Public Comment Period - March 10 to April 9, 1997

10408

March 1997

IDAHO DEPARTMENT OF HEALTH AND WELFARE
DIVISION OF ENVIRONMENTAL QUALITY

Proposed Plan for

Waste Area Group 2 - Test Reactor Area

Idaho National Engineering and Environmental Laboratory

*(Note: Technical and administrative terms are used throughout this proposed plan. When these terms are first used, they are printed in **bold italics**. Explanations of these terms, and other helpful notes are provided in the margins. The ⓘ symbol appears when additional information or document references are cited.)*

1996 Test Reactor Area photo showing lined evaporation ponds that replaced the Warm Waste Pond after it was covered in 1994.

Inside This Plan

Public Meetings/ Briefings*

Idaho Falls
March 25,1997
Shilo Inn

Boise
March 26,1997
Boise State University
Student Union Building

Moscow
March 27,1997
University Inn

* See page 34 for details.

Briefings for other communities can be arranged by calling the INEEL's toll-free number at (800) 708-2680.

Introduction

The primary reason this document has been written is because contamination exists at the Test Reactor Area that poses an unacceptable risk to human health and the environment; remediation of this contamination is being recommended in the manner described in this document. The purpose of this ***proposed plan*** is three-fold: (1) it summarizes information presented in the *Comprehensive Remedial Investigation/ Feasibility Study for the Test Reactor Area Operable Unit 2-13 at the Idaho National Engineering and Environmental Laboratory* report and on the proposed decisions for "No Further Action" sites; (2) it proposes remedial alternatives for sites that pose an unacceptable risk to human health and the environment identified in the Comprehensive ***Remedial Investigation/Feasibility Study (RI/FS)***; and (3) it is the document through which the U.S. Department of Energy, (DOE) the state of Idaho Department of Health and Welfare (IDHW), and the Environmental Protection Agency (EPA) Region 10 solicit public input concerning cleanup alternatives.

