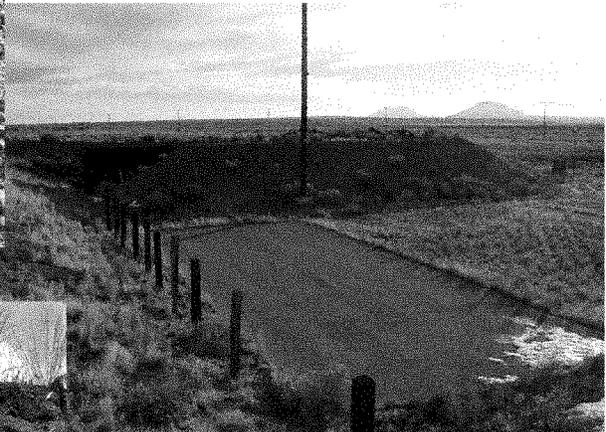
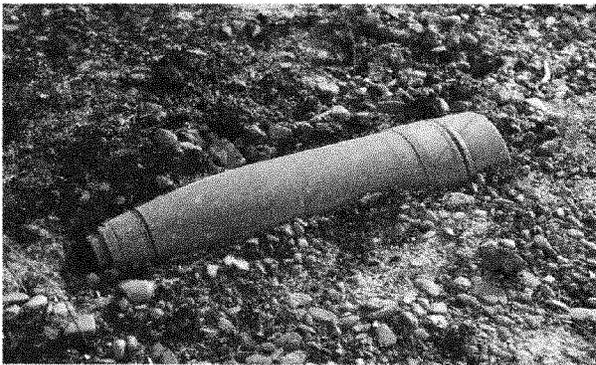


IDAHO DEPARTMENT
OF HEALTH AND WELFARE
DIVISION OF
ENVIRONMENTAL QUALITY

Record of Decision

Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Miscellaneous Sites



Operable Units 6-05 and 10-04
Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho

**DOE/ID-10980
November 2002**

Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Miscellaneous Sites

November 2002

**Operable Units 6-05 and 10-04
Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho**

Part 1: Declaration

Site Name and Location

Waste Area Groups 6 and 10 Comprehensive Remedial Investigation/Feasibility Study,
Operable Unit 10-04 (including Operable Unit 6-05)

Incorporating 50 individual sites in Operable Units 6-01 through 6-05 and 10-01 through 10-07.

Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho

CERCLIS ID 4890008952.

Statement of Basis and Purpose

This decision document presents the selected remedy for Operable Unit (OU) 6-05, Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and OU 10-04, Miscellaneous Sites, at the Idaho National Engineering and Environmental Laboratory (INEEL), hereafter referred to as OU 10-04. The selected remedy comprises remedial action involving removal, treatment, and institutional controls at eight individual sites, remedial action involving removal and treatment at one specific site, remedial action involving institutional controls at seven additional sites, and no action with INEEL-wide long-term monitoring for ecological receptors. The components of the selected remedy were chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. The selected remedy is intended to be the final action for contamination at OU 10-04 sites.

The United States (U.S.) Department of Energy Idaho, Operations Office (DOE-ID), is the lead agency for this decision. The U.S. Environmental Protection Agency (EPA) approves the decision and the Idaho Department of Environmental Quality (IDEQ) concurs. The EPA and IDEQ have participated in the evaluation and selection of remedies for the OU 10-04 sites of concern, the no action and institutional control decisions, and the identification of sites that will be administered under other INEEL regulatory programs. The basis for decisions are established in this Record of Decision (ROD) and documented in the Administrative Record for Waste Area Groups (WAGs) 6 and 10.

Assessment of Site

The response action selected in this Record of Decision is necessary to protect the public health, welfare, or the environment from actual or threatened releases of hazardous substances into the environment. Such a release, or threat of release, may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

WAGs 6 and 10 at the INEEL, are two of 10 WAGs identified in the Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991). The FFA/CO, which provides the framework and schedule for the implementation of CERCLA at the INEEL, was negotiated and signed by DOE-ID, EPA Region 10, and the State of Idaho. The FFA/CO required development of the OU 10-04 Comprehensive Remedial Investigation/Feasibility Study (RI/FS) for WAGs 6 and 10.

The FFA/CO states that WAG 10 includes miscellaneous surface sites and liquid disposal areas throughout the INEEL that are not included within other WAGs. It also states that the boundary of

WAG 10 is the INEEL boundary or beyond, as necessary, to encompass real or potential impact from INEEL activities and areas within the INEEL not covered by other WAGs. Additionally, the FFA/CO stated that the WAG 6 Comprehensive RI/FS would be incorporated into the OU 10-04 RI/FS. Waste Area Group 6 consists of the Experimental Breeder Reactor No. I (EBR-I) and the Boiling Water Reactor Experiment (BORAX) areas. Waste Area Group 10 also includes regional Snake River Plain aquifer concerns related to the INEEL that cannot be addressed on a WAG-specific basis. The other WAGs have addressed aquifer concerns on a WAG-specific basis and WAG 10 has evaluated aquifer concerns for the OU 10-04 sites. However, to address Site-wide groundwater issues and potential new sites, an additional operable unit, OU 10-08, was added under WAG 10. OU 10-08 will be responsible for the evaluation of Site-wide groundwater concerns and evaluation of new sites that are passed to WAG 10 by other WAGs, and sites discovered during the development of the OU 10-08 ROD, as well as sites discovered after the OU 10-08 ROD is finalized. Information from the OU 10-08 investigation will be used to develop a baseline for groundwater information that will be used for institutional control and monitoring at the INEEL.

The OU 10-04 also evaluated the risk to ecological receptors across the INEEL. The INEEL-wide ecological risk assessment was the culmination of all Site-specific ecological risk assessments carried out at the INEEL.

