point and lay down area, many of the species found in the survey plots along the road are commonly found and widely distributed across the INL . Species with relatively lower abundances and more restricted distributions both along the route and across the INL include *Allium textile*, *Carex douglasii*, *Delphinium andersonii*, *Lomatium foeniculaceum*, *Lygodesmia grandiflora*, *Oenothera pallida*, *Packera cana*, *Ranunculus glaberrimus*, *Sporobolus cryptandrus*, and *Stephanomeria spinosa.*

3.1.5 Wildlife Resources

Scientists at the INL have been collecting wildlife data for more than 30 years and have recorded a total of 219 vertebrate species (Reynolds et al. 1986) occurring at the INL, many of which are directly associated with sagebrush steppe habitat. After the fire that occurred during 1999 in the proposed project area, the habitat changed from a dominant sagebrush ecosystem to dominant grassland system, which contained a scattering of sagebrush plants and lava outcroppings. This changed how wildlife utilizes the immediate area. Although species such as the pygmy rabbit (*Brachylagus idahoensis*), sage sparrow (*Amphispiza bilineata*), and Brewer's sparrow (*Spizella breweri*) are dependent upon sagebrush, species that thrive in grasslands such as elk (*Cervus elaphus*), mountain cottontail (*Sylvilagus nuttallii*), horned larks (*Eremophila alpestris*), and vesper sparrows (*Pooecetes gramineus*) predominate; sagebrush dependent species, such as the sage grouse, continue to flourish in the surrounding sagebrush areas and may live in the adjacent grasslands.

Species that permanently reside in the proposed project area include small and medium-sized mammals (e.g., bushy-tailed woodrat [*Neotoma cinerea*], Ord's kangaroo rat [*Dipodomys ordii*], black-tail jackrabbit [*Lepus californicus*], mountain cottontail, long-tailed weasel [*Mustela frenata*], badger [*Taxidea taxus*]), and reptiles (sagebrush lizard [*Sceloporus graciosus*] and gopher snake [*Pituophis catenifer*]). These species have small home ranges, limited mobility, or a social structure that restricts movement.

The western rattlesnake (*Crotalus viridis*), gopher snake (*Pituophis catenifer*), northern sagebrush lizard (*Sceloporus graciosus graciosus*), and short-horned lizard (*Phrynosoma douglasii*) were observed using rocky outcroppings that surround the proposed project area. At the INL these habitats are typically associated with volcanic features such as craters, cones, and lava tubes. The presence of rattlesnakes and gopher snakes suggests that a snake hibernaculum (wintering area) is present in the general area.

Two species considered uncommon on INL, leopard lizards (*Gambelia wislizenii*) and desert striped whipsnakes (*Masticophis taeniatus*), have only been found in this general area of INL (Linder and Sehman 1978) and were not observed during our survey. All Idaho reptiles and amphibians (except bullfrog) are classified as protected non-game species. This designation is held at the state level to help protect populations (Idaho State Department of Fish and Game 2005).

Several species of small mammals were observed using the proposed project area. These include black-tailed jackrabbit, mountain cottontail, Townsend's ground squirrel (*Spermophilus townsendii*), bushy-tailed woodrat, Ord's kangaroo rat, deer mouse (*Peromyscus maniculatus*), and montane vole (*Microtus montanus*). Although these species are not listed on any sensitive list, they do provide a food resource for many that are, such as prairie falcon (*Falco mexicanus*), ferruginous hawk (*Buteo regalis*), bald eagle (*Haliaeetus leucocephalus*), and golden eagle (*Aquila chrysaetos*). These small mammal species also provide a major prey base for coyotes (*Canis latrans*) and bobcats (*Lynx rufus*) using the proposed project area.

Many species use the proposed project area in a transitory manner. Species that use the area in this manner are in search of prey or forage, areas to reproduce, or shelter from the elements. Although sage grouse primarily use sagebrush-dominated areas, droppings observed in the surveyed area suggest that they frequent the proposed project area. Nests of sagebrush obligate birds located in the area include sage sparrow (*Amphispiza belli*), Brewer's sparrow (*Spizella breweri*), and sage thrasher (*Oreoscoptes montanus*). Other species of birds observed using the area included horned lark, western meadowlark (*Sturnella neglecta*), vesper sparrow, grasshopper sparrow (*Ammodramus savannarum*), loggerhead shrike (*Lanius ludovicianus*), rock wren (*Salpinctes obsoletus*), common nighthawk (*Chordeiles minor*), red-tailed hawk (*Buteo jamiacensis*), ferruginous hawk, prairie falcon, and common raven (*Corvus corax*). Each of these is protected under the Migratory Bird Treaty Act , 16 USC 703-712. Although ferruginous hawks were not observed nesting within 3.2 km (2 miles) of the proposed area, they have been documented using nests that are currently occupied by red-tailed hawks, which are found within the project area, and along T-25. Unoccupied nests and use of nests by other raptor or corvid species does not eliminate nesting activity in future years by ferruginous hawks. In addition, bald eagles have been observed using the general area during the winter, and golden eagles have been observed using the area throughout the year.

Although the 1999 burn resulted in a significant long-term impact on nesting habitat, sage grouse still occupy areas of dominant sagebrush adjacent to the proposed test range during the winter and spring (Blew, et al., 2006). It is likely that they use the proposed test range in a transitory manner year-round.

Populations of pygmy rabbits on the INL lands may be relatively stable because much of the site remains undisturbed; however, little is currently known about the status of pygmy rabbit populations on the INL lands.

Both elk and pronghorn (*Antilocapra americana*) were observed using the proposed project area during the survey. Mule Deer (*Odocoileus hemionus*) also occur on the INL but were not observed during this survey. Big game surveys that have been conducted every winter and summer indicate that big game species use the proposed project area at various times throughout the year (Blew, et al., 2006). Elk and pronghorn benefit from fires due to the increased herbaceous vegetation production. A research study conducted on INL lands (Comer 2000) found that elk used the general area, including the proposed project area, for calving purposes. In addition, pronghorn have been observed using the area for fawning. Large herds, numbering more than 130 individuals, have been observed using the proposed project area during different times of the year.

Even though nocturnal species such as bats are difficult to locate during daytime surveys, past studies (Haymond 1998) indicate bats use the INL lands throughout the year. The western small-footed Myotis (*Myotis ciliolabrum*) is considered the most abundant bat on the INL lands during the spring and summer. They roost in sagebrush, junipers, buildings, and rocky outcroppings. Townsend's big-eared bat (*Corynorhinus townsendii*), a BLM sensitive species (BLM 2003), has been documented as roosting in caves and lava tubes throughout the INL (Earl and Morris 1995) as recently as 2003 (Earl 2003).

3.1.6 National Environmental Research Park

The INL is also the site of the Idaho National Environmental Research Park (NERP). Congress established the NERP program in the early 1970s. Idaho NERP was chartered in 1975. NERPs are field laboratories set aside for ecological research, for study of the environmental impacts of energy developments, and for informing the public of the environmental and land-use options open to them. According to the NERP Charter, those goals have been articulated in the NEPA, the Energy Reorganization Act, the Department of Energy Organization Act, and the Nonnuclear Energy Research and Development Act. The public's concern about environmental quality was translated through NEPA into environmental goals, and NERP provides a land resource for the research needed to achieve those goals. The NERP Charter allows that, while execution of the program missions of DOE sites must be ensured, ongoing environmental research projects and protected natural areas must be given careful consideration in any site-use decisions.

The primary objectives for research on NERP are to develop methods for assessing the environmental impact of energy development activities and to develop methods for predicting and mitigating those impacts. NERP achieves these objectives by facilitating use of this outdoor laboratory by university and government researchers. Several research and monitoring projects have study sites near the proposed facility and roads (Figure 4).

