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Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R10-92/040
June 1992

EPA

Superfund Record of Decision:

US DOE Idaho National Engineering Lab (Operable Unit 23), ID

NOTICE

The appendices listed in the index that are not found in this document have been removed at the request of the issuing agency. They contain material which supplement, but adds no further applicable information to the content of the document. All supplemental material is, however, contained in the administrative record for this site.

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R10-92/040	2.	3. Recipient's Accession No.
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15. Supplementary Notes

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16. Abstract (Limit: 200 words)

The US DOE Idaho National Engineering Laboratory (INEL), established in 1949, is located 32 miles west of Idaho Falls, Idaho. The facility occupies 890 square miles, and land use in the area is predominantly industrial. The Snake River Plain Aquifer, which underlies the INEL, has been designated as a sole source, Class I, aquifer pursuant to the Safe Drinking Water Act. Within the INEL is a 270-square-mile area, formerly known as the Naval Proving Ground (NPG), which was used prior to World War II for naval artillery testing, explosives, storage bunker testing, and ordnance disposal. Investigations by site personnel have resulted in the discovery of numerous unexploded ordnance devices, such as 3- to 16-inch artillery shells, partially exploded 125- to 2,000-pound bombs, anti-tank mines, and depth charges. This ROD addresses OU23, which covers six locations on the site: the CFA gravel pit, the storage bunkers north of Idaho Chemical Processing Plant, the National Oceanic and Atmospheric Grid, CFA Building 633 Zone, Fire Station II Zone, and Power Line Road. Unexploded ordnance has been found on the ground surface in most of these areas. It is estimated that

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - US DOE Idaho National Engineering Laboratory (Operable Unit 23), ID
Second Remedial Action - Subsequent to follow
Contaminated Media: soil, debris
Key Contaminants: organics, inorganics, natural decomposition products

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 26
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(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

EPA/ROD/R10-92/040
US DOE Idaho National Engineering Laboratory
(Operable Unit 23), ID
Second Remedial Action - Subsequent to follow

Abstract (Continued)

150 unexploded ordnance will be found and detonated during this remedial action. Areas of soil are also contaminated with explosive compounds at the ground surface, or will become contaminated by detonation activities. This interim ROD addresses ordnance in the six NPG areas and associated soil contamination. Future RODs will address remaining ordnance areas for which insufficient information exists at this time, final remedies for soil contamination, and all of the Waste Area Group 10 (WAG 10) at the INEL site. The primary contaminants of concern affecting the ordnance debris and soil are organics; inorganics; and natural decomposition products.

The selected interim remedial action for this site includes conducting soil sampling of the detonation areas; excavating, containerizing, and transporting an estimated 185 cubic yards of soil exceeding action levels offsite for treatment using incineration, with offsite disposal of residuals; researching historical records pertaining to ordnance activities at INEL; conducting a field search of the six NPG areas for unexploded ordnance; controlled onsite thermal treatment (detonation) of any identified ordnance, with onsite disposal or recycling of any residual metal debris; and posting signs where the public has access to ordnance areas. The estimated present worth cost for this remedial action is $2,359,500. No O&M costs are associated with this remedial action.

PERFORMANCE STANDARDS OR GOALS:

Action levels for soil were determined based on health-based criteria and include TNT 44 mg/kg and RDX 18 mg/kg. A screening level for DNT has not been developed as it is a breakdown product of TNT. Soil at or above these screening levels will be excavated, containerized, and transported to an offsite incinerator. Any resultant ash will be disposed of by the incinerator facility. Containerized soil will be sampled and analyzed for TCLP analytes to determine whether they should be classified as a RCRA waste.

Idaho National Engineering Laboratory

IDAHO DEPARTMENT OF HEALTH AND WELFARE

DIVISION OF ENVIRONMENTAL QUALITY

Declaration of the Record of Decision

JUL 17 1992
FEDERAL FACILITIES SF BR.

Site Name and Location

Ordnance Interim Action
Operable Unit 10-05
Waste Area Group 10
Idaho National Engineering Laboratory

Statement of Basis and Purpose

This decision document presents the selected alternative for interim remedial action of six identified ordnance locations at the Idaho National Engineering Laboratory (INEL), Operable Unit 10-05. This alternative was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the information in the administrative record for the site, which is indexed in Appendix C, and applicable guidance.

The lead agency for this decision is the U. S. Department of Energy (DOE). The U. S. Environmental Protection Agency (EPA) approves of this decision and, along with the State of Idaho Department of Health and Welfare (IDHW), has participated in the evaluation of interim action alternatives. The State of Idaho concurs with the selected remedy.

Assessment of the Site

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment due to the presence of unexploded ordnance and ordnance compounds in the soil.

Description of the Selected Remedy

This Record of Decision addresses the cleanup of portions of the INEL contaminated with unexploded ordnance and explosives residues. Operable Unit 10-05 includes only those areas which have been identified for interim action in order to remove the immediate risks associated with unexploded ordnance. These areas are near facilities which are frequented by INEL site personnel and therefore pose an unacceptable risk which needs to be eliminated. The selected remedy addresses the significant potential risks associated with these sites: explosive hazards, and inhalation, ingestion, and dermal absorption of explosive residues.

The major components of the selected remedy are:

- In-depth search of U. S. Navy and Department of Defense (DOD) historical records pertaining to activities at the Naval Proving Ground (NPG) and other suspected ordnance locations at the INEL;
- Search for unexploded ordnance using both visual and geophysical methods, followed by marking of locations;
- Controlled detonation of unexploded ordnance, confirmation of complete detonation, and disposal of nonhazardous solid waste;
- Soil sampling of detonation areas and other areas of suspected explosives contamination to determine areas requiring excavation;
- Removal and containerization of contaminated soils;
- Shipment of contaminated soils to an off-site incineration facility for treatment and disposal.

Declaration

The remedy selected for this interim action is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements for the scope of this action, and is cost-effective. Although not intended to address fully the statutory mandate for permanence and treatment to the maximum extent practicable, the selected remedy does utilize treatment and thus is in furtherance of that mandate. This interim action may not constitute the final remedy for this operable unit, but the selected remedy does meet the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. The comprehensive Remedial Investigation/Feasibility Study (RI/FS) for Waste Area Group (WAG) 10, which encompasses the entire INEL site, will succeed this interim action. The WAG 10 RI/FS will evaluate the need for any additional action at the INEL, including the ordnance areas cleaned up under this interim action. Because this is an interim action Record of Decision, review of this operable unit and of this remedy will be ongoing as DOE, EPA, and the State of Idaho continue to develop final remedial requirements and alternatives for WAG 10.

Signature sheet for the foregoing Record of Decision for Operable Unit 10-05 interim action at the Idaho National Engineering Laboratory between the United States Department of Energy and the United States Environmental Protection Agency, with concurrence by the State of Idaho Department of Health and Welfare.

AUGUSTINE A. PITROLO
Manager
Department of Energy Field Office, Idaho

6-2-92
Date

Signature sheet for the foregoing Record of Decision for Operable Unit 10-05 interim action at the Idaho National Engineering Laboratory between the United States Department of Energy and the United States Environmental Protection Agency, with concurrence by the State of Idaho Department of Health and Welfare.