The OU 10-04 evaluated 50 potential release sites in the OU 10-04 Comprehensive RI/FS (DOE-ID 2001). The Comprehensive RI/FS tasks included estimating the individual and cumulative risks associated with all 50 sites and identifying and evaluating appropriate remedial actions for those sites posing unacceptable risk. The OU 10-04 Proposed Plan, which was issued for public review in January 2002, summarized the RI/FS results and the preferred remedial alternatives.

The selected remedy for OU 10-04 comprises two remedial actions involving removal, treatment, and institutional controls to mitigate the risk associated with eight specific sites, one remedial action involving removal and treatment to mitigate the risk at one specific site, remedial action to implement institutional controls at seven sites, and no action with INEEL-wide long-term ecological monitoring. The first remedial action involving removal, treatment, and institutional controls addresses three extensive artillery and bombing ranges dating from World War II. The possible presence of unexploded ordnance (UXO) at various locations within these sites may pose a risk to human health. The second remedial action involving removal, treatment, and institutional controls will mitigate five sites for trinitrotoluene (TNT)/Royal Demolition Explosive (RDX) soil contamination from U.S. Army and U.S. Navy ordnance testing, detonation research, and demolition of explosives. The third remedial action involving removal and treatment will address unacceptable levels of lead contamination from spent bullets in the soil at the Security Training Facility (STF) Gun Range. Remedial action will be performed to implement institutional controls at seven additional sites at WAGs 6 and 10, which will be referred to as a limited action remedy. OU 10-04 will also develop and implement an INEEL-wide institutional control plan for all CERCLA sites at the INEEL that require institutional control. While no action is required for protection of ecological receptors, long-term ecological monitoring at the INEEL will be performed to address uncertainties identified during the ecological assessment and ensure protection of the ecosystem.

Selected Remedy for the Ordnance Areas

The ordnance areas include three extensive artillery testing and bombing ranges used by the U.S. Navy and U.S. Army Air Corps during the WW II period. They are the Naval Proving Ground (NPG), which encompasses 172,495 acres along the central corridor of the INEEL; the Arco High-Altitude Bombing Range, a 26,406-acre area to the west; and the Twin Buttes Bombing Range, which encloses 9,291 acres on the southeast periphery of the INEEL. Activities that may have left UXO behind include aerial bombing practice, naval artillery testing, detonation research, explosives storage bunker testing, and ordnance disposal. Any UXO remaining in these areas can pose a physical risk to human safety if an

explosion is triggered from handling or contact, especially by machinery. Remedial action is required to protect human health and welfare from physical injury due to inadvertent detonation of any UXO that may be present.

The selected remedial action at the ordnance areas is UXO detection, removal, and institutional controls, and will include the following:

- Implement and maintain institutional controls until the UXO hazard is removed or reduced to acceptable levels. Institutional controls can include access restrictions, excavation restrictions, restrictive covenants, and other restrictions such as signage and educational programs.
- Perform a visual or geophysical survey for the presence of UXO. Before any aerial UXO detection methods are used, a demonstration will be performed over a specially designed test area and over a known high-impact area of ordnance testing to confirm effectiveness under site-specific conditions.
- Investigate potential UXO targets identified during the survey.
- Identify and define the boundaries of the firing and bombing impact areas and the weapons testing and detonation areas.
- Determine the ordnance density, explosive characteristics of the UXO, and ordnance accessibility.
- Determine the relative risks of land use and determine the extent of UXO removal required to meet desired land use objectives.
- Perform surface clearance and intrusive UXO removal with disposal by detonation at the Mass Detonation Area (MDA) or in-place detonation. Waste generated during detonation activities will be addressed using current disposal practices.
- Dispose of other non-ordnance items recovered, such as shrapnel at a landfill on the INEEL or sent off the INEEL for recycling. If secondary explosive contamination, such as TNT or RDX is discovered, perform remediation as described for the TNT/RDX contaminated soil sites.
- As appropriate, backfill excavated areas deeper than 1 ft contour to match the surrounding terrain and vegetate.

Selected Remedy for TNT/RDX Contaminated Soil Sites

Unacceptable risk to human health or the environment from TNT/RDX contaminated soil sites designated as the Experimental Field Station, the Fire Station II Zone and Range Fire Burn Area, the Land Mine Fuze Burn Area, the National Oceanic and Atmospheric Administration (NOAA), and the Naval Ordnance Disposal Area (NODA) have been identified. The human health risk associated with these sites is primarily through ingestion of TNT and/or RDX in homegrown produce, soil and groundwater exposure pathways. Adverse effects to ecological receptors are associated with exposure to RDX, TNT, and 1,3 dinitrobenzene at these same sites. Removing soil that is contaminated with concentrations in excess of the remediation goals will mitigate these threats.

The selected remedial action at the TNT/RDX sites is removal, treatment of TNT/RDX fragments, disposal of soil, and institutional controls, and will include the following activities:

- Perform a visual survey for UXO and TNT/RDX fragments or stained soil and a geophysical survey for UXO.

- Excavate soil contaminated with concentrations in excess of the remediation goals, by hand, unless it is determined that mechanical excavation equipment may be safely used. UXO will be removed, if required, to proceed with soil excavation. Otherwise, UXO removal will be performed during remediation of the Ordnance Areas.
- Manually segregate fragments of TNT/RDX from the soil unless safety analysis indicates it is safe to mechanically screen the soil.
- Dispose of fragments of TNT/RDX by detonation at the MDA. Waste generated during detonation activities will be addressed using current disposal practices.
- Use field screening methods and soil sampling with laboratory analysis to determine the extent of soil removal required to meet remediation goals.
- Sample and analyze removed soil by standard laboratory methods to determine the TNT and RDX concentrations and if the soil exhibits any RCRA hazardous waste characteristics. If the TNT/RDX concentration is less than 10% and not regulated under RCRA as characteristic waste, it will be sent to an approved disposal facility on or off the INEEL. If the concentration of TNT/RDX is above 10% and, hence, regulated under RCRA, the soil will be sent off the INEEL to an approved treatment, storage, and disposal (TSD) facility for thermal treatment and disposal.
- Backfill areas that have been excavated during remediation to depths greater than 0.3 m (1 ft) with uncontaminated soil or contoured to match the surrounding terrain and vegetate.
- Monitor air and soil until the TNT/RDX contamination is removed or reduced to acceptable levels.