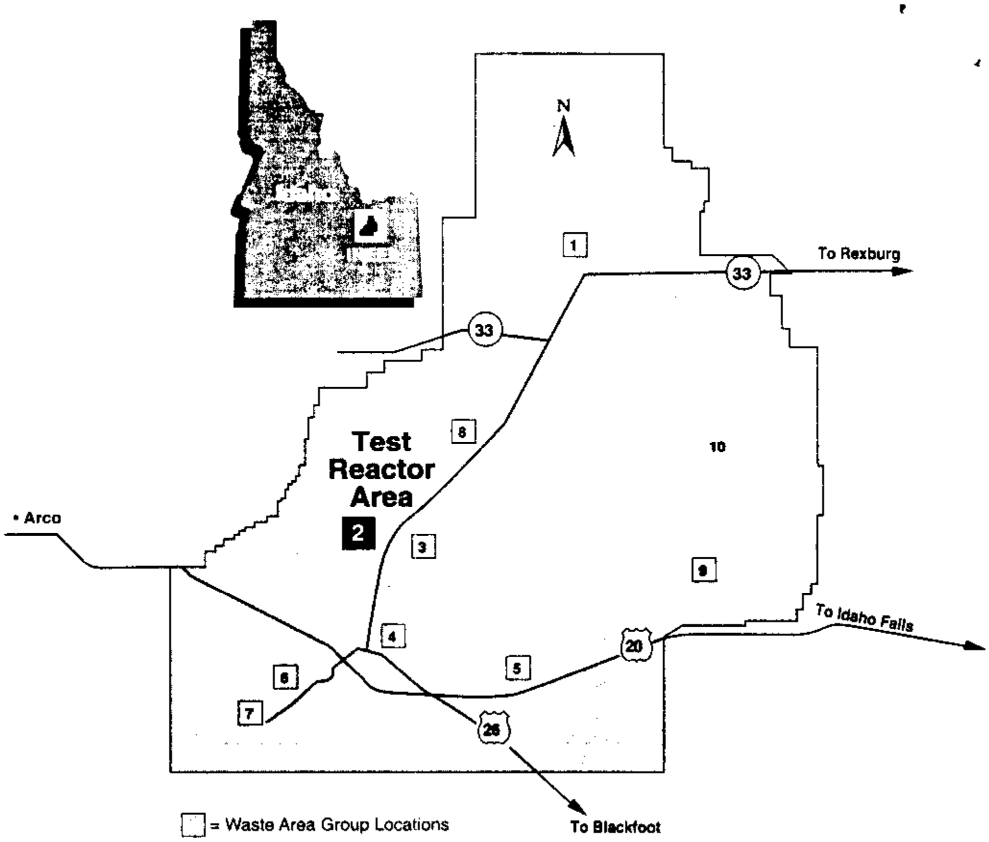


Figure 1. *Location of the Test Reactor Area (Waste Area Group 2) and other Waste Area Groups at the INEEL.*

The RI/FS for ***Waste Area Group*** 2 represents the last extensive ***Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*** investigation for the Test Reactor Area. Because this is the comprehensive investigation, the assessment is done from the perspective of the entire Waste Area Group rather than on a site specific basis only. Extensive investigations have been conducted since 1991 to determine the nature and extent of contamination at potential and known release sites through document collection, personnel interviews, and field data collection and analysis. The comprehensive investigation completed for the Test Reactor Area identified the types, quantities, and locations of contaminants and assessed the potential impact to human health and the environment from exposure to these contaminants. For those sites with a potential for adverse impacts, alternative ways for addressing the contamination problem were developed. ℹ This is known as the feasibility study and can be found in Sections 7 through 11 in the Operable Unit 2-13 Comprehensive RI/FS report. This proposed plan summarizes the results of 5 years of data collection and analysis of release sites at the Test Reactor Area, previous agency decisions based on the data collected, and the current recommendations based on the data and information compiled. Figure 1 shows the location of the Test Reactor Area at the Idaho National Engineering and Environmental Laboratory (INEEL).

ℹ Information summarized in this plan can be found in greater detail in the Comprehensive Remedial Investigation/Feasibility Study for Operable Unit 2-13 report in the ***Administrative Record***. This and other documents are available for public review at the repositories listed on page 33 of this plan.

Proposed Plan - document requesting public input on a proposed remedial alternative (cleanup plan).

Remedial Investigation/Feasibility Study (RI/FS) - studies required by CERCLA to characterize the nature and extent of contamination because of past releases of hazardous and radioactive substances to the environment, to assess risks to human health and the environment from potential exposure to contaminants, and to evaluate cleanup actions.

Waste Area Group - one of the 10 administrative management areas established under the INEL Federal Facility Agreement and Consent Order (FFA/CO). The Test Reactor Area is designated as Waste Area Group 2.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - a federal law that establishes a program to identify, evaluate, and remediate sites where hazardous substances may have been released, leaked, poured, spilled, or dumped into the environment.

Administrative Record - documents including correspondence, public comments, Records of Decision, and technical reports upon which the agencies base their remedial action selection. ℹ See the sidebar on page 32 for the titles of additional information available through the Administrative Record file.

ℹ (Note: You will see the acronym INEL and INEEL in this plan. The official name of the laboratory was changed in January 1997 from the *"Idaho National Engineering Laboratory"* to the *"Idaho National Engineering and Environmental Laboratory."* In some instances, INEL has been used because it is part of the official titles of some documents produced during that era.)

ℹ The status of each of these sites is summarized in Figure 1-1 and Table 1.1 (pages 1-2, 1-3 and 1-4) of the *Comprehensive Remedial Investigation/ Feasibility Study for the Test Reactor Area Operable Unit 2-13 at the Idaho National Engineering Laboratory* report. This information is contained in the Administrative Record section of the Information Repositories listed on page 33.

Agency Involvement

This proposed plan identifies the preferred alternatives for controlling risks at the Test Reactor Area. This plan is issued by the EPA, the IDHW, and the DOE. DOE, EPA, and IDHW will be referred to throughout this plan as "the agencies." The agencies will select a final remedy after reviewing and considering information and comments submitted by the public during the public comment period of March 10 through April 9, 1997. Written comments must be received by April 9, 1997.