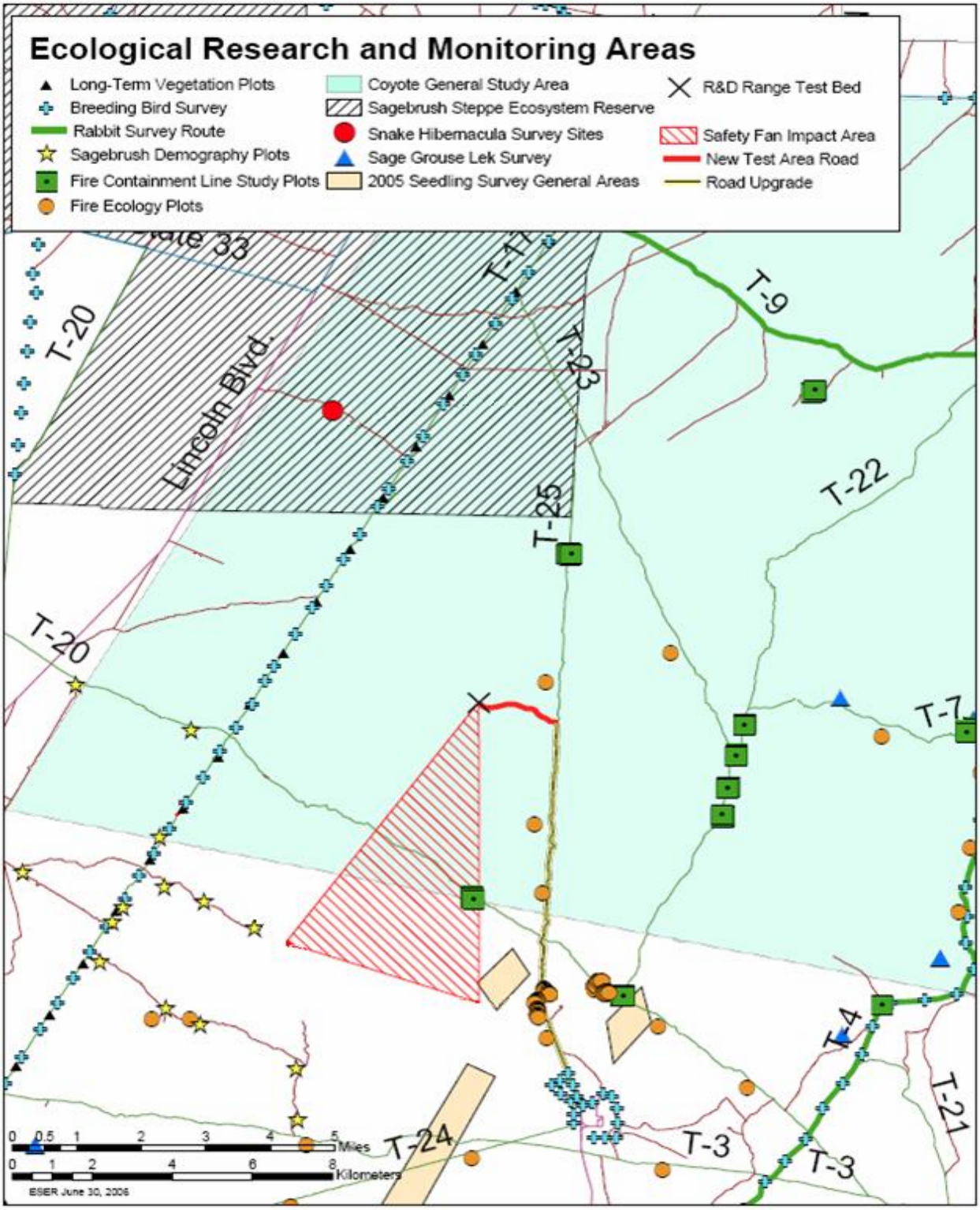

Figure 44. NERP Ecological Research and Monitoring Plots and Study Areas in the Vicinity of the Proposed Test Range.

The Long-Term Vegetation Plots were established in 1950 and have been read on a regular basis since then. The data from these plots represents one of the longest rangeland vegetation databases in the western U.S. The plots are currently being surveyed.

A recent research project studying vegetation recovery following wildland fires established plots near the proposed road corridors. The plots were established with the expectation of being used as a long-term monitoring plot for assessing vegetation recovery following a fire. Some of these plots are very near T-25, north of MFC.

A new study of the population biology of sagebrush, underway in 2006, has plots just within or on the periphery of a 5-mile radius of the proposed test range.

In 2004, researchers from Utah State University initiated a research project to study fine-scale movement patterns of coyotes. As part of this study, 30 adult coyotes were fitted with very high frequency telemetry radio collars. Some of these animals were also fitted with collars that record Global Positioning System locations. The home range of some of these animals includes the proposed test range.

In addition to the NERP activities described above, additional DOE-sponsored ecological monitoring is conducted near the proposed test range (Figure 4). Two Breeding Bird Survey routes on the INL are in the vicinity of the proposed project. One route follows the fence line around MFC, and the other follows T-17 from Power Burst Facility to Highway 28. These routes are surveyed during June each year and are shown in Figure 4.

Secretary of Energy Bill Richardson established the SSER in 1999 for the purpose of conservation of native plant communities and to provide for the study of an undisturbed sagebrush steppe ecosystem. No explosives activities will be conducted within the area of the SSER and little or no entry to the area is anticipated.

3.2 Soils

The soils in the area of the proposed test range are generally sand over basalt. (Olson, et al., 1995) identified the soils in the area as the Grassy Butte-Rock Outcrop Complex. This complex of soils includes a number of soil mapping units. Grassy Butte's stony, loamy sand makes up about 30% and the Rock Outcrop makes up about 20% of the area in this soil complex.

The remaining 50% of this soil complex consists of about equal parts of Grassy Butte 10 to 40 inches deep to bedrock, Grassy Butte 40 to 60 inches. deep to bedrock, Matheson loamy sand, Bondfarm sandy loam, and Grassy Butte loamy sand. The soil at the lay down area is most likely the Grassy Butte series. The proposed new road will likely intersect areas of Grassy Butte and Rock Outcrop. Based on topographic position, the proposed test range and much of the 650 ft. surrounding impacted area are likely Bondfarm sandy loam.

Both the Grassy Butte and the Bondfarm sandy loam have a very high hazard of soil blowing (wind erosion). The very high hazard of soil blowing imparts certain limitations to use of these soils (Olson et al., 1995). They are not suited to mechanical rangeland management treatments including seeding. These soils are classified as Land Capability Class VIIe and have very severe limitations that make them unsuitable for cultivation due to erosion.

Soil at the proposed test range was sampled for radionuclides using Cs-137 as an indicator. The Cs-137 concentration averaged over a 9-in. depth was 0.22 pCi/g, within the lowest range of the background concentration generally quoted for INL (0.44 ±0.22 pCi/g; Table 23 of Rood, et al., 1995).

The proposed test range is in a remote area of the INL where radionuclides in soil are either from natural sources, airborne deposition from distant INL activities, or from worldwide fallout. As part of the routine soil sampling program conducted on the INL site, four locations were sampled during the summer of 2006. The four sampled locations are north, south, east and west of the proposed test range. Data from these samples correlate well with the sample taken at the proposed test range. Figure shows the sampling locations, shown by purple numbers.