Dana A. Rasmussen

DANA RASMUSSEN
Regional Administrator, Region 10
Environmental Protection Agency

June 2, 1992
Date

Signature sheet for the foregoing Record of Decision for Operable Unit 10-05 interim action at the Idaho National Engineering Laboratory between the United States Department of Energy and the United States Environmental Protection Agency, with concurrence by the State of Idaho Department of Health and Welfare.

Richard Donovan

RICHARD DONOVAN
Director
Idaho Department of Health and Welfare

5-28-92
Date

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DECISION SUMMARY

1. SITE NAME, LOCATION, AND DESCRIPTION

The Idaho National Engineering Laboratory (INEL) is located 32 miles west of Idaho Falls, Idaho and occupies 890 square miles of the northeastern portion of the Eastern Snake River Plain. Within the INEL boundary is an area of approximately 270 square miles that was formerly known as the Naval Proving Ground (NPG) (Figure 1). The NPG was utilized primarily during the World War II era, prior to inception of the INEL in 1949.

Numerous unexploded ordnance devices have been discovered at the INEL by Site and subcontractor personnel. The ordnance are primarily a result of past activities associated with the former NPG. These activities included naval artillery testing, explosives storage bunker testing, and ordnance disposal. Unexploded ordnance have been found to be more concentrated in areas where these activities are known to have occurred. Ordnance found to date include: 3- to 16-inch artillery shells, partially exploded 125 to 2,000 pound bombs, anti-tank mines, depth charges, smokeless powder and dummy bombs with spotting charges.

Also, there are three suspected ordnance areas outside the NPG that have been identified at the INEL. The approximate locations of these areas are also shown in Figure 1. Two of these areas were used in the 1940s for aerial bombing practice by the U. S. Army Air Corps, flying out of Pocatello, Idaho. The third area was used at a later date by the U. S. Navy for naval artillery testing. The Navy fired artillery from a facility known as the Naval Ordnance Test Facility toward the north slope of the Big Southern Butte. At this time, the types of ordnance used at these sites, size of the areas potentially impacted, or targets used are not known.

Six ordnance areas within the NPG have been identified for cleanup for this interim action. These areas contain known types of unexploded ordnance and are near or in areas frequented by INEL personnel. Each of these locations is described in detail in Section 5.0. The approximate locations of the six ordnance locations are illustrated in Figure 1.

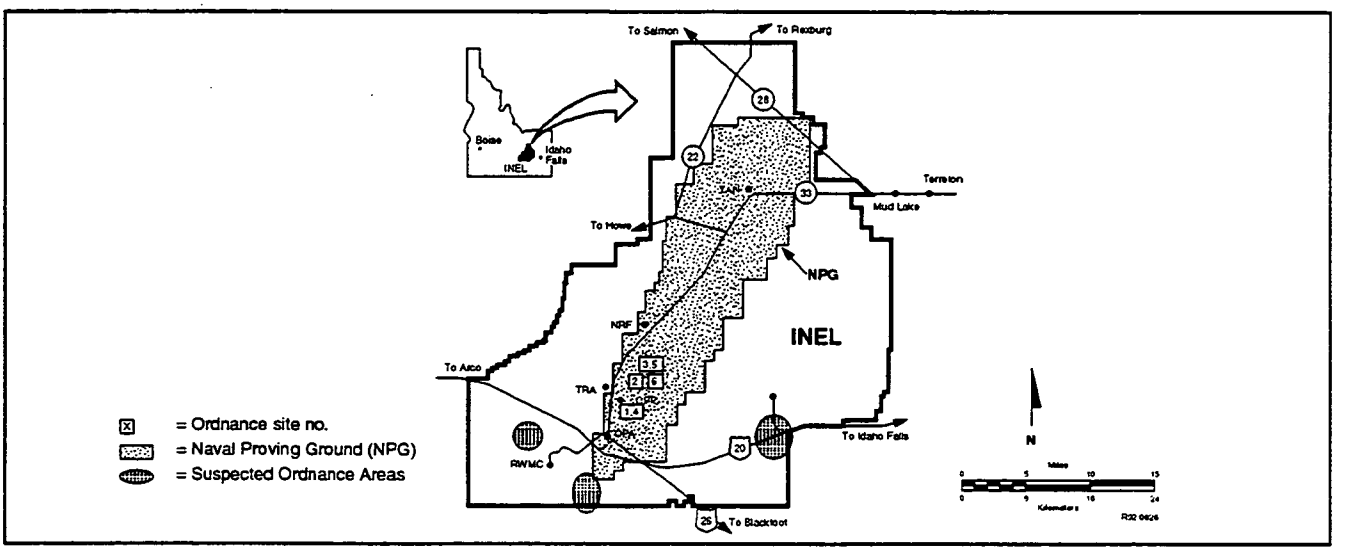

Figure 1. Location of the INEL, former Naval Proving Ground, and locations selected for interim action.

Current land use at the INEL is classified as industrial and mixed use by the Bureau of Land Management. The INEL has been designated as a National Environmental Research Park. The developed area within the INEL is surrounded by a 500 square mile buffer zone used for cattle and sheep grazing.

Approximately 11,700 people are employed at the INEL. The nearest major off-site population centers are in the cities of: Arco (22 miles west), Blackfoot (38 miles southeast), Idaho Falls (49 miles east), and Pocatello (67 miles southeast).

The INEL property is located on the northern edge of the Eastern Snake River Plain. This portion of the Eastern Snake River Plain contains a substantial volume of silicic and basaltic volcanic rocks with relatively minor amounts of sediment. Underlying the INEL are a series of basaltic lava flows interbedded with sediments. The basalt layer immediately beneath the INEL is relatively flat and covered with 20 to 30 feet of alluvium. The Snake River Plain Aquifer underlies the INEL and has been designated as a sole source aquifer pursuant to the Safe Drinking Water Act (SDWA).

The INEL has semidesert characteristics with hot summers and cold winters. Normal annual precipitation is 9.1 inches per year. Twenty distinctive vegetation cover types have been identified at the INEL, with big sagebrush the dominant species, covering approximately 80 percent of the area. The variety of available habitats on the INEL support numerous species of reptiles, birds, and mammals.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Federal Government established the Nuclear Reactor Testing Station in 1949. The name was later changed to the INEL to better reflect the missions of the facility. Prior to 1949, approximately one third of the area now encompassed by the INEL was used by the U. S. Navy for testing naval artillery and other activities. This naval facility became known as the NPG. Other areas now within the INEL boundary were also used by the U.S. Army Air Corps for practice bombing at about the same time.

Two of the ordnance locations identified for cleanup by this interim action were first listed under the Consent Order and Compliance Agreement (COCA) signed by the Environmental Protection Agency (EPA), Department of Energy (DOE), and the U. S. Geological Survey in July 1987. The COCA identified two locations at the Central Facilities Area (CFA), CFA-09 (gravel pit) and CFA-11 (French drain), where ordnance were suspected. No other ordnance areas were listed in the agreement.

The INEL was proposed for listing on the National Priority List (NPL) on July 14, 1989 [54 Federal Register (FR) 29820]. The listing was proposed by the EPA under the authorities granted to the EPA by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. The final rule which listed the INEL on the NPL was published on November 21, 1989 in 54 FR 44184.

In 1991, the EPA, DOE, and the State of Idaho signed the Federal Facility Agreement and Consent Order (FFA/CO). This agreement provided the process and schedule to facilitate cleanup of the areas identified in the FFA/CO Action Plan, in accordance with CERCLA, Resource Conservation and Recovery Act (RCRA), and the State of Idaho Hazardous Waste Management Act. The FFA/CO Action Plan lists three Operable Units (OUs) pertaining to ordnance areas: OU 4-01, OU 10-03, and OU 10-05. Operable Unit 4-

01, as indicated in the FFA/CO, is included in the OU 10-05 interim action.