Community Acceptance

Community acceptance is an important criterion the agencies must evaluate during the process of remedy selection. The agencies will gauge the degree of community acceptance through open dialogue with citizens and by the comments submitted by the public concerning the remedial alternatives identified in the Test Reactor Area proposed plan. This interaction is critical to the CERCLA process for making sound environmental decisions that are protective of human health and the environment. Although the agencies have proposed preferred alternatives for controlling risks at the Test Reactor Area, the public is encouraged to review and comment on all of the alternatives, not just the preferred ones. Additional information supporting the recommended remedial action is available in the Operable Unit 2-13 Administrative Record file for this project at the INEEL Information Repositories.

The actual selection of alternatives will not be made until comments received during the public comment period have been reviewed and addressed. The agencies will consider all public comments on this proposed plan in preparing a ***Record of Decision***. Depending on comments received, the final remedial action plan presented in the Record of Decision may differ from the preferred alternatives identified in this plan. All written and verbal comments will be summarized and responded to in the ***Responsiveness Summary*** section of the Record of Decision, which is scheduled to be completed by October 1997.

Preferred Alternatives

Preferred remedial alternatives are recommended by the agencies for each of the eight sites of concern in the Test Reactor Area (see Figure 2) that pose an unacceptable risk to human health or the environment based on the information contained in the Operable Unit 2-13 Comprehensive RI/FS report. Because of similarities in the types of contaminated media, the sites of concern were grouped into the following four broad categories of contaminated sites to facilitate the evaluation of remedial alternatives. Baseline assumptions will be reassessed prior to remedy implementation to verify whether baseline conditions have changed.

Disposal Ponds (see details on pages 13-21)

- Warm Waste Pond—1952, 1957, and 1964 Cells (TRA-03)
- Chemical Waste Pond (TRA-06)
- Cold Waste Pond (TRA-08)
- Sewage Leach Pond (TRA-13)