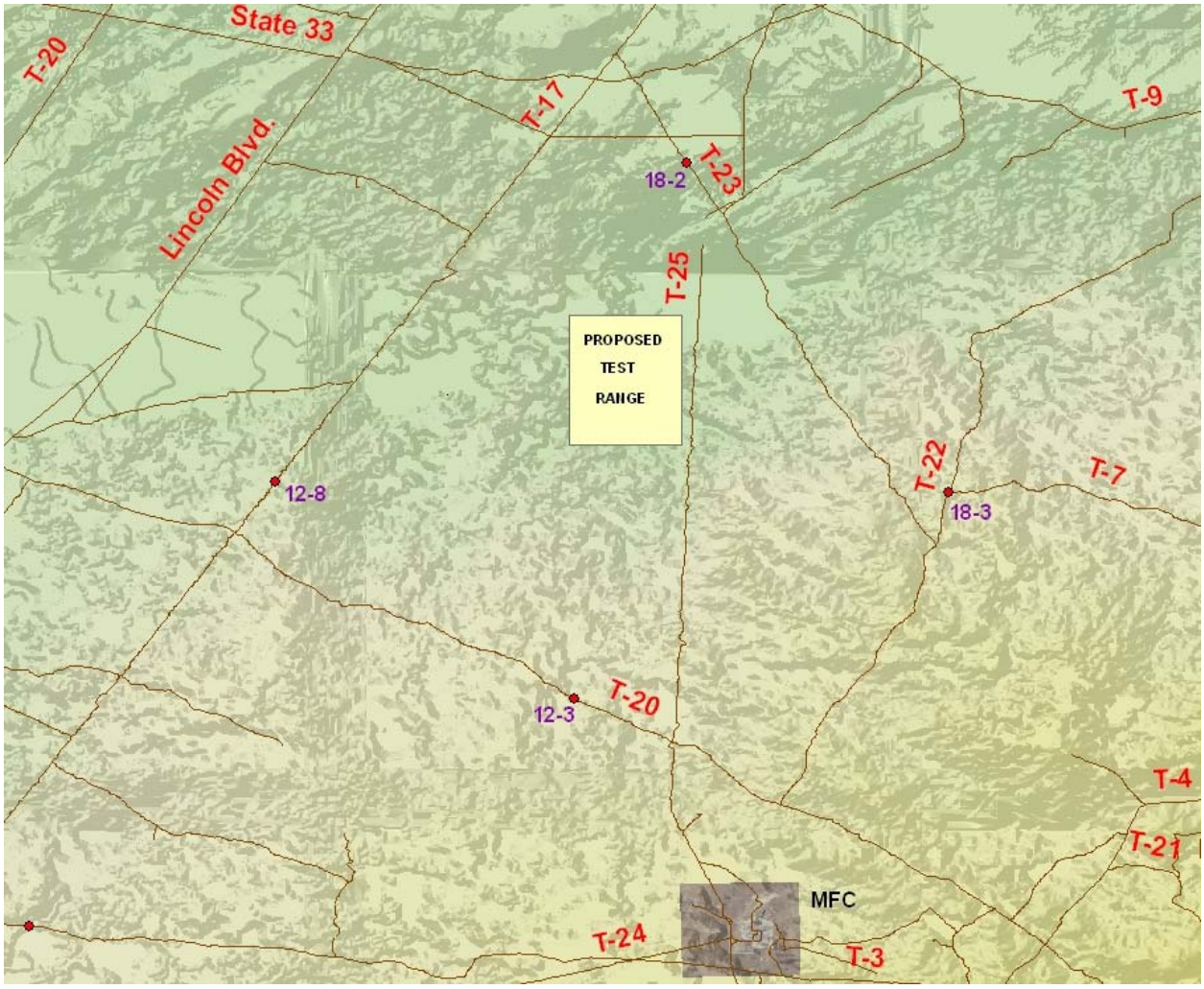

Figure 5. Location of soils samples surrounding the proposed test range.

3.3 Historical/Cultural Resources

For human populations, the INL site area has always had much to offer. Native American hunter-gatherers, who probably utilized the area on a seasonal basis for more than 12,000 years, found game animals and useful plants in abundance and nearby Big Southern Butte was attractive for the obsidian toolstone that outcrops near its crest. Members of the Shoshone-Bannock Tribes today continue to value a variety of resources and settings found on INL lands. Within the last 150 years, emigrants began to pass through the area along a northern spur of the Oregon Trail (Goodale's Cutoff). Soon thereafter, early homesteaders sought to harness the intermittent flows of the Big Lost River and transform sagebrush flats into green pastures. Few were successful, but the failure of their efforts opened the area for use of another kind. The remote and largely uninhabited expanse of the northeastern Snake River Plain was well suited for the test firing of large guns and ordnance testing in support of U.S. military applications. In 1949 the National Reactor Testing Station (NRTS) was established to support the development and testing of nuclear reactors. The NRTS has gone through several name changes and is known today as the INL.

The components of the proposed test range (i.e. test bed, new and existing access roads, lay down/ administrative areas) are located in similar topographic situations. Primary landforms are volcanic in origin and consist of low-relief basaltic pressure ridges and closed basins that add variation to the generally flat terrain. Exposures of basalt bedrock are common along ridge tops and aeolian sands have accumulated in some areas, creating dune pockets. Elevations range between approximately 5,110 and 4,850 ft. Plant life is typical of INL as a whole, dominated by various grasses, low shrubs (rabbitbrush, bitterbrush), and forbs but has been influenced by recent (1999) range fires that removed many of the larger shrub components, particularly sagebrush. Thicker accumulations of sediment are evident in the basins and grasses dominate the vegetation community. Intermittent drainages cut through the lava plains, providing seasonal moisture via local runoff to support the grassy vegetation during periods of increased moisture.

Cultural resource investigations completed to assess the potential impact of construction and operation of a proposed test range included cultural resource archive searches, intensive archaeological field surveys, reconnaissance-level archaeological field surveys, and coordination with the Shoshone-Bannock Tribes (Pace, et al., 2006)[1]. In the areas of potential effect for the project, 20 cultural resources were formally recorded or reevaluated as a result of these efforts. Nine of these resources are previously recorded archaeological sites (10-JF-77, 10-JF-78, 10-JF-80, 10-JF-83, 10-JF-84, 10-JF-85, 10-JF-88, 10-BM-123, 10-BM-124) and two are newly recorded archaeological sites (2006-20-7, 2006-20-12) potentially eligible for nomination to the National Register of Historic Places for their potential to yield information that may contribute to a better understanding of prehistoric human occupation of the northeastern Snake River Plain. One historic trail (road T-20, Blackfoot and Little Lost River Road ca. 1888 – 1920) also passes through the project area and is evaluated as potentially eligible to the National Register for its associations with broad historic themes including emigration, transportation and commerce, and mining. The eight remaining archaeological resources identified in the project area are isolated finds (2006-20-1, 2006-20-2, 2006-20-3, 2006-20-4, 2006-20-5, 2006-20-6, 2006-20-10, 10-JF-108) that are unlikely to yield any additional information and are evaluated as ineligible for nomination to the National Register. However, four of these isolates are located in sandy areas where additional artifacts may be present.

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[1] Unless otherwise noted, information given on ecological resources of the proposed project area come from INL's Cultural Resource Management Office (Pace, et al., 2006).

In addition to these resources, the surveyors in the areas of potential effect also observed six single isolated flakes of stone tool material (obsidian and/or chalcedony); two along the proposed new access road and four along road T-25. In three instances, isolated flakes found along T-25 in 2006 were confirmed to be within the boundaries of previously recorded resources. Information from these localities was added to existing documentation for these resources, but the remaining isolated flakes were not formally recorded. These materials probably represent very short-term cultural activities in the area and may be simple outliers to the more intensive activities represented at larger archaeological sites nearby. None of the locations where these materials were observed is likely to yield any additional information and as a result, all are considered ineligible for nomination to the National Register.

3.4 Air Quality

The five Idaho counties (Butte, Jefferson, Bingham, Bonneville, and Clark) represented at INL are all in attainment or are unclassified for National Ambient Air Quality Standards (NAAQS) status under the federal Clean Air Act. The nearest nonattainment area is located approximately 50 miles south of INL in Power and Bannock Counties. That area has been designated nonattainment for respirable particulate matter.

INL is a major source for the purposes of prevention of significant deterioration (PSD), and an analysis must be performed whenever any new source or modification would result in a significant net increase in any air pollutant. The Idaho Department of Environmental Quality (DEQ) specifies significance levels for PSDs in Idaho Adminstrative Procedures Act (IDAPA) 58.01.01.006. The INL is classified under the PSD regulations as a Class II area, an area with reasonable or moderately good air quality that allows moderate industrial growth. The Craters of the Moon Wilderness Area, located approximately 25 miles west-southwest of the proposed test range is a PSD Class I area. Class I areas have the highest level of protection from air pollutants, and very little deterioration of air quality is allowed.