This Record of Decision (ROD) documents the decision to perform an interim action on OU 10-05 and the remedy selected. The OU 10-05 interim action will be evaluated for adequacy as a final remedial action in the Waste Area Group (WAG) 10 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), which is scheduled to begin in 1998 and is the final RI/FS scheduled for the INEL. In the interim, RI/FS investigations at the other WAGs will be completed according to the schedule in the FFA/CO Action Plan and lead to the final comprehensive RI/FS for WAG 10. By starting the interim action process now, cleanup activities on ordnance locations will begin much earlier than if following the RI/FS schedule in the FFA/CO Action Plan.

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Notice of Availability for the Proposed Plan was published January 4 and 5, 1992 in the *Moscow-Pullman Daily News*, January 5, 1992 in *The Post Register* (Idaho Falls), *The Idaho State Journal* (Pocatello), *Twin Falls Times News*, *Idaho Statesman* (Boise), *The Lewiston Morning Tribune*, *South Idaho Press* (Burley), and January 6, 1992 in the *Idaho Press Tribune* (Nampa). A similar newspaper advertisement was published January 30, 1992 in *The Post Register* (Idaho Falls), *The Idaho State Journal* (Pocatello), *Twin Falls Times News*, *Idaho Statesman* (Boise), *Idaho Press Tribune* (Nampa), and the *South Idaho Press* (Burley) repeating the public meeting locations and times. Personal phone calls were made to inform key individuals and groups about the comment opportunity.

The public comment period was initially scheduled from January 13, 1992 to February 12, 1992. Three public meetings were held on February 4, 5, and 6, 1992 in Idaho Falls, Boise, and Burley, respectively. Representatives from the DOE, EPA, State of Idaho, and EG&G Idaho, Inc. were present at the public meetings to discuss the Proposed Plan, answer questions, and receive both written and oral official public comments. A court reporter was also present at each meeting to record verbatim the proceedings of the meetings. Copies of these records have been placed in each of the information repositories as part of the Administrative Record for public review.

A request for an extension of the public comment period was received and granted, therefore extending the comment period to March 13, 1992. A notice of the extension was published February 17 or 18, 1992 in *The Post Register*, *The Idaho State Journal*, *Twin Falls Times News*, *Idaho Statesman*, *The Lewiston Morning Tribune*, *Idaho Press Tribune*, *South Idaho Press*, and *Moscow-Pullman Daily News*.

All verbal comments, as given at the public meetings, and all written comments, as submitted, are repeated verbatim in the Administrative Record for the ROD. Those comments are annotated to indicate which response in the Responsiveness Summary (see Appendix A) addresses each comment. A response to the comments received during the public comment period is included in the Responsiveness Summary, which is part of this ROD. Public comments received on the Proposed Plan were considered during the development of this ROD. This decision document presents the selected remedial action for Operable Unit 10-05, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. The decision for this site is based on the information in the Administrative Record for this operable unit.

4. SCOPE AND ROLE OF OPERABLE UNIT

Under the FFA/CO the INEL is divided into ten WAGs. The WAGs are further divided into OUs. The ordnance areas have been assigned to WAG 10 since they are not associated with an identified facility. Operable Unit 10-05, which also includes OU 4-01, includes the six areas (see Section 5.0) which have been identified for this interim action. The intent of this interim action is to reduce the immediate risks associated with the six unexploded ordnance areas and expedite overall site cleanup. These six locations are in or near areas frequented by INEL site personnel and therefore pose a more immediate unacceptable risk to human health which needs to be reduced in the near-term. The principal risk in these areas is the threat of uncontrolled detonation of unexploded ordnance. Also, exposure to soil contaminated with ordnance compounds above the action levels presents a potential risk to site personnel in these areas since these compounds have been identified by the EPA as potential human carcinogens.

Another Operable Unit, OU 10-03, has been identified in the FFA/CO Action Plan for the remaining ordnance areas for which insufficient information exists to plan remediation at this time. In accordance with the FFA/CO Action Plan, these areas will be addressed in the Fall of 1995. The historical record search identified as part of the selected remedy documented by this ROD will provide much of this information and enable possible future actions for OU 10-03 to be planned.

The final remedies for both OU 10-03 and OU 10-05 will be addressed in the WAG 10 RI/FS scheduled to begin in 1998. In the interim, RI/FS investigations at the other WAGs will be completed according to the schedule in the FFA/CO Action Plan and lead to the final comprehensive RI/FS for WAG 10. This interim action is consistent with any planned final action.

5. SUMMARY OF SITE CHARACTERISTICS

Operable Unit 10-05 consists of the six locations identified for cleanup in this interim action. These six locations are in or near areas frequented by INEL personnel. INEL personnel working in these areas are exposed to the risks associated with uncontrolled detonation of unexploded ordnance and soils contaminated with explosives compounds. The pathways for human exposure to the soil contaminants include: ingestion, inhalation, and dermal absorption. A description of the six locations is presented below.

(1) CFA Gravel Pit. One 5-inch artillery shell is buried by a slumped gravel pit wall. This location is within 500 ft. of a site proposed for future development and 250 ft. from a road that would be upgraded for that future project.

(2) Storage Bunkers North of Idaho Chemical Processing Plant (ICPP). At least two explosives storage bunkers at this location were destroyed in U. S. Navy tests resulting in the dispersal of 5-inch artillery shells, anti-tank mines, etc. in this area. This site poses a hazard to personnel in the vicinity. The approximate area is 10 acres.

(3) National Oceanic and Atmospheric Association (NOAA) Grid. Numerous 5-inch artillery shells and chunks of explosives have been found at this location. The area is periodically used by NOAA personnel for atmospheric tests and is within 2 miles of Test Reactor Area (TRA) and ICPP, two important operating facilities. The approximate area of this location is 5 acres.

(4) CFA Building 633 Zone. This area was used as a firing station for support of naval artillery tests. Many types of ordnance have been removed from this area. One 5-inch artillery shell is located in a 25 ft deep French drain that has been backfilled with soil and concrete capped. The area is currently used by INEL personnel. Some of the nearby buildings are scheduled for demolition. This location is approximately 20 acres in size.

(5) Fire Station II Zone. Numerous anti-tank mines and other ordnance debris have been found in this area near INEL Fire Station II. These ordnance apparently were dispersed as a result of tests performed at nearby locations at the NPG. This location is approximately 10 acres in size and is used periodically for training of INEL fire fighting personnel.

(6) Power Line Road. The power line road is located approximately 2 miles east of ICPP and Fire Station II and is frequently used by INEL and off-site workers during maintenance of the power line. Numerous 5-inch artillery shells have been found from this area. Approximately 10 miles of this access road lies within the former Naval artillery range. Clearing unexploded ordnance from a corridor 50 feet wide on both sides of this access road would result in an area of about 118 acres.

Unexploded ordnance have been found on the ground surface in most of these areas during routine work activities. Ordnance found to date at the INEL include: 3- to 16-inch artillery shells, partially exploded 125 to 2,000 pound bombs, anti-tank mines, depth charges, smokeless powder, dummy bombs with spotting charges, and chunks of explosives compounds. It is estimated that 150 unexploded ordnance will be found and detonated during the implementation of this interim action.