Selected Remedy for the STF-02 Gun Range

The STF-02 Gun Range will be remediated to mitigate risk to human health and ecological receptors from lead. The Gun Range was used between 1983 and 1990 by INEEL security personnel who fired approximately 4 to 5 million rounds into targets erected on six earthen berms and in a wooden building. Pieces of lead were also found in a nearby dry pond. Exposure can result from breathing or ingesting contaminated soil, dust, or air, or from eating food covered with lead-containing dust grown in soil containing lead. If the lead contamination is not remediated, it could also result in groundwater contamination.

The selected remedy for the STF-02 Gun Range is removal and treatment, which will include the following activities:

- Excavate the berms, surrounding soil, and the adjacent pond with mechanical equipment to remove soil above the final remediation goal for lead. Field screening will be used to initially identify the extent of soil excavation required to meet the remediation goal.
- Perform physical separation to remove copper and lead fragments (bullets, casings, etc.) from the soil. Transport the recovered copper and lead off the INEEL for recycling, if allowed by the U.S. Department of Energy (DOE) policy. If DOE policy prohibits recycling of the recovered metal, it will be stabilized to meet RCRA disposal criteria and disposed in an approved compliant facility on or off the INEEL.
- After sorting, return soil containing lead in concentrations below the remediation goal of 400 ppm to the site. Stabilize soil that is RCRA characteristic for lead and send to a waste disposal facility located on or off the INEEL for permanent disposal. Probable disposal locations on the INEEL include the Central Facilities Area (CFA) landfill or the proposed INEEL CERCLA Disposal

Facility (ICDF). Dispose of soil above the remediation goal, but not RCRA characteristic for lead, without further treatment at the CFA landfill, the ICDF, or another approved location on or off the INEEL.

- Encapsulate the railroad ties and send to an approved compliant landfill on or off the INEEL.
- Dispose of the wooden building and asphalt pads as non-hazardous construction debris on the INEEL in an appropriate landfill, such as the CFA landfill or the ICDF.
- Sample and analyze soil to verify the remediation goal has been achieved.
- Contour the excavated areas to match the surrounding terrain and vegetate.

Limited Action

No additional remediation will be conducted under CERCLA for the remaining 41 of the 50 sites in OU 10-04. However, institutional controls will be maintained at the seven sites listed in the table below because residual contamination precludes unrestricted land use and action is required to minimize potential human exposure to contamination. These seven sites present risk greater than 1E-06 but less than 1E-04 and a hazard index (HI) of less than 1 for the future residential scenario. Only institutional controls are required to ensure protection of human health and the environment. In April 1999, the EPA Region 10 developed a policy for institutional controls. During the OU 10-04 remedial design/remedial action (RD/RA) phase, an operation and maintenance (O&M) plan will be developed which will contain the institutional controls for OU 10-04 institutional control sites as well as all other INEEL CERCLA sites that will follow the guidelines in the policy. This plan will establish uniform requirements of the institutional control remedy components of all CERCLA FFA/CO institutional control sites, at the INEEL, and specify the monitoring and maintenance requirements.

Institutional control sites at Waste Area Groups 6 and 10.

Site Code	Description
BORAX-01	BORAX II through V Leach Pond
BORAX-02	BORAX I Buried Reactor
BORAX-08	BORAX V Ditch
BORAX-09	BORAX II through V Reactor Building
EBR-08	EBR-I Fuel Oil Tank (WMO-703)
OMRE-01	Organic-Moderated Reactor Experiment Leach Pond
ORD-21	Juniper Mine

Institutional controls will reside with DOE or another government agency until 2095, based on the Comprehensive Facility and Land Use Plan, or until a remedy review or INEEL-wide 5-year statutory review concludes unrestricted land use is allowable. It is anticipated that industrial use will continue at the INEEL for the institutional control period and beyond.

No Action with Site-Wide Ecological Monitoring

As part of the overarching concerns at the INEEL for sustaining a healthy environment, the OU 10-04 comprehensive investigation included an analysis of ecological risk. The OU 10-04 INEEL-wide ecological risk assessment (ERA) compiled information from previous investigations of risk to ecological receptors at each WAG into a depiction of the effects of contamination on the environment of the INEEL as a whole. The risk assessment was based on population level endpoints and concluded

that less than 20% of the habitats present on the INEEL are lost to facility activities and, therefore, minimal risk is expected to the diverse plant and animal communities at the INEEL. This conclusion was supported using results of other investigations performed on the INEEL in a multiple line of evidence approach. This required the use of assumptions in the assessment resulting in considerable uncertainty in the conclusion. Based on the multiple uncertainties and assumptions in the assessment, it was determined that INEEL-wide ecological monitoring would be implemented. The monitoring will ensure that expectations regarding the protectiveness of the no action approach to the INEEL-wide ERA are met.

Additional Components of the Selected Remedy

In addition to remediation of specific sites, several activities will be implemented at WAG 10 to complete the selected remedy. These activities, including disposition of stored and investigation-derived waste and groundwater monitoring, are discussed below.

Investigation and Remediation-Derived Waste. Contaminated media such as soil, debris, liquids, sample residue, sampling equipment, and personnel protective equipment not specifically identified by the INEEL FFA/CO or in this comprehensive investigation may be generated as a result of RD/RA activities at WAG 10. Procedures to address the remediation-derived waste will be documented in the OU 10-04 remedial action work plan. In addition, waste that has been generated during previous sampling activities at WAG 10 will be appropriately characterized, assessed, and dispositioned in accordance with regulatory requirements to achieve remediation goals consistent with remedies selected for the sites in this ROD.