In addition to NAAQS and PSD requirements, the Federal Clean Air Act (CAA) includes National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements. The primary application of NESHAP requirements at INL is for control and reporting of radionuclide emissions (40 CFR 61, Subpart H). INL complies with the standards and requirements for radionuclide emissions and associated dose limits to the public (DOE/ID-10890, June 2006). In addition, under NESHAP, the INL is considered a major source for hydrochloric acid emissions.

3.5 Water Quality

3.5.1 Surface Water

The Big Lost River crosses the INL. As an ephemeral stream, it carries water on an irregular basis, as the majority of the flow is typically diverted for irrigation before entering the INL. The INL has no “end-of-pipe” discharges to the Big Lost River, and thus no National Pollutant Discharge Elimination System point source permits. Idaho Water Quality regulations identify protection requirements for surface water. The section of the Big Lost River on the INL is protected for the anticipated uses of cold-water biota, salmonid spawning, primary contact recreation, domestic water supply and as special resource water. It has also been used by the INL since its inception as a federal reservation, and therefore remains subject to federal environmental laws protecting water quality.

3.5.2 Groundwater

The Snake River Plain Aquifer (SRPA) is located approximately 350 ft below the proposed test range. The geology above the SRPA is generally a layer of soil on top of basalt interspersed by relatively thin layers of soil. The SRPA, like other sources of groundwater in the state of Idaho, is subject to the protection standards identified in federal and state regulations. These standards generally reflect drinking water standards for a variety of chemicals and pollutants. The water in the SRPA under the INL generally meets these standards. However, past practices at the INL have caused localized contamination of the SRPA by both chemicals and radionuclides. These zones have been identified and are being addressed through various remedial actions implemented, or planned, through the Comprehensive Environmental Response, Compensation and Liability Act, often known as Superfund. The nearest of these is a very localized zone at TAN, approximately 10 miles from the proposed test range.

The SRPA is recognized and protected by the Environmental Protection Agency as a Sole Source Aquifer because the majority of people living above the aquifer use it as their only potential source of drinking water. This designation recognizes the importance of the existing water quality in the SRPA. The water in the SRPA located at most places beneath the INL meets drinking water standards established under both state and federal regulations.

There is no known past source of potential groundwater contamination of the SRPA at, or near, the proposed location of the National Security Test Range. There are no known wells in the area of the proposed test range, so sampling the SRPA at the site is not possible. The nearest INL drinking water wells, located several miles from the proposed test range, meet all state groundwater and drinking water standards.

4. EXPECTED ENVIRONMENTAL IMPACTS

The following sections evaluate the potential impacts that are likely to occur from the preferred alternative and the no action alternative on the ecology, soil, historical cultural, air, and water resources.

4.1 Preferred Alternative: Develop a National Security Test Range at the INL

4.1.1 Ecological Impacts

4.1.1.1 Plant Communities

An area of about 900-ft diameter at the test range would be mowed to reduce the possibility of starting a wildland fire. Likewise, direct loss of vegetation would result from soil disturbance associated with construction activities and traffic on and near the proposed test range. This loss would be mitigated through revegetation with native plant species when the project is terminated. Weed control will be achieved through implementation of INL PLN-611 "Sitewide Noxious Weed Management Plan."

Upgrading T-25 and constructing a new access road would increase soil disturbance, possibly impact study plots and cause vegetation community fragmentation. Increased soil disturbance would likely lead to increases in weedy non-native species and the potential to displace native species in the communities adjacent to the upgraded road. The prevalence of needle-and-thread grass as a community dominant or co-dominant in plots along the route is indicative of sandy soils along that route. Because sandy soils tend to have less structure and are more easily displaced, invasion of noxious weeds and invasive plants can occur as evidenced by the substantial amount of cheatgrass already present there.

Many of those plant species listed as sensitive are described as abundant or common to the INL (see Section 3.1.1). The primary impacts of the proposed test range and associated road upgrades on plant populations relates to habitat fragmentation, possible study plot disturbance and the risk of invasive species. Cheatgrass invasion would adversely affect most plant populations. The impacts of the proposed activities at the test range and the impacts of upgrading the road would likely be greater on less-common species than they would be on abundant species. Frequently occurring species are generally quite abundant; thus, removing several individuals would not greatly affect the larger population. However, populations of species with more isolated distributions are much more sensitive to the loss of several individuals. Many of those plant species listed as sensitive are described as abundant or common to the INL (see Section 3.1.1). The only sensitive plant species found to occur on the proposed test range is the painted milkvetch. Limiting soil disturbance and fire risk by mowing and quickly reseeding any disturbed areas would be critical to minimizing impacts of the proposed test range and road upgrades on these plant populations. (Blew et. al., 2006). During road upgrades, coordination will be made with Environmental Surveillance Education and Research (ESER) Program to ensure long term vegetation plots are not adversely affected.

Soil disturbance and invasion of non-native species would affect plant populations, including those of ethnobotanical interest. The most effective mitigative measure to protect those populations is to minimize the amount of soil disturbed. Potential impacts to populations of plant species of ethnobotanical concern would be mitigated through revegetation of areas impacted by soil disturbance. Seeds or seedlings are commercially available for some of the species. Those species would be directly replanted, using appropriate subspecies and cultivars. The use of a diverse mix of native species in revegetation efforts would be important if species of concern, for which seed or stock is not available, are to repopulate

naturally. Finally, weed control would be critical to facilitate reestablishment of native communities, including species of ethnobotanical concern.

4.1.1.2 Invasive and Non-Native Species

Soil disturbance is a primary contributor to the spread of invasive plants. Invasive and non-native plants are present on much of T-25, the new road route, and the proposed test range, and could be spread by mowing, blading, and any other means used to remove the vegetation to support construction of the road and facilities. Seed dispersal plays a large role in spreading invasive species. Project activities in late summer increase the potential for seed dispersal onto the project site and roads. It is likely that the proposed test range and the berm created as a backstop for the projectile tests would be prone to weed invasion. A plan would be developed and implemented to prevent weed invasions on the proposed test range and berm. (See PLN-611 Sitewide Noxious Weed Management).

4.1.1.3 Wildlife and Habitat Resources

The preferred alternative would disturb soils and eliminate vegetation on approximately 12 acres of INL lands. This acreage represents approximately 0.002% of the total INL site land area. The disturbance would result from the following activities:

- Widen T-25 road – 4.0 acres.
- New road from T-25 to the proposed test range – 2.5 acres.
- Proposed test range detonation area – 2.6 acres.
- Lay down and Administrative areas – 2.1 acres.
- Target berm and excavation area – 0.4 acres.

Mowing the 900 ft. diameter proposed test range should have little direct impact on vegetative cover and would not result in additional indirect vegetation losses. The vegetation losses would include some sensitive plant species and species with identified ethnobotanical value. The soil disturbances would also contribute to the spread of invasive plants that could adversely affect native plants and increase the fire hazard in this area.

The proposed test range activities would destroy or displace ground-dwelling animals that reside in the areas subject to disturbance. Increased traffic, human activity, and the detonations may fragment plant communities and wildlife habitats. The increased activity would also disturb and interfere with animals that use the affected area for breeding, nesting, birthing, or transitory purposes. Species of special concern seen in and near the proposed test range include sage grouse, hawks and eagles, and big game animals.

Therefore, the impact of the preferred alternative could result in (1) unavoidable loss of ground-dwelling wildlife species and associated habitat, (2) displacement of certain wildlife species from the cleared area, (3) an increase in the potential for collisions between wildlife and motor vehicles (we anticipate this impact to be minimal due to the slow travel speeds required on the roads to the proposed test range), and (4) increased interactions between wildlife and project personnel. Mitigation measures can lessen the impacts on wildlife. Mitigation techniques would utilize appropriate methods which could techniques such as seasonal timing of activities, lower speed limits, warning signs, reflectors, ultrasonic warning whistles, habitat alteration, animal hazing from the road and/or proposed test range and

awareness programs. In addition, the potential exists for large blasts or frequent activity to displace wildlife from the area.