In addition to unexploded ordnance in these locations, areas of soil are suspected of being contaminated with explosives compounds at the ground surface. Pieces of explosives compounds and discolored soil have been reported in these areas by INEL personnel. Also, controlled detonation of ordnance during this interim action may also release explosive contaminants to the soil. These contaminants potentially include picric acid, RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), TNT (2,4,6-trinitrotoluene), and their numerous manufacturing contaminants and natural decomposition products. Contaminants, such as white phosphorus, metals and other military explosives, may also be present. The exact nature of the contaminants depends on the explosives used in the ordnance. TNT and RDX were the two most commonly used explosives during the World War II era.

Many of the ordnance compounds are considered to be potentially hazardous to human health. TNT and RDX are listed by the EPA as possible (group C) human carcinogens. The common TNT manufacturing contaminants, 2,4- and 2,6-dinitrotoluene (DNT), are listed as probable (group B2) human carcinogens by the EPA. Dinitrobenzene (DNB) and trinitrobenzene (TNB) are common products resulting from the natural breakdown of TNT. However, DNB and TNB are not listed by EPA as carcinogens. It is estimated that 185 cubic yards of soils contaminated with explosives would be remediated in this interim action.

6. SUMMARY OF SITE RISKS

Operable Unit 10-05 has been identified for interim action under the FFA/CO Action Plan for the INEL. This OU consists of six ordnance locations that have been identified for this interim action based on risks posed to site personnel, knowledge of the past activities that created the problem, and the hazards present. This interim action will provide the mechanism to actively search for and identify unexploded ordnance in these areas and remove the risks associated with the ordnance and soils contaminated with explosive compounds at these sites. A Baseline Risk Assessment has not been completed for OU 10-05 at this time, but will be included as part of the WAG 10 comprehensive RI/FS.

6.1 Explosive Risks

The main risk that has motivated this interim action is the potential explosive hazard associated with uncontrolled detonation of unexploded ordnance. Many of the known ordnance locations are in or near areas frequented by INEL personnel. Encounters with unexploded ordnance have occurred in the past and the potential remains for future encounters.

The CERCLA risk assessment methodology does not provide a mechanism to evaluate the risks posed by unexploded ordnance. Therefore, the risks associated with the six ordnance locations identified for this interim action were evaluated using the Department of Defense (DOD) Risk Assessment Code (RAC). The RAC methodology was developed for use at DOD sites where unexploded ordnance and contamination with ordnance compounds are a common problem. This methodology specifically addresses the risks associated with ordnance sites. The RAC was utilized for validation and confirmation of the unacceptable risks present at the six ordnance areas selected for this interim action.

The RAC method asks questions and assigns numerical values to the answers which are based on information available for the sites being evaluated. The result is a qualitative evaluation of the hazards present, the probability of those hazards resulting in an uncontrolled detonation, and recommendation for appropriate response. The results of the RAC evaluations performed on the six locations included in this interim action indicate that the hazards present warrant action to reduce the associated risks. This interim action will reduce those risks by finding and disposing of unexploded ordnance from the six areas identified for this interim action.

6.2 Contaminated Soil

Additional risks result from exposure to soils contaminated with explosive residues. Disposal and detonation of ordnance at the NPG have potentially released explosive residues to the adjacent soils. The detonation of unexploded ordnance for disposal, to be performed during this interim action, also has the potential to release contaminants to the soil.

No soil data exist to quantify concentrations of the contaminants of concern. For this reason, a risk analysis was performed using the risk assessment screening methodology currently used for FFA/CO investigations. This methodology provides a mechanism to derive acceptable levels of contaminants in soil or other media by back-calculation from the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) target risk range. The Track 1 methodology is reasonably conservative and uses humans as

sensitive indicators for the environment. It focuses on major environmental pathways, receptors, and exposure scenarios to identify risk-based soil criteria for contaminants of concern. Modifications to the methodology included the evaluation of dermal contact as an additional pathway of exposure and the derivation of toxicity data when appropriate data was not available. Dermal exposure has been evaluated and found to be an important pathway at other Superfund sites involving cleanup of ordnance compounds.

The objective of the risk analysis was to determine soil concentrations that represent an acceptable risk for the contaminants of concern. Risk-based soil concentrations were back-calculated from the established NCP target risk range of 1 in 10,000 (10^{-4}) to 1 in 1,000,000 (10^{-6}) for carcinogenic contaminants and a Hazard Index of one for non-carcinogenic contaminants. Because the purpose of such an analysis is to obtain risk-based soil concentrations, the Track 1 methodology does not require sampling data. Instead, the procedure uses risk criteria to establish acceptable contaminant concentrations in the media of concern.

The selection of exposure scenarios for the risk analysis was based on the current Track 1 methodology. This conservative methodology uses hypothetical exposure scenarios, both present (occupational) and future (residential). The hypothetical occupational scenario evaluated a worker at the site assumed to be exposed to the contaminants in the soil. The hypothetical residential scenario evaluated exposures to individuals assumed to reside at the site in the future. A future residential scenario was considered for this risk analysis because it is possible that a residence could be built on the site in the event the INEL is eventually closed and vacated.

The major pathways for human exposure to the explosives compounds are through dermal absorption, ingestion, and inhalation of contaminated materials. Each of these pathways was evaluated for the two exposure scenarios, occupational and residential. The occupational exposure scenario resulted in the limiting soil contaminant concentrations.

Concentrations of soil contaminants above the 1 in 10,000 (10^{-4}) risk-based soil levels as determined by the risk analysis are considered to pose an immediate risk, requiring cleanup. Therefore for this interim action, these concentrations have been selected as the screening action levels: TNT (440 mg/kg) and RDX (180 mg/kg). A screening action level for DNT has not been developed, since DNT is a manufacturing contaminant and natural breakdown product of TNT, normally making up approximately one percent by weight. The action level for TNT adequately provides for remediation of DNT and other natural breakdown products that may be present in the soil above the 1 in 10,000 (10^{-4}) level. This is consistent with the approach taken at other CERCLA sites with similar contaminants. The cleanup standards selected for this interim action are the 1 in 100,000 (10^{-5}) risk-based soil concentrations, 44 mg/kg for TNT and 18 mg/kg for RDX.

The action levels and cleanup standards selected for this interim action are protective against actual or expected exposures to the contaminants of concern. Based on the conservative nature of and the use of default values in the risk analysis, the 1 in 100,000 (10^{-5}) risk-based cleanup level is protective of human health and the environment. The calculated non-carcinogenic concentration for TNT (26 mg/kg) was not selected for the cleanup level because the risk evaluation had substantially lower confidence levels than that for the carcinogenic risk evaluation. The 1 in 100,000 (10^{-5}) risk-based cleanup concentration (44 mg/kg) selected for TNT is adequately protective of human health and the environment.

The action levels and cleanup standards selected for this action are appropriate for an interim action and are consistent with those selected at other Superfund sites contaminated with ordnance compounds. These levels will be re-evaluated as part of the WAG 10 comprehensive RI/FS to ensure that the cleanup remains protective considering cumulative effects.

This interim action will reduce the hazards associated with unexploded ordnance and soils contaminated with ordnance compounds at the six identified areas. Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment due to the presence of unexploded ordnance and ordnance compounds in the soil.