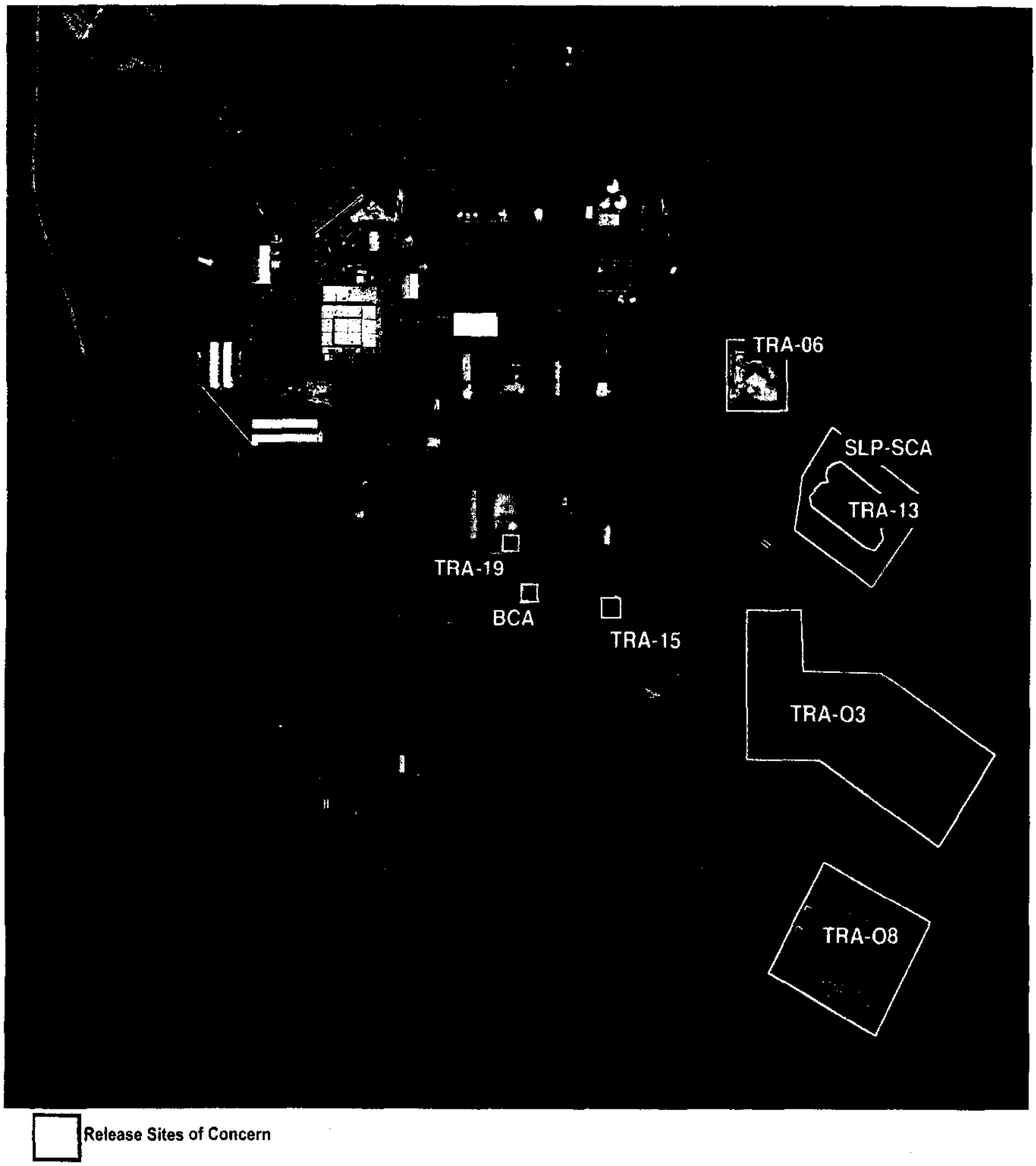
How You Can Participate

Whether you are new to the INEEL and are reviewing this type of document for the first time, or you are familiar with the Superfund process, you are invited to:

- ***Read*** **this proposed plan and review additional documents in the Administrative Record file at Information Repository locations listed on page 33; and access documents via the internet at http://ar.inel.gov/home.html**
- ***Call*** **the INEEL's toll-free number at (800) 708-2680 to ask questions, request information, or make arrangements for a briefing**
- ***Attend*** **a public meeting listed on the cover and on page 34**
- ***Comment*** **on this plan at the meeting or submit written comments (see postage-paid comment form on back cover)**
- ***Contact*** **state of Idaho, EPA Region 10, or DOE project managers (see pages 9, 10 and 11).**

Record of Decision - a public document that identifies the selected remedy at a site, outlines the process used to reach a decision on the remedy, and confirms that the decision complies with CERCLA.

Responsiveness Summary - the part of the Record of Decision that summarizes and provides responses to comments received on a proposed action for a site during the public comment period.



Operable Unit #	FFA/CO Reference No.	Site Description
2-05	TRA-15	Soil Surrounding Hot Waste Tanks at TRA-613
2-05	TRA-19	Soil Surrounding Tanks 1-2 at TRA-630
2-09	TRA-08	Cold Waste Pond (TRA-702)
2-09	TRA-13	Sewage Leach Ponds (2) by TRA-732
2-09	None	Sewage Leach Pond Berm and Soil Contamination Area (SLP-SCA)
2-10	TRA-03	Warm Waste Pond Sediments (Cells 1952, 1957, and 1964)
2-13	TRA-06	Chemical Waste Pond (TRA-701)
2-13	None	Brass Cap Area (BCA)

Figure 2. Test Reactor Area sites of concern.