Pygmy Rabbits. Pygmy rabbits are sagebrush obligate species and have recently been the subject of a Petition for Protection under the Endangered Species Act. Pygmy rabbits depend on sagebrush for cover and forage. Once sagebrush is removed from an area, pygmy rabbits vacate the area (Green and Flinders 1980, Katzner, et al., 1997). Pygmy rabbit occurrence was assessed based on the presence of pygmy rabbit signs (i.e., sightings of rabbits, burrows, and/or scat) and the presence of suitable sagebrush habitats. Although our survey located only one potential pygmy rabbit site, many more locations might exist since our surveys were not conducted under conditions conducive to observing pygmy rabbit signs.

Greater sage grouse. Although the 1999 burn resulted in a significant long-term impact on nesting habitat, sage grouse still occupy areas of dominant sagebrush adjacent to the proposed test range during winter and spring. It is likely they use the proposed test range in a transitory manner year-round. Disturbances associated with the preferred alternative have the potential to temporarily displace sage grouse during winter and spring. Winter and spring are critical survival and reproductive periods, respectively, for sage grouse. Clearing vegetation on the proposed test range within 2 miles of nesting habitat may increase use of the area by breeding sage grouse by providing them an ideal area for breeding displays during the spring. If this occurs, time-of-day and seasonal restrictions would be implemented (see 'Breeding Season' below). The 2006, Sage Grouse State Wide Management Plan will be used as the guidance for mitigating human impacts to this species.

Ferruginous hawk. The influx of humans to the area in spring would likely displace nesting ferruginous hawks. If displacement of incubating or young-rearing ferruginous hawks from nests result in nest abandonment or in loss of eggs or nestling birds, it would constitute a significant short-term impact (see 'Breeding Season' below). Ferruginous hawks are highly sensitive to human-induced disturbance during incubation (Bechard and Schmutz 1995), and nest abandonment due to human disturbance has been documented by several sources (e.g., Fitzner et al 1977, Smith and Murphy 1973, Smith and Murphy 1978). In Idaho, White and Thurow (1985) found a significant difference in nest desertion between nests with created disturbance designed to simulate human activities and controlled, undisturbed nests. The BLM has documented nest abandonment after a single visit by researchers and considers nest abandonment a potentially "severe population limiting factor" (Snow 1974).

Elk. The general elk hunt for Unit 63 (which includes 0.5 mile within the INL boundary) occurs from August 1 through December 31. The hunting season causes increased movement of elk and could increase the potential for vehicular/elk collisions. However, because of the low speed limits, it is likely that elk mortalities would be low to none.

Breeding Seasons. The proposed project area provides important breeding habitat to many species during the spring.. A breeding bird survey of the 900 ft. diameter test range would be conducted annually between February 1 and March 15. The survey would be conducted prior to mowing each year. Additional surveys will be performed before each test exceeding 5,000 lb NEW conducted between February and June. If any nesting activities are discovered, DOE will consult with U.S Fish & Wildlife Service on appropriate mitigations.

The following list shows times when specific animals are breeding, nesting, or birthing:

- Sage Grouse: February 15 - June 30
- Passerines: April 15 - June 30 (a few nest until Sept 1)
- Raptors: February 1 - July 1

- Snakes: August - September
- Pygmy rabbits; February - July
- Big Game: May - June

Habitat fragmentation could occur from the proposed road improvements and construction involved with the proposed test range and disturbance caused by tests. Infrastructure affects natural systems in both direct and indirect ways. Habitat fragmentation on the INL might result in increased brood parasitism, limit pygmy rabbit (Brachylagus idahoensis) dispersal, facilitate the spread of invasive species, disrupt succession of native species, and reduce natural regeneration in shrub lands by limiting the availability and dispersion of seed sources.

4.1.2 Historical/Cultural Resources

Ground disturbance associated with the construction of the proposed test range, new access road, buried cable route, lay down/administrative area, and improvements to Road T-25 would occur and have the potential to impact prehistoric archaeological sites, a historic trail, and Native American resources located in the proposed project area. Heavy equipment would be used in all of these areas, for activities such as mowing, leveling, grading the ground surface, and adding fill to build features like the earthen berm. The integrity of any archaeological sites located within the construction zone would be destroyed. However, the survey yielded no artifacts within the proposed construction zone. Any artifacts that would be discovered during the construction of the range would be preserved by altering the route of the new road, moving the construction zone, and/or placing gravel over the artifact to preserve it as much as possible. Animals and plants important to the Shoshone-Bannock Tribes could also be destroyed.

During operation of the proposed test range, there is a very slight possibility of impacts to archaeological sites and Native American resources resulting from the impact of projectiles and associated fragments, or the air blast and shock waves associated with the detonation of explosives. Table 5 lists a number of potentially impacted cultural resource sites. Site 10-JF-88 is a campsite with rock structures. Based on modeling results, the detonation of 20,000 lbs of explosive would result in a maximum acceleration of 0.0028 g at that site. By comparison, the 1982 Borah Peak earthquake yielded a maximum acceleration of 0.025 g at RTC and the 2005 Dillon, Montana earthquake yielded maximum acceleration of 0.0044 g at TAN. Given that neither of the earthquake events resulted in any evident damage to Site 10-JF-88 or to any cultural resources found in lava tubes or caves, there will likely be no impact to these sites from test range operations. (Weathersby, 2006).

In addition to direct impacts from heavy equipment and earth-moving, archaeological sites and Native American resources identified in the proposed test range could also be subject to indirect impacts during construction and operation as a result of higher visibility on the landscape and overall increases in activity levels in an area that has always been quite remote.

Table 5 lists all cultural resources in the areas of potential impact from construction and operation of the proposed test range and indicates the relationship of each property to anticipated project impacts.

Table 5. Potentially Impacted Cultural Resource Sites

Site no.	NRHP eligibility	Location	Anticipated Impact
2006-20-1	Isolate location – Not eligible	Lay down/Administrative Area	No effect
2006-20-2	Isolate location – Not eligible	New Access Road	No effect if monitoring demonstrates no additional material
2006-20-3	Isolate location – Not eligible	New Access Road	No effect if monitoring demonstrates no additional material
2006-20-4	Isolate location – Not eligible	New Access Road	No effect if monitoring demonstrates no additional material
2006-20-5	Isolate location – Not eligible	Test range	No effect if monitoring demonstrates no additional material
2006-20-6	Isolate location – Not eligible	T-25 Road Upgrade	No effect
2006-20-7	Lithic scatter – Potentially eligible criterion “d”	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided

Table 5. Potentially Impacted Cultural Resource Sites			
Site no.	NRHP eligibility	Location	Anticipated Impact
2006-20-10	Isolate location – Not eligible	T-25 Road Upgrade	No effect
2006-20-12	Lithic scatter – Potentially eligible criterion "d"	Lay down/Administrative Area	No adverse effect if ground disturbance is avoided
10-JF-77	Lithic scatter – Potentially eligible criterion "d"	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided
10-JF-78	Lithic scatter – Potentially eligible criterion "d"	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided
10-JF-80	Lithic scatter – Potentially eligible criterion "d"	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided
10-JF-83	Lithic scatter – Potentially eligible criterion "d"	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided
10-JF-84	Lithic scatter – Potentially eligible criterion "d"	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided
10-JF-85	Lithic scatter – Potentially eligible criterion "d"	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided
10-JF-88	Campsite with Rock Structures – Eligible criterion "d"	Fragmentation/air blast/shock wave zone	No adverse effect if ground disturbance is avoided
10-JF-108	Isolate location – Not eligible	T-25 Road Upgrade	No effect
10-BM-124	Lithic scatter – Potentially eligible criterion "d"	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided
10-BM-123	Lithic scatter – Potentially eligible criterion "d"	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided
Road T-20	Historic Trail – Potentially eligible criterion "a"	T-25 Road Upgrade	No adverse effect if ground disturbance is avoided

4.1.3 Air Quality

The preferred alternative would generate air pollutants including fugitive dust, criteria pollutants (e.g. sulfur oxides, carbon monoxide), and toxic pollutants (e.g. ammonia, formaldehyde). The amounts and types of explosive materials used for the testing would be controlled so that the emissions would satisfy Idaho Permit to Construct (PTC) exemption criteria. Under these criteria, the emissions from the proposed testing activities would not exceed ambient air quality limits.