6.3 Ecological Concerns

Ecological concerns will be more fully addressed in the WAG 10 comprehensive RI/FS ROD. Since the Track 1 risk evaluation methodology is conservative and the major ecological exposure routes are expected to be the same as for human exposures, the risk reduction realized due to this interim action should also achieve a significant reduction in adverse ecological effects.

7. DESCRIPTION OF ALTERNATIVES

The Proposed Plan presented four interim action alternatives: (1) no action; (2) placement of administrative barriers; (3) detonation and disposal on-site; off-site incineration of contaminated soil; and (4) detonation and disposal on-site, on-site composting of contaminated soil. These four alternatives are discussed below in greater detail.

7.1 Alternative 1 - No Action

No remedial action would be implemented under the no action alternative. The no action alternative was evaluated as required by CERCLA and the NCP. No immediate reduction of the explosive risk or risks from explosive contamination would be accomplished. No significant costs would be associated with the no action alternative.

7.2 Alternative 2 - Placement of Administrative Barriers

This alternative would involve the placement of administrative controls, such as signs and fences, at all identified areas where unexploded ordnance have been found. Administrative barriers would not meet cleanup requirements but would limit human exposure by informing personnel of the hazards present in the identified areas. However, this alternative would provide no guarantee of reducing the risk of uncontrolled detonation to site personnel and would not reduce the potential risk to site personnel or the environment from the release of explosive residues. Estimated total cost would be $182,600.

7.3 Alternative 3 - Detonation and Disposal On-site, Off-site Incineration of Contaminated Soil

This alternative involves a phased approach leading to controlled on-site detonation of unexploded ordnance by experienced personnel, followed by incineration of soils contaminated with explosive residues.

Phase I would first proceed with an in-depth record search of NPG and INEL historical records. This would include searching DOD record storage facilities located outside of the INEL and would encompass all identified and suspected ordnance areas at the INEL. The record search would provide the necessary background information to identify ordnance-related activities, target areas, and existing hazards in order to prepare plans, procedures and health and safety documentation to implement the cleanup. Additional ordnance areas identified through the record search which the FFA/CO Remedial Project Managers agree will pose an immediate unacceptable risk to site personnel or the public, and consist of limited additional magnitude and associated hazards, will be considered within the scope of this interim action. Ordnance areas evaluated during the record search, which are deemed to pose an immediate unacceptable risk and fall outside the current scope of this interim action could be addressed by amending the ROD for this interim action. Upon concurrence of the three FFA/CO Project Managers, a ROD amendment may be initiated and would involve another public comment period.

As part of this interim action, areas identified which are crossed by public roads will be posted with signs to warn of the potential hazards to the public presented by unexploded ordnance. Phase II would continue with a systematic search for surface and near-surface ordnance at the identified ordnance areas using visual and geophysical search methods. Unexploded ordnance and chunks of explosive discovered in this manner would be marked, identified, and investigated to determine ordnance types and whether explosives were contained within. These ordnance would then be detonated in place or, if necessary, moved to a safer location for detonation with other like devices by qualified explosive ordnance disposal technicians. The areas would then be policed for shrapnel and examined to insure complete detonation of explosive materials. Any pieces of explosive residue released due to incomplete detonation would be detonated again. Nonhazardous solid waste, such as shrapnel, resulting from detonation would be disposed in the INEL RCRA Subtitle D landfill at CFA and, to the extent possible, scrap metal would be recycled.

Phase III would involve systematic sampling of soils in areas where detonations occurred and areas suspected to be contaminated from past activities due to visible discoloration. Samples would be analyzed using field methods developed for explosives by the DOD with 10 percent of the samples sent to an off-site analytical laboratory for quality assurance and confirmation of results. These data would be used to determine the volume of soil to be removed based on the cleanup action levels and standards presented in this ROD.

Phase IV would involve removal of soil contaminated with explosives above the action levels. Contaminated soils would first be sampled and analyzed using toxicity characteristic leaching procedure (TCLP) methodology to determine if RCRA requirements apply, and then taken to an off-site treatment/ disposal facility for incineration and disposal. The $2,359,500 estimated total cost for this alternative assumes 185 cubic yards of soil will require treatment.

7.4 Alternative 4 - Detonation and Disposal On-site, On-site Composting of Contaminated Soil

Alternative 4 involves the same phased approach as in alternative 3. The NPG record search, posting of signs, ordnance area search, detonation, and soil sampling (Phases I, II and III) would be the same for this alternative. However, remediation of soil contaminated with explosive residues (Phase IV) would utilize the innovative composting technology currently being evaluated by the DOD and EPA for cleanup of soils contaminated with explosives at the Umatilla Army Depot Activity Superfund site in Oregon.

In this alternative, contaminated soil would be removed and mixed with nutrient-rich organic material (manure, etc.) and placed inside a containment structure where temperature and moisture could be controlled. This methodology utilizes native soil microorganisms, similar to municipal waste composting, to degrade contaminants and has been shown to successfully remediate mixed explosives in soil within 90 days. Treated soil would be sampled and analyzed for explosives to confirm successful remediation. Successfully treated soil would then be used for clean fill at the INEL.

The capabilities of INEL soil and associated native microorganisms to biodegrade ordnance compounds would first have to be evaluated in a pilot-scale test. If this methodology is not proven to be feasible, alternative 3 would be selected as a contingency. Total cost estimated for this alternative is $2,075,500.

8. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The CERCLA guidance requires that each remedial alternative be evaluated according to specific criteria. The purpose of the evaluation is to determine the advantages and disadvantages of each alternative, and thereby guide selection of the remedial alternative offering the most effective and feasible means of achieving the stated cleanup objectives. While all nine CERCLA criteria are important, they are weighted differently in the decision making process depending on whether they describe a required level of performance (threshold criteria), technical advantages and disadvantages (balancing criteria), or review and evaluation by other entities (modifying criteria). The four remedial alternatives described in Section 7.0 were evaluated according to the following CERCLA criteria:

- Threshold criteria
  - Overall protection of human health and the environment
  - Compliance with ARARs
- Balancing criteria
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume through treatment
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying criteria
  - State acceptance
  - Community acceptance

8.1 Threshold Criteria

The remedial alternatives were evaluated in relation to the threshold criteria: overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The threshold criteria must be met by the remedial alternatives for further consideration as potential final remedies for the ROD. It is the intent of this interim action to meet the threshold criteria. The effectiveness of this remedial action as a final remedy will be evaluated in the WAG 10 comprehensive RI/FS.

8.1.1 Overall Protection of Human Health and the Environment

The primary risks to be reduced are the safety hazard to INEL personnel due to the presence of unexploded ordnance and risk of ingestion, inhalation, or dermal contact with explosive residues present on-site. Alternatives 3 and 4 would remove the hazards associated with the unexploded ordnance and soil contaminated with explosive residues above the action levels, providing protection for human health and the environment. Alternative 2 could potentially reduce exposure to these risks but would not be as effective as alternatives 3 and 4 since the hazards remain in place. Alternative 1 would do nothing to reduce these risks.

8.1.2 Compliance with ARARs

CERCLA, as amended by SARA, requires that remedial actions for Superfund sites comply with Federal and State laws applicable to the action being taken. Remedial actions should also comply with the requirements of laws and regulations that are not directly applicable, but are relevant and appropriate. Combined, these are referred to as ARARs. Compliance with ARARs requires evaluation of the remedial alternatives for compliance with chemical-, location-, and action-specific ARARs or justification of a waiver; and whether the remedial alternatives consider other criteria, advisories, and guidelines.