Groundwater. The existing wells downgradient from the TNT/RDX contamination areas will be sampled and analyzed for explosive contaminants and degradation products. If no secondary explosive contamination or degradation products are present in the groundwater samples, then no further groundwater monitoring for these contaminants will be required. In the event contamination is detected in any groundwater sample, monitoring will be continued as part of the OU 10-08 INEEL groundwater monitoring plan. If contamination is detected at or above the remediation goals, a supplemental evaluation will be performed to determine if remedial action is required and if so, alternatives will be evaluated, a preferred remedy will be selected, and this ROD will be amended to implement the selected remedial action.

Statutory Determinations

Statutory Requirements

The selected remedies are protective of human health and the environment, are compliant with federal and state requirements that are applicable or relevant and appropriate (ARAR) to the remedial actions, are cost-effective, and are using permanent solutions and alternative treatments (or resource recovery) technologies to the maximum extent practicable.

Statutory Preference for Treatment

The selected remedy for the ordnance areas satisfies the statutory preference for treatment as a principal element of the remedy because the remedy reduces the toxicity, mobility, or volume through treatment of the principal threat waste UXO. The UXO will be detected, removed, and detonated, or detonated in place if too high a risk is associated with removal.

The selected remedy for the TNT and RDX contaminated sites satisfies the CERCLA statutory preference for treatment as a principal element of the remedy. The TNT and RDX fragments, which are a significant source of the soil contamination and a principal threat waste, will be gathered and detonated. Unexploded ordnance at the TNT/RDX sites will be located, removed, and detonated.

The selected remedy for the STF-02 Gun Range satisfies the statutory preference for treatment as a principal element of the remedy. The lead fragments, a principal threat waste, separated from the soil will be sent off the INEEL for recycling or stabilized to meet RCRA disposal requirements, and disposed in a secure, approved landfill on or off the INEEL. Any soil determined, through sampling and analysis, to be RCRA characteristic for lead, a principal threat waste, will be treated to meet RCRA disposal criteria by stabilization with a material such as Portland cement and disposed in an approved landfill on or off the INEEL.

Five-Year Review Requirements

Because components of the selected remedy for OU 10-04 will result in hazardous substances, pollutants, or contaminants remaining at levels greater than allowed for unrestricted use, periodic remedy reviews will be conducted after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment. Results of the OU 10-04 remedy reviews will be included in the statutory 5-year review, which is performed on an INEEL-wide basis.

Most remediation goals are based on soil concentrations equivalent to a risk of 1E-04 (1 in 10,000) to a hypothetical resident 100 years in the future. Therefore, residual contamination and UXO may remain after remediation that precludes immediate unrestricted land use, and institutional controls will be applicable. Remedy reviews will be conducted periodically for remediated sites with institutional controls until it is determined, during a remedy review or a 5-year statutory INEEL-wide review, that controls and reviews are no longer necessary.

As discussed above, limited action will be implemented to manage the residual contamination at seven OU 10-04 sites in WAG 10. These sites will also be subject to periodic remedy reviews to support the 5-year statutory INEEL-wide review. Controls such as access restrictions will be maintained until it is determined, during a periodic remedy review or the INEEL 5-year statutory review, that controls are no longer necessary.

The status of these sites will be examined during the periodic remedy reviews for OU 10-04 to ensure that site conditions have not changed significantly and that the status of each site remains consistent with this ROD. The reviews will include an assessment of maintenance requirements such as fencing repairs, sign replacement, and control to prevent soil erosion.

Record of Decision Data Certification Checklist

The information listed below is included in the Decision Summary (Part 2) of this ROD:

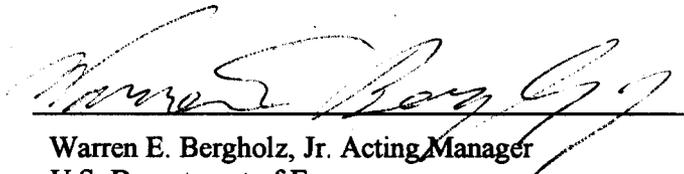
- Contaminants of concern (COCs) and their respective concentrations (Sections 8, 9, and 10)
- Baseline risks represented by the COCs (Sections 8, 9, and 10)
- Cleanup levels established for the COCs and the basis for the levels (Sections 8.4, 9.6, and 10.4)
- How source materials constituting principal threats are addressed (Sections 8.7, 9.9, and 10.7)
- Current and reasonably anticipated future land-use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (Section 6)
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (Sections 6, 8.7, 9.9, and 10.7)

- Estimated capital, annual operation and maintenance, and total net present value costs; the discount rate; and the number of years over which the remedy cost estimates are projected (Sections 8.7, 9.9, and 10.7)
- Key factors that led to selecting the remedies (i.e., how the selected remedy provides the best balance of tradeoffs relative to the balancing and modifying criteria) (Sections 8.6, 9.8, and 10.6).

Additional information can be found in the Administrative Record for WAG 10.

Signature Sheet

Signature sheet for the Record of Decision for Operable Unit 10-04 (including Operable Unit 6-05), Waste Area Groups 6 and 10 consisting of the Experimental Breeder Reactor-I, the Boiling Water Reactor Experiment areas, the miscellaneous surface sites and liquid disposal areas not included in other WAGs, the Liquid Corrosive Chemical Disposal Area, the Organic Moderated Reactor Experiment, the Security Training Facility Sumps, Pits, and Gun Range, and the ordnance areas of the Idaho National Engineering and Environmental Laboratory, between the U.S. Department of Energy, Idaho Operations Office, and the U.S. Environmental Protection Agency Region 10, with concurrence by the Idaho Department of Environmental Quality.