Release estimates of criteria and toxic pollutants were based on the Environmental Protection Agency's (EPA's) AP-42, Section 13.3, "Explosives Detonation" (EPA 1995) or, for explosives not listed in AP-42 and mixtures of explosives, the CHEETAH code (Lawrence Livermore National Laboratory). The emission factors are shown in Table 6. The factors were used to back-calculate the amounts of each explosive that could be detonated within applicable NAAQS averaging times to remain within regulatory limits and within the PTC exemption requirements.

Calculated maximum quantities of explosives that could be detonated without exceeding ambient air concentration limits for Toxic Air Pollutants (TAPs) and Criteria Pollutant NAAQS standards at points of compliance are documented in an engineering design file (EDF-7147). Calculations were based on air modeling (using EPA's Toxic Screening model), regulatory air quality limits, and existing background air concentrations. Receptor locations included the following: 1) the nearest public access location, which is a point on Idaho State Highway 33, 7.0 miles from the proposed test range (used for all criteria pollutants and TAPs with short-term limits), or 2) a point on the nearest INL land boundary, 10.9 miles from the proposed test range (used for formaldehyde, the carcinogenic TAP with an annual limit).

In addition to the explosive material detonation products, soil particles could be ejected by the blasts. Emissions of soil particles with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}) were conservatively estimated based on blast crater volumes and the clay fraction measured in soil samples from the proposed test range. Modeling data show there would be no PM-10 ambient air limits exceeded.

Table 6. Explosive Material Emission Factors.

		Criteria Pollutants						Toxic Pollutants							
		Sulfur Oxides (SO2)	Carbon Monoxide (CO)	Nitrogen Oxides (NO2)	PM10	PM10 from soil[a]	Lead	Hydrogen Sulfide (H2S)	Ammonia (NH3)	Hydrogen Cyanide (HCN)	Hydro-chloric Acid (HCl)	Formic Acid (CH2O2)	Methanol (CH3OH)	Aluminum & Oxides (Al)	Formalde-hyde (CH2O)
Molelcular Weight			28	46			207				36	46	31	27	30
Explosive		Ap-42 Emission Factors (lb emission/ton explosive)													
Black Powder			170			1.4		24							
Smokeless Powder			77			1.4		21							
Dynamite Straight			281			1.4		6							
Dynamite Ammonia			63			1.4		31							
Dynamite Gelatin (nitroglycerine)		1	104	53		1.4		4							
ANFO		2	67	17		1.2									
TNT			796			1.4			29	27					
RDX			196			1.4			44						
PETN			297			1.8			2.5						
		Calculated Emission Factors for Explosives Not Listed in AP-42 (lb emission/ton of explosive)													
HMX Explosives	$C_4H_8N_8O_8$		263.73		87.41	1.4			0.87			0.83	0.08		0.04
Binex 400	NaCl+Al+C2H6O2+H2O				78.44	1.4					98.93			242.41	
AN-NM	NH4NO3+CH3NO2		0.02			1.4									
NM-Al	CH3NO2 + Al		304.58		238.75	1.4			0.15				0.01	261.50	0.01
AN-Al	NH4NO3+Al				235.80	1.4								235.80	
HMX-GAP	$C_4H_8N_8O_8$ + C3H5N3O + Al		232.06		220.42	1.4			3.52			0.35	0.14	31.73	0.14
Al-IPN	C3H7NO3 + Al		126.96		494.58	1.4			0.19					206.93	
Dexs	C5H8N4O12+H4N2O3+ H2O+C2H6O2			1.14E-07		1.4									
Semtex[b]	$C_3H_6N_6O_6$+C5H8N4O12		247.00			1.4			23.00						
Ammonium Picrate	C6H6N4O7			7.16E-08		1.4									
Baratol	BaN2O6+C7H5N3O6			7.86E-08	189.20	1.4									
Tetryol	C7H5N5O8+C7H5N3O6			6.55E-08		1.5									
Detonators	$Pb(N_3)_2$			1906.00		1.4	1420								

a. Based on maximum crater size per lb TNT and AP-42, Table 11.3-1 emission factor of 0.53 lb/ton; adjusted for TNT equivalent, if available

b. Semtex emission factors are means of factors from RDX and PETN since Semtex is a 50/50 mixture

Under the preferred alternative, no individual detonations would exceed 20,000 lb NEW. Based on the NAAQS and the IDAPA requirements, the maximum amounts of explosives that could be detonated at the proposed test range in compliance with applicable standards and PTC exemption criteria are shown in Table 7. As the table shows, some of the explosives used in tests would be limited to amounts less than 20,000 lb. Large explosive tests would occur infrequently and would likely use ammonium nitrate and fuel oil (ANFO) as the primary explosive material.

Table 7. Maximum Tons of Explosives that Meet Air Quality Standards and PTC Exemption Criteria.

	Averaging Time			
Explosive	1 hr	8 hr	24 hr	Annual
Black Powder	6.7	11.3	21.8	117.6
Smokeless Powder	14.7	25.0	25	259.7
Dynamite Straight	4.0	6.8	56.7	71.2
Dynamite Ammonia	16.9	16.9	16.9	317.5
Dynamite Gelatin (nitroglycerine)	10.9	18.5	56.7	150.9
ANFO	16.9	28.7	69.2	298.5
TNT	1.4	2.4	6.9	25.1
RDX	5.8	9.8	15.3	102.0
PETN	3.8	6.5	44.7	67.3
HMX Explosives	0.9	0.9	0.9	34.3
Explosive Mixtures				
Binex 400	1.0	1.0	1.0	38.2
AN-NM	56.7	56.7	56.7	2124.9
NM-Al	0.3	0.3	0.3	12.6
AN-Al	0.3	0.3	0.3	12.7
HMX-GAP	0.4	0.4	0.4	13.6
Al-IPN	0.2	0.2	0.2	6.1
Dexs	56.7	56.7	56.7	2124.9
Semtex	4.6	7.8	29.3	81.0
Ammonium Picrate	56.7	56.7	56.7	2124.9
Baratol	0.4	0.4	0.4	15.9
Tetryol	53.5	53.5	53.5	2004.6
Detonators	0.1	0.1	0.1	0.4*

*No more than 0.1 ton per quarter year

The explosive material limits established for the proposed test range would limit emissions such that NAAQS and TAP air quality standards would not be exceeded. Fugitive dust would be controlled as appropriate by applications of water or chemical suppressants to unpaved roads and work areas. Radionuclides in the soil are typical of regional background concentrations and would not pose elevated dose risk to members of the public. The proposed intermittent, short duration testing activities coupled with the remote location of the proposed test range would ensure that adverse air quality effects upon potential receptors and Class 1 areas are minimal.

The proposed test range is in a remote area of the INL lands, where radionuclides in soil are either from natural sources, airborne deposition from distant INL activities, or from worldwide fallout. Even though blast detonations at the proposed test range would resuspend some of this contamination, the resuspended dust would be at very low concentrations at downwind receptor locations, and exposures would be intermittent and of very short duration. Since inhalation dose from airborne radionuclides is dependent upon cumulative annual intake, the total annual potential dose from these short duration events would be far less than that which typically occurs from chronic windblown dust exposure, especially, for example, around agricultural and construction operations.

4.1.4 Water Quality

4.1.4.1 Surface Water

The nearest surface water, the Big Lost River, is 7 to 8 miles from the proposed test range. Other off-INL sources of surface water, such as Birch Creek, the Little Lost River, and Mud Lake, are located even further away. Fragments from the explosive work would travel only a few hundred feet and would not reach surface waters. Air emissions from explosive materials are expected to disperse before reaching surface water sources.