8.1.2.1 Chemical-specific ARARs - Chemical-specific ARARs are standards for allowable levels of certain contaminants in the environment. Such standards are generally issued pursuant to the Federal SDWA, Clean Water Act, Clean Air Act, RCRA, Atomic Energy Act, and State counterpart requirements.

There are no chemical-specific ARARs governing clean-up levels for unexploded ordnance or explosive residues in soil. Therefore, based on knowledge to date, no chemical-specific ARARs have been identified. If chemical-specific ARARs are identified as the development of Remedial Design/Remedial Action progresses, they will be complied with.

Federal and State water quality regulations are not applicable because the interim action does not deal with surface water or groundwater contamination. Water quality issues will be addressed in the WAG 10 site-wide, comprehensive RI/FS.

Unexploded ordnance are not classified as hazardous waste as described in RCRA. Explosives residues are classified as listed RCRA hazardous wastes if they are generated by a manufacturing or processing facility or may be characteristic RCRA hazardous wastes if they are reactive. The concentrations of explosives in the contaminated soils are expected to be far below the 12 percent by weight cutoff that would make them reactive, based on research performed by DOD. However, any contaminated soils taken off-site

for treatment/disposal would need to be sampled and analyzed using the RCRA TCLP methodology to determine waste handling and shipping requirements.

8.1.2.2 Action-specific ARARs - An air quality permit is not required for this interim action since it is a CERCLA onsite action. However, the substantive requirements of an air quality permit must be met. The Idaho Division of Environmental Quality will be informed of this action and provided with the appropriate information for their review prior to taking any action.

8.1.2.3 Location-specific ARARs - The National Historic Preservation Act is applicable to CERCLA actions. However, this interim action is not expected to impact areas with historic significance. Five of the six locations have been previously surveyed for cultural resources and the sixth location will be surveyed prior to the start of any actions. Also, no threatened or endangered species or habitats have been identified in these areas so the Endangered Species Act is not considered to be an ARAR for this interim action.

8.2 Balancing Criteria

Once a remedial alternative has been shown to satisfy the threshold criteria, five balancing criteria are used to evaluate other aspects of the potential alternatives. The balancing criteria are used in refining the selection of candidate alternatives for the proposed action. The five balancing criteria are: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. Each criterion is further explained in the following sections.

The no action alternative was eliminated from further evaluation since it did not meet the threshold criteria described above. The remaining three alternatives are evaluated below against each of the five balancing criteria.

8.2.1 Long-term Effectiveness and Permanence

Alternatives 3 and 4 would provide long-term effectiveness and permanence by removing the potential explosive hazards and soil contaminated with explosive residues above the cleanup action levels. Alternative 2, placement of administrative barriers, provides some reduction of risk but its effectiveness and permanence would be limited. The hazards would remain in place and some personnel must enter these areas to perform their work in support of the continued operations of the INEL.

8.2.2 Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion addresses the statutory preference for selecting remedial actions employing treatment technologies that permanently reduce toxicity, mobility, or volume of the hazardous substances as their principal element. Evaluation of alternatives based on this criterion requires analysis of the following factors: treatment process used; toxicity and nature of the material treated; amount of hazardous material destroyed or treated; irreversibility of the treatment; type and quantity of treatment byproducts; and the statutory preference for treatment as a principal element.

Alternative 3 would remove the risk posed by unexploded ordnance through controlled detonation. Under this alternative, contaminated soils with concentrations of contaminants above the cleanup action level

would be incinerated off-site. The incineration process is irreversible, destroying the ordnance compounds, and producing a smaller volume of ash. The incinerator chosen for this action will be a facility approved by the EPA to receive CERCLA wastes and will be responsible for proper disposal of the ash depending on the nature of any residual contamination present. This alternative offers the greatest reduction of toxicity, mobility, or volume of wastes present at the ordnance locations identified in this interim action.

Alternative 4 would also remove the risk posed by unexploded ordnance through controlled detonation. Alternative 4 differs from alternative 3 in that soils contaminated with ordnance compounds above the cleanup action levels would be treated by composting on-site. This alternative would also potentially reduce toxicity, mobility or volume of wastes by degrading the ordnance compounds present in the soil. However, if other contaminants, such as heavy metals, are present, the treatment process could be compromised resulting in an increase in the residual waste volume, which could potentially require disposal at an off-site EPA approved facility. No soil sampling data exists to fully evaluate the nature of the soil contaminants.

Alternative 2, placement of administrative barriers, would provide no treatment and, therefore, would not fulfill the statutory preference for remedial actions involving treatment. The hazards associated with unexploded ordnance and contaminated soils would remain in place. No reduction of toxicity, mobility, or volume through treatment would be accomplished.

8.2.3 Short-term Effectiveness

The evaluation of alternatives based on short-term effectiveness requires an analysis of the effectiveness of protection for the community and workers during remedial actions, environmental impacts during implementation, and the amount of time required for remedial action objectives to be achieved.

Alternative 3 could be implemented relatively quickly using available technology. Additionally, this technology has been demonstrated in the past at the INEL and DOD facilities. Detonation of unexploded ordnance would remove the immediate safety hazard to INEL workers. Removal of contaminated soil would further reduce risks and cause minimal impacts to the environment. Remedial action objectives would be achieved within two years. Dust and noise would be produced by this alternative but these impacts would be mitigated through remedial design to minimize impacts to INEL workers and the environment. Remedial activities would protect workers by meeting the requirements of the Occupational Safety and Health Act (OSHA). Disturbed areas would be backfilled with clean fill as necessary and reseeded to match natural vegetation. No impact to the community is expected from this action.

Alternative 4 would require some lead time to design and perform a pilot-scale study before implementation. After this study demonstrated feasibility of the treatment, this alternative would be implemented. Remedial objectives could be achieved within two years. Alternative 4 could effectively remove the hazard of unexploded ordnance and risks associated with explosive residues in soil. Potential impacts to workers and the environment from detonation of ordnance and excavation of contaminated soils would be similar to those identified for alternative 3.

Alternative 2 could be completed quickly using existing resources. No significant impacts to the environment would be associated with this alternative. However, this alternative would not eliminate risks associated with the ordnance sites, and therefore not meet the remedial action objectives.

8.2.4 Implementability

The implementability criterion has three factors that must be evaluated: technical feasibility; administrative feasibility; and the availability of services and materials. Technical feasibility requires evaluation of the ability to construct and operate the technology, the reliability of the technology, the ease of undertaking additional remedial action (if necessary), and monitoring considerations. The ability to coordinate actions with other agencies is the only factor for evaluating administrative feasibility. This would include the substantive requirements of a State of Idaho air quality permit and any requirements for off-site disposal. The availability of services and materials requires evaluation of the following factors: availability of treatment, storage and disposal services; availability of necessary equipment and specialists; and availability of prospective technologies.

Detonation and incineration, alternative 3, has previously been implemented at many DOD facilities. However, these facilities brought an incinerator on-site for treatment of contaminated soil. Due to the low volume of contaminated materials expected, this action cannot justify the significant initial capital costs of bringing an incinerator to the INEL. Therefore, an off-site incinerator approved by the EPA to receive CERCLA wastes would be utilized. This alternative could be readily implemented using existing technologies.