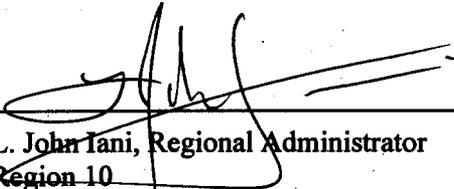
Warren E. Bergholz, Jr. Acting Manager
U.S. Department of Energy,
Idaho Operations Office

11/5/02

Date

Signature Sheet

Signature sheet for the Record of Decision for Operable Unit 10-04 (including Operable Unit 6-05), Waste Area Groups 6 and 10 consisting of the Experimental Breeder Reactor No. I, the Boiling Water Reactor Experiment areas, the miscellaneous surface sites and liquid disposal areas not included in other WAGs, the Liquid Corrosive Chemical Disposal Area, the Organic Moderated Reactor Experiment, the Security Training Facility Sumps, Pits, and Gun Range, and the ordnance areas of the Idaho National Engineering and Environmental Laboratory, between the U.S. Department of Energy, Idaho Operations Office, and the U.S. Environmental Protection Agency Region 10, with concurrence by the Idaho Department of Health and Welfare, Division of Environmental Quality.



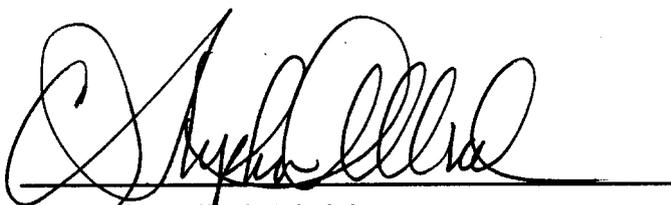
L. John Iani, Regional Administrator
Region 10
U.S. Environmental Protection Agency

25 Sept 2002

Date

Signature Sheet

Signature sheet for the Record of Decision for Operable Unit 10-04 (including Operable Unit 6-05), Waste Area Groups 6 and 10 consisting of the Experimental Breeder Reactor No. I, the Boiling Water Reactor Experiment areas, the miscellaneous surface sites and liquid disposal areas not included in other WAGs, the Liquid Corrosive Chemical Disposal Area, the Organic Moderated Reactor Experiment, the Security Training Facility Sumps, Pits, and Gun Range, and the ordnance areas of the Idaho National Engineering and Environmental Laboratory, between the U.S. Department of Energy, Idaho Operations Office, and the U.S. Environmental Protection Agency Region 10, with concurrence by the Idaho Department of Environmental Quality.



C. Stephen Alfred, Administrator
Idaho Department of Environmental Quality



Date

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ACRONYMS

ABS	absorbed through skin
AEC	Atomic Energy Commission
AEF	Argonne Experimental Facility
AFSR	Argonne Fast Source Reactor
AF	adjustment factors
ANL	Argonne National Laboratory
ANL-W	Argonne National Laboratory-West
ANP	Aircraft Nuclear Propulsion
ARAR	applicable or relevant and appropriate requirements
ATSDR	Agency for Toxic Substance Disease Registry
AT&T	American Telephone and Telegraph Company
BAF	bioaccumulation factor
BBS	breeding bird survey
BLM	U.S. Bureau of Land Management
BORAX	Boiling Water Reactor Experiment
BRA	baseline risk assessment
BW	body weight
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CFSGF	Coal-fired Steam Generation Facility
COC	contaminant of concern
COPC	contaminant of potential concern
CSM	conceptual site model
CTT	closed, transferred, and transferring

D&D	decontamination and decommissioning
1,3 DNB	1,3 dinitrobenzene
2,4 DNT	2,4 dinitrotoluene
2,6 DNT	2,6 dinitrotoluene
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy, Idaho Operations Office
DQO	data quality objectives
EBR-I	Experimental Breeder Reactor-I
EG&G	Edgerton, Germeshausen, and Grier
EOCR	Experimental Organic-Cooled Reactor
EP	Environmental Programs
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ERA	ecological risk assessment
FFA/CO	Federal Facility Agreement and Consent Order
FR	Federal Register
FS	feasibility study
G&A	General and Administrative
Ge-spectrometer	germanium-spectrometer
GIS	geographical information system
GPRS	global positioning radiometric scanner
HA	health advisory
HE	high explosives
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessments

HI	hazard index
HQ	hazard quotient
HSDB	Hazardous Substance Data Bank
HTRE	Heat Transfer Reactor Experiment
HWMA	Hazardous Waste Management Act
HWPB	Hazardous Waste Permitting Bureau
ICPP	Idaho Chemical Processing Plant
ICDF	INEEL CERCLA Disposal Facility
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IEUBK	Integrated Exposure Uptake Biokinetic
INEL	Idaho National Engineering Laboratory
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IRIS	Integrated Risk Information System
LCCDA	Liquid Corrosive Chemical Disposal Area
LMITCO	Lockheed Martin Idaho Technologies Company
LOAEL	lowest observed adverse effect level
MDA	Mass Detonation Area
MOU	Memorandum of Understanding
MTRU	mixed transuranic
NaK	sodium potassium
NCP	National Oil and Hazardous Substances Contingency Plan
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOAA	National Oceanic and Atmospheric Administration

NOAEL	no observed adverse effect level
NODA	Naval Ordnance Disposal Area
NPG	Naval Proving Ground
NRF	Naval Reactor Facility
NRTS	National Reactor Testing Station
NTCRA	none-time-critical removal action
O&M	operations and maintenance
OMRE	Organic Moderated Reactor Experiment
OU	operable unit
PBF	Power Burst Facility
PCB	polychlorinated biphenyl
PRG	preliminary remediation goals
PUF	plant uptake factors
RAGS	Risk Assessment Guidance for Superfund
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RD/RA	remedial design/remedial action
RDX	Royal Demolition Explosive
RESL	Radiological and Environmental Science Laboratory
RFD	reference dose
RI/FS	remedial investigation/feasibility study
RME	reasonable maximum exposure
ROD	record of decision
RTF	Reactor Training Facility
RWMC	Radioactive Waste Management Complex
SMDP	scientific management decision points