Storm water run-off, if any, from the proposed test range would not reach surface water, such as the Big Lost River.

4.1.4.2 Ground Water

The SRPA is located below the proposed test range. The geology above the SRPA is generally a layer of surficial soil followed by basalt interspersed by relatively thin layers of soil. Detonation of explosives on the surface of the ground would be attenuated by the soil and rock, resulting in no perceptible shock impact to the SRPA

Small amounts of explosive residues would be generated during testing. Some of the residues would collect on the ground and would be available for infiltration with snowmelt and rain. These residues are not expected to have an impact on the SRPA due to a low infiltration rate and adsorption onto the soil. Studies at the INL undertaken through the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) program, have demonstrated that small amounts of chemical contaminants, located at the ground surface, do not present a risk to groundwater even if there is no adsorption on soil. (Comprehensive Remedial Investigation Feasibility Study (RI/FS) for Waste Area Group 6 (WAG-6) and Waste Area Group 10 (WAG-10) Operable Unit (OU) 10-04, DOE-ID-10807.)

4.1.5 Safety and Health

No adverse impacts to human health and safety are anticipated from the preferred alternative. Appropriate precautions and mitigations would be employed to minimize health and safety risks. Explosive charges would be assembled under the supervision of explosive use supervisors and explosives safety officers. All personnel involved with construction and operations, including those handling explosives, would be properly trained, use appropriate protective equipment and maintain close communication with one another. Standoff distances would be determined using standard formulation from the U.S. Army Manual Department of Defense-6055.9 STD. Once it is declared safe, essential personnel would be allowed to enter to collect data and to take photographs. Each work activity would include processes to identify, analyze, and control the hazards. Table 1 provides further detail on the operational controls that would be used during testing.

Table 3 describes the noise and ground velocity information associated with the maximum test size of 20,000 lbs NEW at locations away from the proposed test range. Characteristic noise associated with testing would occur as pulses rather than continuous noise. At the locations specified in the table as examples, these noise pulses would occur at levels below the limits established by the Occupational Safety and Health Administration standards. Industry recognized blasting safety standards recommend maintaining peak ground velocities below 2.0 inches per second (ips) to prevent damage to light civilian type structures. The maximum ground velocity at the nearest area with structures at MFC would be 0.006 ips. Therefore noise and ground motion from a 20,000 lb explosive test would not pose any significant impact to personnel or facilities on or off of the INL.

4.1.6 Ecological Monitoring and NERP Research Activities

There is the potential for impact to other research and monitoring activities near the proposed test range. This includes ongoing ecological monitoring and research conducted by the ESER Program and academic researchers. The potential for impact may be in the form of direct damage to plots, alteration of natural animal behaviors being investigated, or potential loss of access to the area for data collection.

Most of these potential impacts would be avoided by implementing a few administrative controls. Travel would be strictly limited to the designated areas. Project Managers would coordinate their activities, through use of the Plan of the Week and Plan of Day documents, with ESER personnel to avoid conflicts with long-term scheduled monitoring activities such as the Breeding Bird Survey, Long-Term Vegetation Survey, Rabbit Survey, Big Game Surveys, Sage Grouse Surveys, and other data collection activities.

For some large-scale projects that involve studying animal behavior or movement patterns, such as the coyote project previously described, there is potential for impacts. Utah State University researchers conducting the coyote project have indicated that development of a long-term or permanent test range for similar activities in this area would likely cause them to move their research program somewhere other than the Idaho NERP (Mike Jaeger, Utah State University, personal communication). Current research has been completed. However, there is potential impact of further and similar research being proposed in this area.

4.1.7 Environmental Justice

Executive Order 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations,* directs Federal agencies to address disproportionately high and adverse human health or environmental effects of proposed projects on minority populations and low-income populations. Because this proposed project would be located in a remote portion of the INL with no significant adverse impacts to human health and the environment, DOE anticipates there would be no disproportionately high and adverse impacts to minority populations.

4.1.8 Cumulative Impacts

The preferred alternative represents a small percentage of the overall 890 square mile INL. The test range, lay down areas, and T-25 road upgrade would involve about 12 acres (or about 0.02- square miles) of INL land. The current developed area, including all facilities at the INL equals 15 square miles or 1.7% of the total size of the INL . While the 12 acres affected by the proposed test range is a small portion of the INL it does represent development within a relatively pristine desert ecosystem.

Cumulative impacts on ecological resources would most likely come by increasing habitat fragmentation and the potential to spread noxious weeds (including other invasive plants). Project activities, including more frequent site access and explosive testing, could change the behavior of elk, pronghorn, sage grouse, and other wildlife. While project activities would continue for the life of the proposed test range, wildlife would likely adjust to the increases in access and activity. Reduced speed limits, limited access, additional surveys, and seasonal limitation on activity would help lessen the impacts resulting from increased activity and access. In addition, project activities would likely increase the potential for spread of noxious and invasive weeds by increased soil disturbance from vehicle traffic and explosive testing. Conducting an aggressive reseeding and weed control program would help lessen the impacts from soil disturbance.

Cumulative impacts to air quality would be generation of fugitive dust and pollutants generated as by products from explosive detonations. As described in Table 1, construction and operational controls would be in place to minimize fugitive dust. Table 7 describes the limitations that would be placed on the quantities of explosives that could be used to ensure compliance with air quality requirements. With these control

measures in place, any cumulative impacts should be minimal and remain within prescribed air quality standards.

Given that an explosives test is an instantaneous event, the noise generated would be a brief pulse. The cumulative impact would be negligible relative to the ambient noise level at the INL.

4.2 No Action Alternative

The No Action Alternative would not change the current activities or the locations at which they are performed. Current testing activities would continue at the LFR and the MDA. The No Action Alternative would avoid any additional impacts on the natural environment since it would not require any ground disturbance or possibly affect wildlife in an additional area.

The No Action Alternative has the potential to impact the human environment on a limited scale. The No Action Alternative would not provide DOE the data necessary to enhance protection of the human environment from security threats. The quality of tests would not increase because of the inability to provide optimal data measurement. The number of tests would not increase because the tests could only occur when the LFR and the MDA were not being used for their established purposes. The size of tests would not increase because they would be limited to the capabilities of those ranges. Thus, the No Action Alterative limits the quantity and quality of data available for the improvement of national security.

5. COORDINATION AND CONSULTATION

INL personnel coordinated and consulted with the following agencies and Tribes regarding the preferred alternative and environmental resources on or near the INL lands.

5.1 Shoshone Bannock Tribes

On May 10, 2006, the INL Cultural Resources Working Group held its monthly meeting. The INL personnel conducted a briefing on the proposed test range for the Tribal members. Other participants in the meeting were DOE-ID Cultural Resource coordinator, DOE-ID Tribal Liaison and members of the INL Cultural Resource Management (CRM) Office. At that time, Tribal members expressed several concerns about impacts, including adverse effects to plants, animals, the aquifer, and lava tube caves, plus a perceived danger of contaminated soils becoming airborne during the tests. They also indicated that project personnel should go before the Shoshone-Bannock Business Council. At the same meeting, Tribal representatives were invited to participate in the archaeological fieldwork for the project. As a result, Tribal representatives joined INL technical personnel in the field, assisting with the archaeological surveys and becoming familiar with the project and project area. They continued to express concerns about impacts during these field trips.

5.2 U. S. Fish & Wildlife Service

DOE contacted the U.S. Fish & Wildlife Service on August 8, 2006 to discuss testing on the proposed test range and any potential impacts on wildlife. Discussions also took place in 2005 relative to a similar proposed activity. Concerns raised included noise, explosives use during nesting season, explosives fragments and groundwater and soil contamination. The U.S. Fish & Wildlife Service will receive a copy of this Environmental Assessment during the comment period.