The alternatives considered for the Disposal ***Pond*** sites include No Action (with Monitoring); ***Containment*** with an Engineered Cover or a Native Soil Cover; Excavation, Treatment, and Disposal; and Excavation and Disposal. The recommended preferred remedial alternative for the Warm Waste Pond 1952 and 1957 ***cells*** (TRA-03) is Containment with an Engineered Cover. The recommended preferred remedial alternative for the Warm Waste Pond 1964 cell is Containment with a Native Soil Cover (currently in place because of the 1994 Interim Action) combined with a final cover layer consisting of basalt rip rap or cobble layer to inhibit future intrusion and offer a greater degree of permanence. For the Chemical Waste Pond (TRA-06), the recommended preferred alternative is Containment with a Native Soil Cover after Excavation, selective Treatment of the mercury contaminated soils, and Disposal. The recommended preferred alternative for the Cold Waste Pond (TRA-08) is Excavation and Disposal at an appropriate facility. The recommended preferred alternative for the Sewage Leach Pond is Containment with a Native Soil Cover. The containment alternatives identified in this paragraph are to include ***institutional controls*** as described on page 12 for Alternative 3.

Pond - only the Chemical Waste Pond and the Cold Waste Pond are operational ponds. Though classified as ponds, the Warm Waste Pond and the Sewage Leach Pond are nonoperational dry beds.

Containment - a remedy that limits migration of contaminants from a waste site.

Cells - distinct sections of the Warm Waste Pond.

Institutional Controls - steps taken to control public and worker exposure to contaminants.

Subsurface Release Sites (see details on pages 21-25)

- Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15)
- Soil Surrounding Tanks 1 and 2 at Building TRA-630 (TRA-19)
- Brass Cap Area

In general, "hot" waste is slang for highly radioactive, "warm" for moderately radioactive, and "cold" for nonradioactive.

The alternatives considered for these sites included No Action (with Monitoring), Limited Action, Containment with an Engineered Cover, and Excavation and Disposal. The preferred remedial alternative for Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15) is Limited Action. For Soil Surrounding Tanks 1 and 2 at Building TRA-630 (TRA-19) and Brass Cap Area, the preferred alternative is Limited Action with the contingency that if the controls established under the limited action would not be maintained then an excavation and disposal option would be implemented to levels of intrusion (maximum of 10 feet or to the maximum depth at which contaminant concentrations exceed preliminary remediation goals, whichever is less) with disposal.

Windblown Surficial Contamination Site (see details on pages 25-28)

- Sewage Leach Pond Berm and Soil Contamination Area (SLP-SCA)

The alternatives considered for this site include No Action (with Monitoring), Limited Action; and Excavation and Disposal. The preferred remedial alternative for the Sewage Leach Pond Berm and Soil Contamination Area is Limited Action. However, consistent with the recommended remedy for the Sewage Leach Pond (TRA-13), the berms would be used to backfill the pond as a component of a native soil cover.

Other Considerations

It is acknowledged that a different alternative may prove to be more appropriate for certain sites because of changes in technologies and site specific information which may show the selected alternative is not appropriate. If that were to occur an Explanation of Significant Difference or a Record of Decision amendment could be

INEL Federal Facility Agreement and Consent Order (FFA/CO) - an agreement between the EPA, state of Idaho, and DOE to evaluate waste disposal sites at the INEEL and perform remediation if necessary.

CERCLA 5-year Review Process - CERCLA and the FFA/CO, provide that the Environmental Protection Agency and the Idaho Department of Health and Welfare may review response actions for sites that allow hazardous substances to remain on-site, no less often than every 5-years after the initiation of the cleanup action, to ensure that human health and the environment are being protected by the cleanup being implemented. If upon review it is the judgement of EPA and IDHW that additional action or modification of the cleanup action is appropriate, the EPA and IDHW may require the DOE to implement additional work. (See FFA/CO, sec. XXII, page 38.)

Maximum contaminant levels (MCLs) - contaminant level standards established under the Safe Drinking Water Act that are not to be exceeded for water being used for human consumption.

Radioactive decay - the spontaneous decrease in the number of radioactive atoms in radioactive materials.

Dispersion - the process by which a contaminant in flowing groundwater is mixed with uncontaminated water and becomes reduced in concentration.

implemented if a significant change were pursued. The viability of some of the process options eliminated in the feasibility study evaluation could be reconsidered as part of any possible adjustment in the selected remedy. Public participation would be solicited.