SRP	Snake River Plain
SRPA	Snake River Plain Aquifer
STF	Security Training Facility
TAN	Test Area North
TBC	to-be-considered guidance
TCRA	time-critical removal action
TNT	trinitrotoluene
TNB	trinitrobenzene
TRA	Test Reactor Area
TRU	transuranic
TRV	toxicity reference value
TSD	treatment, storage, and disposal
UCL	upper confidence limit on the mean
USC	U.S. Code
USGS	United States Geological Survey
UST	underground storage tank
UXO	unexploded ordnance
WAG	waste area group
WMO	waste management operations
WROC	Waste Reduction Operations Complex
ZPR-III	Zero Power Reactor No. 3

Part 2: Decision Summary

1. SITE NAME, LOCATION, AND BRIEF DESCRIPTION

Operable Unit (OU) 10-04, comprises the miscellaneous sites including, Waste Area Group (WAG) 6—the former Boiling Water Reactor Experiment (BORAX) and Experimental Breeder Reactor No. I (EBR-I) facilities—as well as surface contamination sites in WAG 10, at the Idaho National Engineering and Environmental Laboratory (INEEL). The INEEL is located in southeastern Idaho and occupies 2,305 km² (890 m²) in the northeastern region of the Snake River Plain (see Figure 1). The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (40 USC 9601) identification number for the INEEL is 1000305. Land use at the INEEL is classified as industrial (DOE-ID 1997).

Two broader investigations were also part of OU 10-04. First, the Shoshone-Bannock Tribes (the Tribes) of the Fort Hall Indian Reservation, whose members traditionally occupied the INEEL area and continue to use parts of it for many cultural and economic purposes, contributed a summary of what is important to them in defining and remediating risks to human health and the environment. This summary is presented in whole as Appendix A of the OU 10-04 Comprehensive RI/FS (DOE-ID 2001). Second, OU 10-04 also investigated the risks to ecological receptors across the INEEL from all contaminated areas combined. This INEEL-wide ecological risk assessment (ERA) was the culmination of all site-specific ecological risk assessments carried out at the INEEL.

WAG 6 sites are located in the southwest portion of the INEEL, approximately 3.2 km (2 mi) from U.S. Highway 20, as shown in Figure 2. WAG 6 consists of sites related to the EBR-I and the nearby BORAX areas. The WAG 6 boundary encompasses both facilities and the immediately adjacent surface and subsurface areas (FFA/CO and Action Plan [DOE-ID 1991]). The BORAX area, located approximately 1.21 km (0.75 mi) northwest of the EBR-I facility, was the site of five reactor experiments (BORAX-I, -II, -III, -IV, and -V) conducted between 1953 and 1964.

WAG 10 comprises miscellaneous surface sites and liquid disposal areas throughout the INEEL that are not included within other WAGs (WAGs 1 through 9) as shown in Figure 2. WAG 10 also includes regional Snake River Plain Aquifer (SRPA) concerns related to the INEEL that cannot be addressed on a WAG-specific basis. The scope of WAG 10 was expanded from the original Federal Facility Agreement and Consent Order (FFA/CO) concept (DOE-ID 2001). As discussed in the OU 10-04 Comprehensive Remedial Investigation and Feasibility Study (RI/FS) (DOE-ID 2001) since the initial signing of the FFA/CO agreement, several new sites were identified and a facility assessment completed. Other changes in scope have resulted in creation of OU 10-08 in WAG 10. OU 10-08 will evaluate Site-wide groundwater concerns. The WAG 6 Comprehensive RI/FS (OU 6-05) was incorporated into OU 10-04 in accordance with the FFA/CO (DOE-ID 1991).

The OU 10-04 Comprehensive RI/FS (DOE-ID 2001) evaluated 50 potential release sites. These potential release sites are listed in Table 1-1 of the OU 10-04 Comprehensive RI/FS Work Plan (DOE-ID 2001) and include 22 sites at WAG 6 (14 at EBR-I and 8 at the BORAX area); and 28 sites at WAG 10 (10 at miscellaneous sites, 2 at LCCDA, 1 at OMRE, 2 at STF, 3 large [primary] ordnance areas [one of which includes 16 smaller ordnance areas], 9 ordnance areas either laying outside the boundaries of the larger ordnance areas or possessing soil contamination and the Idaho Chemical Processing Plant (ICPP), and the Fly Ash Pit [added to OU 10-04 for an ecological risk assessment]). The three primary ordnance areas include, the Naval Proving Ground (NPG) (not specifically listed as a site) also known as the Naval Gun Range, the Arco High Altitude Bombing Range, and the Twin Buttes Bombing Range. Most of the ordnance, unexploded ordnance (UXO), and ordnance-related areas at the INEEL result from ordnance testing, demolition of explosives, and bombing practice, conducted at the NPG in the 1940s. To date, 29 smaller ordnance areas have been identified primarily in the NPG (see Figure 2) that were listed