6. PERMITS AND REGULATORY COMPLIANCE

6.1 Air Resources

The Federal CAA provides the framework for protecting the nation's air resources. The EPA and the Idaho DEQ are jointly responsible for establishing and implementing programs that meet requirements of the CAA in Idaho. Applicable portions of the CAA with respect to the preferred alternative are found in Idaho Regulation IDAPA 58.01.01. These rules include screening emission rates and acceptable ambient air concentration limits used to determine emission controls and permit conditions. The types and amounts of explosives will be limited such that a Permit To Construct will not be required.

Activities at the INL are subject to a CAA Title V Operating Permit, which specifies facility-wide requirements for activities that generate pollutants such as fugitive dust. Activities at the proposed test range will operate in compliance with all requirements of the Title V Operating Permit.

6.2 Water Resources

The Federal Clean Water Act (CWA) provides the framework for protecting water resources at the INL. Because this project will not discharge pollutants or storm water to the Big Lost River, no permit under the CWA is required.

6.3 Wildlife/Habitat Resources

Soil disturbing activities have the potential to increase noxious weeds and invasive plant species that would be managed according to the "Management of Undesirable Plants on Federal Lands" (7 United States Code Section 2814) and the Invasive Species Executive Order 13112. The INL would follow the applicable requirements to manage undesirable plants according to PLN-611.

In analyzing the potential environmental impacts of the preferred alternative, DOE-ID has followed the requirements of the Endangered Species Act (16 U.S.C. Sections 1531 et seq.) and has reviewed the most current lists for threatened and endangered plant and animal species.

Other Federal laws that could be applicable include: the Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.), Bald Eagle Protection Act (16 U.S.C. § 668), and the Migratory Bird Treaty Act (16 U.S.C. Sections 715 to 715s).

6.4 Cultural/Historical Resources

The INL would comply with the National Historic Preservation Act and its implementing regulations at 36 CFR Part 800 et seq. as well as the broader requirements outlined in the INL Cultural Resource Management Plan (DOE/ID-10997, revision 1, September 2005). DOE-ID also recognizes its responsibilities to the Shoshone-Bannock Tribes under the Agreement in Principle and the "Working Agreement" on cultural resource issues. DOE-ID would also consult with the State Historic Preservation Officer, if necessary.

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Appendix A

Glossary

Appendix A - Glossary

Affected Environment. The overall environment potentially affected by the Preferred alternative.

Basalt. A hard, dense, dark volcanic rock composed chiefly of plagioclase, pyroxene, and olivine, and often having a glassy appearance.

Bedrock. The solid rock that underlies loose material, such as soil, sand, clay, or gravel.

Bentonite. An absorbent aluminum silicate clay formed from volcanic ash and used in various adhesives, cements, and ceramic fillers.

Best Management Practices. Practices designed, implemented, and maintained to give full protection to the environment.

Calcareous Soils. Soils that contain calcium carbonate.

Council on Environmental Quality (CEQ). A council established by the National Environmental Policy Act of 1969, as amended (Public Law 91-90, 42 U.S.C. 4321-4347, January 1970, as amended by Public Law 94-52, July 3, 1975, and Public Law 94-83, August 9, 1975). The Council's duties are described in Title II of the National Environmental Policy Act.

Cultural resource. Prehistoric or historic sites, structures, districts, landscapes, or objects of some importance to a culture or community for scientific, traditional, religious, or other reasons. A broad general term meaning any cultural property of traditional life-way value.

Decibel. The decibel (abbreviated dB) is the unit used to indicate the intensity of a sound.

Ethnobotany. The plant lore and agricultural customs of a people.

Environmental Assessment (EA). A concise public document for which a Federal agency is responsible that serves to briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.

Environmental Impact Statement (EIS). A document that serves to ensure that the policies and goals defined in NEPA are incorporated into actions of the federal government. An EIS gives a full and fair discussion of significant environmental impacts. The EIS informs decision makers and the public of reasonable alternatives that would avoid or minimize adverse impacts to the environment.

Finding of No Significant Impact (FONSI). A document, based on an environmental assessment by a federal agency briefly presenting the reasons why an action would not have a significant effect on the human environment and for which an environmental impact statement would therefore not be prepared.

Fledgling. A young bird that has recently acquired its flight feathers.

Fugitive Dust Emission. Fugitive emissions composed of particulate matter (e.g., dust, vehicle emissions).

Herbaceous Vegetation. Relating to or characteristic of an herb as distinguished from a woody plant.

Hibernacula. A protective structure in which an organism remains dormant for the winter.

Historic. Historic represents about 150 to 50 years before present.

Home Range. The geographic area to which an organism normally confines its activity.

Infrastructure. The basic facilities, services, and installations needed for the functioning of the INL , such as transportation and communications systems and water and power lines.

Lek. An area where male grouse congregate for breeding purposes.

National Ambient Air Quality Standard (NAAQS). Those standards set forth by federal law to promulgate maximum levels of air pollutants that can exist in the ambient air without producing an adverse effect to humans (primary standard) or the public welfare (secondary standard).

National Environmental Policy Act (NEPA). A federal law that requires the federal government to consider the environmental impacts of, and alternatives to, major proposed actions in its decision making processes. Commonly referred to by its acronym, NEPA.

Nocturnal. Most active at night.

Non-game Species. Animals which are not normally hunted, fished, or trapped.

Off-site. An area outside the INL boundaries.

On-site. The area within the INL boundaries. This does not include in-town facilities.

Permeability. The rate of flow of a liquid or gas through a porous material.

Prehistoric. Prehistoric represents about 12,000 to 150 years before present.

Prevention of Significant Deterioration (PSD). Clean Air Act regulations designed to "protect public health and welfare from any actual or potential adverse effect . . .", U.S. Code, Title 42, The Public Health and Welfare, Chapter 85--Air Pollution Prevention and Control, Subchapter I--Programs and Activities, Part C--Prevention of Significant Deterioration of Air Quality.

Record of Decision (ROD). A concise public record of decision (40 CFR 1505.2) at the conclusion of an environmental impact statement. The ROD, which must be published in the Federal Register, would (a) State what the decision is, (b) Identify all alternatives considered and specify the alternative or alternatives that were considered environmentally preferable, and (c) State whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted and, if not, why they are not.

Run-off. That part of precipitation or snow melt that runs off the land and pavement into streams or other surface-water. It can carry pollutants from the air and land into the receiving waters.

SCREEN3. An Environmental Protection Agency approved analytical model used to estimate airborne pollutant concentrations in source analysis.

Senescence. The process of growing old and dying. Gradual deterioration of function in an organism leading to an increased probability of death; aging.

Transitory. Existing or lasting only a short time; short-lived or temporary

Appendix B

Acronyms

Appendix B - Acronyms

AN	Ammonium Nitrate
ANFO	AN and Fuel Oil
ATV	All-Terrain Vehicle
BEA	Battelle Energy Alliance, LLC
BLM	Bureau of Land Management
CAA	Clean Air Act
CDC	Conservation Data Center
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulation
CRM	Cultural Resource Management
DEQ	Idaho Department of Environmental Quality
DOE	Department of Energy
EA	Environmental Assessment
EBW	Exploding Bridge Wire
ECT	Explosive Cutting Tape
EDF	Engineering Design File
EPA	Environmental Protection Agency
ESER	Environmental Surveillance, Education, and Research Program
FLSC	Flexible LSC
HMX	High Melting Point Explosive
IDAPA	Idaho Administrative Procedures Act
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IPS	Inches Per Second

LSC	Linear Shaped Charges
MFC	Materials and Fuels Complex
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NERP	National Environmental Research Park
NESHAP	National Emission Standards specifies those requirements for Hazardous Air Pollutants
NEW	Net Explosive Weight
NRF	Naval Reactors Facility
PBX	Plastic Bonded Explosives
PLN	Plan
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTN	Pentaerythritol Tetranitrate
RTC	Reactor Technology Complex
SRPA	Snake River Plain Aquifer
SRT	Shock Reflecting Tape
SSER	Sagebrush Steppe Ecosystem Reserve
TAN	Test Area North
TAP	Toxic Air Pollutant
TNT	Trinitrotoluene
U.S.C.	United States Code