Alternative 4 would require design and completion of a pilot-scale study prior to construction and implementation of Phase IV. Soils and contaminants specific to the INEL would be evaluated to insure success of the composting technology. However, this alternative is not readily implementable due to the unknown nature of the soil contaminants and the estimated small quantity requiring treatment. The presence of heavy metals, in particular, would make the composting technology infeasible.

Alternative 2, placement of administrative barriers, could be readily implemented following procurement of materials, minimal personnel training and planning. The time required to fabricate the signs and install signs and fences would be minimal compared to the other alternatives. However, administrative barriers are effective only if the integrity of the barriers is maintained, personnel acknowledge the hazards that are present, and a long-term commitment for maintenance and funding is provided.

8.2.5 Cost

Capital costs, operation and maintenance costs, and present worth costs must be estimated in order to evaluate total project costs. Capital costs include design, construction, equipment, buildings, startup, and contingency costs. Operation and maintenance costs include labor, power, disposal of residuals, administration, and periodic review. Actual costs are expected to be no more than 50 percent over, or 30 percent under, the cost estimate.

Alternative 2 costs ($182,600) are minimal and would also require minimal annual inspection and maintenance to ensure administrative barriers remain in place.

The costs of alternatives 3 and 4, $2,359,500 and $2,075,500 respectively, are significantly higher than the cost of alternative 2. However, both of these alternatives remove the immediate and long-term hazard and associated risks. These two alternatives assume that 150 unexploded ordnance will be detonated in a

controlled manner. This assumption is based on previous field searches and ordnance detonation at the INEL. Alternatives 3 and 4 also assume known acreage for each area and the volume of contaminated soil (185 yd^3) to be remediated. This volume estimate is based on the cumulative area assumed to be potentially affected by the ordnance detonations. Deviation from the above assumptions would significantly affect estimated costs of the alternatives.

8.3 Modifying Criteria

The modifying criteria are used in the final evaluation of remedial alternatives. The two modifying criteria are state and community acceptance. These two criteria must consider the following factors: the elements of the alternatives which are supported; the elements of the alternatives which are not supported; and the elements of the alternatives for which there is strong opposition.

8.3.1 State Acceptance

This assessment evaluates the technical and administrative issues and concerns the state may have regarding each of the alternatives.

The State of Idaho Department of Health and Welfare (IDHW) supports the selection of alternative 3, controlled detonation and on-site disposal, off-site incineration of contaminated soil. The State of Idaho has been involved in this project from the beginning, including preparation of the Proposed Plan and this decision document. Comments received from IDHW were incorporated into these documents and they have been issued with IDHW concurrence.

8.3.2 Community Acceptance

This assessment evaluates the issues and concerns the public may have with each of the proposed alternatives. The issues identified during the public comment period are more fully addressed in the attached Responsiveness Summary.

Alternative 2, placement of administrative barriers, was supported in combination with both alternatives 3 and 4.

Alternative 3, detonation and incineration, received moderate support. However, the public was concerned with the location of the incinerator and transportation of wastes off the INEL.

Alternative 4, detonation and composting, received the most support. The public especially preferred the idea of treating contaminants on-site. However, this technology is infeasible for this interim action since the composting technology is still being developed, the estimated volume of contaminated soil is low, and heavy metals may be present in the soil.

9. THE SELECTED REMEDY

Operable Unit 10-05, which also contains OU 4-01, includes the six areas which have been identified for this interim action. It is the intention of this interim action to reduce the immediate risks (see Section 6) associated with these six unexploded ordnance areas and expedite overall site cleanup. The six locations have been identified for cleanup in this interim action because they are in or near areas frequented by INEL site personnel and contain unexploded ordnance, which pose an unacceptable risk to human health.

The selected remedy (alternative 3) for the interim remedial action of OU 10-05 will cost an estimated $2,359,500 (present worth). The remedy includes the following actions: (1) a comprehensive search of historical records pertaining to the NPG and other suspected ordnance sites at the INEL, (2) posting of signs where the public has access to ordnance areas, (3) a field search of the six identified areas for unexploded ordnance, (4) controlled detonation of the ordnance, (5) field sampling of detonation areas and other areas suspected of contamination with explosive compounds, (6) excavation of contaminated soils exceeding action levels, and (7) off-site incineration and disposal of contaminated soils. This alternative is preferred because it best achieves the goals of the evaluation criteria given the scope of the action.

The selected remedy assumes an estimate of approximately 150 unexploded ordnance and 185 cubic yards of ordnance-contaminated soils to be remediated in the interim action. The estimates are based on previous field searches and ordnance detonation work at the INEL. This interim action is limited to the six identified areas or the estimated quantity of materials to be remediated.

The selected remedy for this interim action includes a search of historical records pertaining to ordnance activities at the INEL. The search will be comprehensive and will not be limited to the six areas identified for cleanup. This record search will provide information to enable possible future actions to be planned for remediation of unexploded ordnance at the INEL. Information from the record search will be evaluated by the agencies to determine whether any additional ordnance locations, other than the six identified, present an immediate unacceptable risk to INEL site personnel or the public.

Additional ordnance areas identified through the record search which the FFA/CO Remedial Project Managers agree will pose an immediate unacceptable risk to site personnel or the public, and consist of limited additional magnitude and associated hazards, will be considered within the scope of this interim action. Ordnance areas evaluated during the record search, which are deemed to pose an immediate risk and fall outside the current scope of this interim action could, upon concurrence of the FFA/CO Project Managers, be addressed by amending the ROD, or in another manner consistent with the FFA/CO process.

Another operable unit, OU 10-03, has been identified in the FFA/CO Action Plan for the remaining ordnance areas for which insufficient information exists to plan remediation at this time. In accordance with the FFA/CO Action Plan the remaining areas will be addressed in the Fall of 1995.

The final remedies for both OU 10-03 and OU 10-05 will be addressed in the WAG 10 RI/FS scheduled to begin in 1998. In the interim, RI/FS investigations at the WAGs will be completed according to the schedule in the FFA/CO Action Plan and lead to the final comprehensive RI/FS for WAG 10. This interim action is consistent with, and will not interfere with, any planned final action.

9.1 Historical Record Search

In Phase I, a comprehensive search of historical records pertaining to the former NPG and other suspected ordnance sites at the INEL will be completed. This search will include U. S. Navy, U. S. Army, DOE and other record repositories as necessary to sufficiently identify activities performed at the former NPG and other ordnance sites at the INEL. Specifically, the purpose of the record search is to identify the types of ordnance used, strategies and goals of the tests conducted, targets used, and other information that will aid in the planning of this and future cleanup activities pertaining to ordnance at the INEL.

9.2 Ordnance Search and Detonation

Signs would be posted at the borders of the suspected ordnance areas which are transected by public roads (see Figure 1) to warn the public of the possible presence of unexploded ordnance and the associated risks.

Phase II would continue with a systematic search for unexploded ordnance in the six identified ordnance areas in OU 10-05. These searches will employ both visual and geophysical sweeps of the areas in an effort to identify all ordnance within two feet of the surface. All ordnance identified in this manner will be marked, the location identified by coordinates, and logged into a field notebook to enable workers to relocate them. Areas suspected of soil contamination, due to discoloration or presence of chunks of explosives, will also be identified and marked for sampling in Phase III.