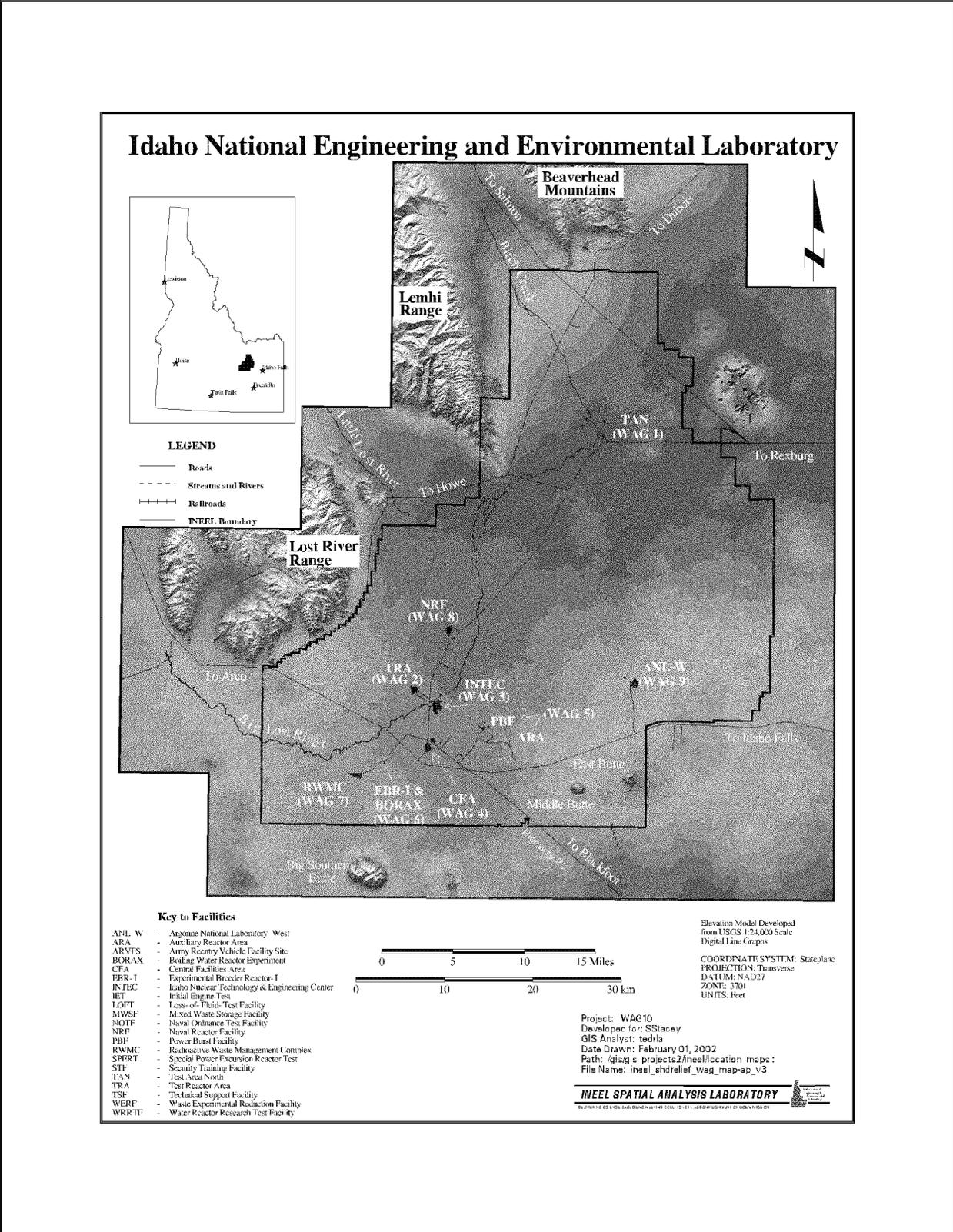


Figure 1. Location of INEEL facilities and general area of WAGs 6 and 10.

INEEL WAG-10 CERCLA SITES

KEY TO CERCLA SITES

Operable Unit	Site	Action	Description
10-00	ARVFS-01	No Action	ARVFS Containers of Contaminated NAK
10-00	ARVFS-02	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-03	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-04	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-05	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-06	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-07	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-08	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-09	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-10	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-11	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-12	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-13	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-14	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-15	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-16	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-17	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-18	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-19	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-20	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-21	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-22	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-23	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-24	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-25	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-26	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-27	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-28	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-29	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-30	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-31	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-32	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-33	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-34	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-35	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-36	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-37	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-38	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-39	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-40	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-41	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-42	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-43	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-44	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-45	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-46	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-47	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-48	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-49	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	ARVFS-50	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)

KEY TO ORDINANCE AREAS

Red text indicates areas with the Unexploded Ordnance (UXO) Green text indicates areas with TNT and/or RDX soil contamination

- 1 - Also High Altitude Bombing Range (Northwestern Area) and CFA 633 Naval Firing Site and Downrange Area
- 2 - CFA Gravel Pit
- 3 - CFA Stationary Landfill Area
- 4 - Explosive Storage Bunkers - North of ICP
- 5 - National Oceanic & Atmospheric Administration (NOAA) Twin Bunkers Bombing Range (partially cleared)
- 6 - Twin Bunkers Bombing Range (partially cleared)
- 7 - Anasazi Power Line
- 8 - Old Military Structures
- 9 - Mine Decomposition Area
- 10 - Mine Decomposition Area
- 11 - Environmental Field Station
- 12 - Unexploded Ordnance East of TRA
- 13 - Blast Area South of Experimental Field Station
- 14 - Blast Area North of Experimental Field Station
- 15 - Unexploded Ordnance East of ARVFS
- 16 - Unexploded Ordnance East of ARVFS
- 17 - Unexploded Ordnance East of ARVFS
- 18 - Unexploded Ordnance East of ARVFS
- 19 - Unexploded Ordnance East of ARVFS
- 20 - Unexploded Ordnance East of ARVFS
- 21 - Unexploded Ordnance East of ARVFS
- 22 - Unexploded Ordnance East of ARVFS
- 23 - Unexploded Ordnance East of ARVFS
- 24 - Landmine and Fuse Burn Area
- 25 - Unexploded Ordnance East of the Big Low and Zone East of the Big Low River
- 26 - Unexploded Ordnance East of the Big Low and Zone East of the Big Low River
- 27 - Dirt Mounds Near the Experimental Field Station, NOAA, and NRP
- 28 - Unexploded Ordnance East of ICP
- 29 - Unexploded Ordnance East of ICP
- 30 - Assessed Propellant Decomposition Area
- 31 - Assessed Land Mine Decomposition Area
- 32 - Live 5" Avit Aircraft Common Projectile
- 33 - Live 5" Avit Aircraft Common Projectile
- 34 - Live 5" Avit Aircraft Common Projectile and 4 Live Fuzes
- 35 - Fuzes and RDX explosives found in and around crater
- 36 - Crater with 12 plus propellant and chunks of RDX explosives
- 37 - Northern Most Projectile Point (16" fuze)