The possibility exists that contaminated environmental media not identified by the ***INEL Federal Facility Agreement and Consent Order (FFA/CO)*** or in this comprehensive investigation will be discovered in the future as a result of routine operations, maintenance activities, and/or decontamination and dismantlement activities at the Test Reactor Area. Future discoveries of radioactively and chemically contaminated environmental media will be evaluated as part of the ***CERCLA 5-year review process.*** The 5-year review process will ensure remedial actions and institutional controls are maintained. Five-year reviews will also ensure that any changes in the physical configuration of any Test Reactor facility or site where there is a suspicion of a release of hazardous substances (such as decontamination and dismantlement or facility renovation/modification) will be managed to achieve remediation goals consistent with remedies established for the sites in this proposed plan. Sufficient planning documentation for such actions will be submitted to the agencies before implementation to ensure this consistency.

Groundwater

- Snake River Plain Aquifer
- Deep Perched Water System

For the Snake River Plain Aquifer and Deep Perched Water System, the previous OU 2-12 Record of Decision for continued monitoring is unchanged. Two contaminants (tritium and chromium) are present in the Snake River Plain Aquifer at concentrations above their respective ***maximum contaminant levels*** in the Test Reactor Area. However, computer modeling of contaminant flow shows that contaminant concentrations in the vicinity of the Test Reactor Area are expected to decrease to levels below the maximum contaminant levels within 20 years, well ahead of any future residential land use scenarios. The decrease in contaminant concentrations will most likely be due primarily to ***radioactive decay*** and contaminant ***dispersion***. In addition, computer modeling indicates groundwater contamination, as a result of water infiltrating sites of concern, is within allowable ranges. Continued monitoring of the Snake River Plain Aquifer and the Deep Perched Water System is recommended to verify contaminant concentrations of concern decline as predicted. A required monitoring plan would be developed after the Record of Decision is signed. Monitoring performed in accordance with the OU 2-12 Record of Decision would be integrated into the OU 2-13 Record of Decision. Until that time, monitoring will continue to be performed as prescribed for OU 2-12.

Site Background

The INEEL is an 890-square mile DOE facility on the Eastern Snake River Plain in southeastern Idaho. INEEL's primary mission is the integration of engineering, applied science, and nuclear reactor operations in an environmentally conscious, safe, and cost-effective manner. The Eastern Snake River Plain is a relatively flat, semiarid sagebrush desert. Drainages around and within the Eastern Snake River Plain recharge the Snake River Plain Aquifer. The top of the aquifer is about 460 feet below the Test Reactor Area and is overlain by lava flows and sedimentary interbeds.

The INEEL lands are within the aboriginal land area of the Shoshone-Bannock Tribes. The Tribes have used the land and waters within and surrounding the INEEL for fishing, hunting, plant gathering, medicinal, religious, ceremonial, and other cultural uses since time immemorial. These lands and waters provided the Tribes their home and sustained their way of life. The record of the Tribes' aboriginal presence at the INEEL is considerable, and DOE has documented an excess of 1,500 prehistoric and historic archeological sites at the INEEL.

The Test Reactor Area was established in the early 1950s to house extensive facilities for studying the effects of radiation on materials, fuels, and equipment, including high neutron flux nuclear test reactors. Three major reactors have been built at the Test Reactor Area; the Materials Test Reactor, the Experimental Test Reactor, and the Advanced Test Reactor. The Advanced Test Reactor is currently the only major operational reactor.

Because of confirmed contaminant releases to the environment at the INEEL, in November 1989 the INEEL was placed on the ***National Priorities List***, which identifies hazardous substance sites requiring investigation. Under Superfund, risks posed by hazardous substances at National Priorities List sites must be evaluated; appropriate remediation methods would then be implemented, if necessary, to reduce risks to acceptable levels.

National Priorities List - a formal listing of the nation's hazardous waste sites as established by CERCLA that have been identified for possible remediation. Sites are ranked by the EPA based on their potential for affecting human health and the environment.