Phase II will continue with the controlled detonation of the unexploded ordnance and chunks of explosives located by the searches. Each ordnance would be detonated to initiate an explosion that would either destroy the ordnance and its associated explosive or expose the inside of the ordnance to determine its contents. Live ordnance would then be further detonated to destroy the ordnance compounds within. Metal debris produced would first be checked for complete detonation and then discarded as nonhazardous waste to the INEL RCRA Subtitle D landfill at CFA or, if possible, recycled as scrap metal.

9.3 Soil Sampling and Excavation

In Phase III, soil in detonation areas and other areas suspected of being contaminated with ordnance compounds will be systematically sampled using field analytical methods. Soil samples will be collected to determine if action levels have been exceeded due to the release of contaminants during ordnance detonations.

The field analytical methods developed specifically for ordnance compounds by the U. S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory will be used for this interim action. These methods will analyze for both TNT and RDX, providing low detection levels, good reproducibility, and reliability. Detection levels are sufficiently low to detect these compounds at concentrations below the cleanup action levels. Other ordnance compounds and mixtures, such as Compound B, amitol, etc., contain TNT and/or RDX and will therefore be detected using these methods.

Ten percent of the soil samples collected will be sent to an off-site analytical laboratory for quality assurance and verification of field analytical results. These samples will be analyzed using EPA method 8330 for a suite of ordnance compounds, including: RDX, TNT, DNT, and numerous related compounds.

These samples will serve as a quality check of the field analytical methods that will be used.

The screening action levels and cleanup standards for TNT and RDX have been selected based on results of the risk analysis discussed in Section 6.2 and information derived from cleanup actions at other ordnance sites. The action levels are 440 ppm for TNT and 180 ppm for RDX. These action levels were selected based on the NCP excess cancer risk of 1 in 10,000 (10^{-4}) for an occupational exposure scenario. The occupational scenario resulted in the lowest risk-based concentrations for the exposure pathways evaluated. The risk-based soil concentrations generated by the risk analysis closely parallel those used at other ordnance Superfund sites. Additionally, the risk evaluation used to derive these risk-based soil concentrations is a reasonably conservative methodology and has established action levels that are protective of human health and the environment.

Soils with TNT and RDX concentrations determined to be over the screening action levels will be excavated and containerized for transportation to an off-site incinerator. Other ordnance contaminants potentially present in the contaminated soils would also be remediated as a result of their co-occurrence with TNT and RDX. For example, DNT is a manufacturing byproduct of TNT processing, making up approximately one percent by weight of the total TNT concentration. It therefore occurs with TNT as a contaminant and will be remediated simultaneously with soils that exceed the TNT cleanup action level. This will also be true for TNT degradation products and compounds similarly associated with RDX. Field analytical methods are not available that would quantify these other potential contaminants.

The cleanup standard selected for this interim action is based on the NCP excess cancer risk of 1 in 100,000 (10^{-5}) for an occupational exposure scenario. The cleanup standards for TNT and RDX are 44 and 18 ppm, respectively. These risk-based soil concentrations were also derived in the risk analysis performed following the conservative Track 1 methodology. The cleanup standard represents the maximum concentration of soil contaminants allowed following completion of the interim action. The screening action levels and cleanup standards for this interim action are similar to those selected at other Superfund sites contaminated with ordnance compounds.

9.4 Off-site Incineration

Excavated soil will be containerized for transport off-site to an EPA approved incinerator, consistent with the EPA off-site disposal policy. The containerized soil will first be sampled and analyzed for TCLP analytes to determine whether it should be classified as RCRA waste. Excavated contaminated soils are expected to exhibit contaminant concentrations that would be less than the 12 percent by weight cutoff that would make them a reactive waste under RCRA. Transport of contaminated soil to the selected incinerator will follow all applicable laws regarding transportation of hazardous materials. The sampling results for the containerized waste will determine which transportation laws are applicable and help determine the final disposition of incinerator ash.

The interim action will conclude with off-site incineration of the contaminated soils and appropriate disposal of the ash by the incineration facility. The selected incinerator will be a facility approved by the EPA for off-site disposal of CERCLA wastes. The actual location of the incinerator will be selected during the remedial design phase of the interim action.

10. STATUTORY DETERMINATION

The responsibility of DOE and EPA, under CERCLA is to ensure that interim remedial actions will protect human health and the environment. Additionally, Section 121 of CERCLA, as amended by SARA, establishes several other statutory requirements and preferences. These specify that, when complete, the selected remedy must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified.

The selected remedy must also be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The remedy should represent the best balance of tradeoffs among alternatives with respect to pertinent criteria. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as their principal element.

The selected interim remedial action for OU 10-05 at the INEL meets these statutory requirements. The selected remedy will reduce the immediate explosive risks in the six identified areas and reduce the risk of exposure to contaminated soil to within the NCP target risk range of 1 in 10,000 (10^{-4}) to 1 in 1,000,000 (10^{-6}). Implementation of the selected remedy will not pose an unacceptable short-term risk to human health or the environment or cause cross-media impacts.

10.1 Protection of Human Health and the Environment

The selected interim remedial action will protect human health and the environment through removal of the risks associated with unexploded ordnance. In addition, soils contaminated with ordnance compounds which pose an unacceptable risk will be removed and treated by incineration.

10.2 Compliance with ARARs

The selected remedy will comply with all Federal and State ARARs. The ARARs are presented below.

10.2.1 Action-specific ARARs

The substantive requirements of a State of Idaho Air Quality Permit will be met for this action. (IDAPA 16.01.01012)

10.2.2 Chemical-specific ARARs

There are no chemical-specific ARARs for this action.

10.2.3 Location-specific ARARs

There are no location-specific ARARs for this action.

10.3 Cost-Effectiveness

The selected remedy (alternative 3) is cost-effective because it has been determined to provide overall effectiveness proportional to its costs, the net present worth value being $2,359,500. Although the cost of the selected remedy is higher than the other alternatives, controlled detonation and disposal on-site followed by off-site incineration of contaminated soil provides a long-term solution that is protective of human health and the environment. This alternative eliminates the risks posed by unexploded ordnance and soils contaminated with explosives compounds from locations in OU 10-05. The cost of alternative 4 is about the same as alternative 3, the effectiveness of alternative 4 is uncertain because the composting technology would be infeasible if heavy metals are present. Alternative 2, placement of administrative barriers, does not provide any treatment or removal of the hazards present and is not effective for the costs incurred.

10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The DOE, EPA, and the State of Idaho have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner for OU 10-05. The agencies prefer a permanent solution whenever possible and for this action it is possible to meet the objectives of an interim action and provide a potentially permanent solution. The selected remedy, detonation and incineration, will reduce the hazards associated with unexploded ordnance and significantly reduce the volume of soil contaminants present at OU 10-05.

10.5 Preference for Treatment as Principal Element

The statutory preference for treatment that permanently and significantly reduces the toxicity, mobility, or volume of hazardous substances as a principal element is met by this action through incineration. Unexploded ordnance will be located and detonated for disposal thereby eliminating the explosive risks associated with the six areas identified in OU 10-05. Soils contaminated with ordnance compounds will be treated by incineration. This action provides a permanent reduction in toxicity, mobility, and volume of the contaminated soils at OU 10-05.

11. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for OU 10-05, ordnance interim action, was released for public comment in January 1992. The Proposed Plan identified Alternative 3, detonation of unexploded ordnance and disposal on-site and off-site incineration of contaminated soil, as the preferred alternative. DOE, EPA, and the State of Idaho have reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, were necessary.