LEGEND

- U.S. Highways
- State Highways
- Paved or Light-Duty Roads
- Railroad Tracks
- Rivers and Streams
- Buttes
- INEEL Boundary
- Spreading Areas and Ponds
- Live Ordnance Areas
- Assessed or Cleared Ordnance Areas
- Down Range Ordnance Area
- Cities and Towns

Project NVA
Map Recorder: Tom Henry
GIS Analyst: Dan McManis
Data Source: USGS, INEEL, and other sources
Database: Live Ordnance Areas, Assessed or Cleared Ordnance Areas, Down Range Ordnance Areas
File Name: cercla_sites_2011_12_11
Control: NVA

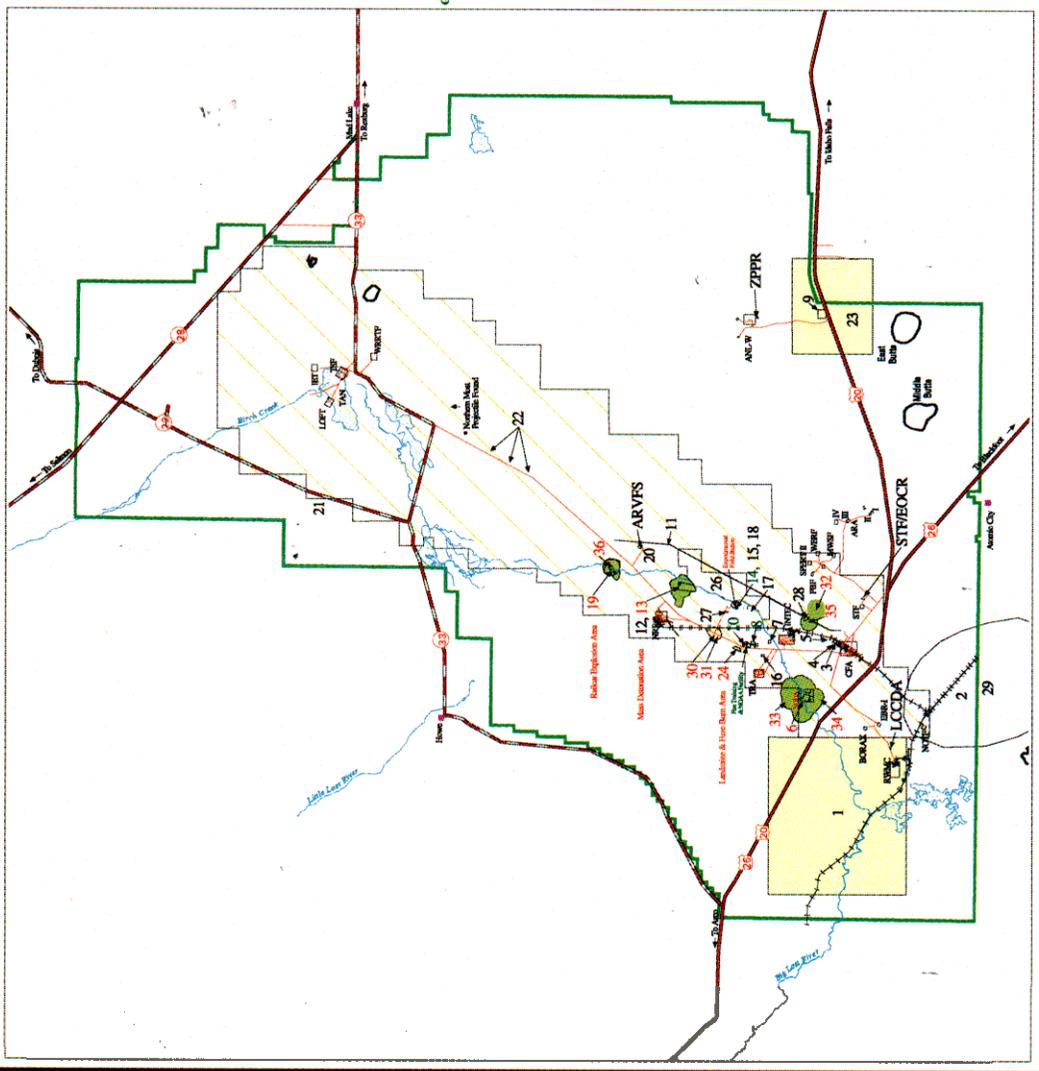


Figure 2. Location of WAG 10 CERCLA Sites at the Idaho National Engineering and Environmental Laboratory.

in Table 1-1 of the OU 10-04 RI/FS Work Plan (DOE-ID 1999a). In 2000, WAG 10 conducted a UXO walk-down at several ordnance sites to assess the extent of UXO. The walk-down sites included the NODA, Craters East of ICPP, Craters West of Powerline Road, Area by Lincoln Boulevard and the Experimental Field Station, Mass Detonation Area (MDA), and Railcar Explosion Area. During the walk-down, additional UXO, bomb craters, fragmented metal debris, TNT, and RDX were identified. These seven additional locations are identified in Figure 2. Activities during World War II also included aerial bombing practice at two other bombing ranges established by the U.S. Army Air Corps. The Arco High Altitude Bombing Range was located adjacent to the southwest end of the NPG (see Figure 2); the Twin Buttes Bombing Range was located east of the southern end of the NPG, near the present-day Argonne National Laboratory-West (ANL-W) complex.

The U.S. Department of Energy, Idaho Operations Office (DOE-ID), is the lead agency for the decisions presented in this Record of Decision (ROD). The U.S. Environmental Protection Agency (EPA) Region 10 approves of the decision and the Idaho Department of Environmental Quality (IDEQ), concurs. Both EPA and IDEQ participated in the evaluation and selection of remedies for WAG 10.