This RI/FS was implemented under the INEL FFA/CO and signed by the agencies in December 1991. The FFA/CO and its associated Action Plan provide procedures and schedules to ensure investigations are conducted in compliance with federal and state environmental laws.

To better manage investigations of potentially contaminated sites, the INEEL has been divided into 10 Waste Area Groups. Each Waste Area Group has in turn been divided into ***operable units*** to expedite the investigations and any required cleanup actions. Under this management system, Waste Area Group 2 covers the Test Reactor Area. Release sites in Waste Area Group 2 required further investigation to determine the nature and extent of the contamination. Ten sites were determined to require no action at the time the FFA/CO was signed because there was no contamination at these sites; however, the No Action status of these sites will be verified as described on page 28 of this proposed plan.

Operable unit - an area or areas with distinct characteristics or similar wastes grouped for management efficiency.

Of the 55 identified release sites at the Test Reactor Area, this proposed plan addresses only the 8 sites that, on the basis of the remedial investigation results, pose an unacceptable risk to human health or the environment and 30 additional sites that are being recommended for No Further Action. The remaining 17 sites were previously determined by the agencies to be No Further Action sites or were part of a previous Record of Decision. The No Further Action status of the 47 sites will be verified as described on page 28 of this proposed plan.

Evaluation of Site Risks

A ***baseline risk assessment*** was conducted to evaluate current and future potential risks to human health and the environment associated with contaminants found at the

Baseline risk assessment - an assessment required by CERCLA to evaluate potential risks to human health and the environment. This assessment estimates risks/hazards associated with existing and/or potential human and environmental exposures to contaminants at an area, assuming no remedial action is taken.

ⓘ For more detailed information see Table 7-1 of the OU 2-13 RI/FS report that provides detailed information regarding the risks at the OU 2-13 sites of concern including the contaminants of concern and exposure pathways (i.e., soil ingestion, external radiation exposure). Table 6-2 of the OU 2-13 Comprehensive RI/FS report provides a summary of the ecological risk assessment results. In addition, Appendix B presents the risk assessment results for every Waste Area Group 2 site.

Risk - an estimate of the probability that exposure to contamination at a release site will cause cancer development.

ⓘ Waste Area Group 2 contaminants of concern -

Occupational
Metastable silver (Ag-108m)
Americium, radioisotope 241 (Am-241)
Cobalt, radioisotope 60 (Co-60)
Cesium, radioisotopes 134 and 137 (Cs-134, 137)
Europium, radioisotopes 152 and 154 (Eu-152, 154)
Strontium, radioisotope 90 (Sr-90)
Arsenic
Polychlorinated biphenyls (PCBs)

Residential
Metastable silver (Ag-108m)
Americium, radioisotope 241 (Am-241)
Cobalt, radioisotope 60 (Co-60)
Cesium, radioisotopes 134 and 137 (Cs-134, 137)
Plutonium, radioisotopes 238 and 239 (Pu-238, 239)
Strontium, radioisotope 90 (Sr-90)
Thorium, radioisotope 228 (Th-228)
Uranium, radioisotope 238 (U-238)
Arsenic
Beryllium
Chromium
Mercury
Acrylonitrile
Polychlorinated biphenyls (PCBs)

Excess risk - a possibility of contracting cancer above the national average.

Test Reactor Area. Data obtained during the remedial investigation were used along with the computer modeling to conduct the baseline risk assessment. ⓘ Refer to sections 5 and 6 of the OU 2-13 Comprehensive RI/FS report for specific information regarding the human health and ecological risk assessments.

Human Health Evaluation

A human health evaluation quantified noncarcinogenic (i.e., noncancer causing) health effects and carcinogenic ***risks***. The human health risk assessment consists of two broad phases of analysis: (1) a site and contaminant screening to identify contaminants of potential concern, and (2) an exposure route analysis for each contaminant of concern. The risk assessment includes an evaluation of human health risk associated with exposure to contaminants through (a) soil ingestion, (b) dust inhalation, (c) volatile organic compound inhalation, (d) external radiation exposure, (e) groundwater ingestion, (f) ingestion of homegrown produce, (g) dermal absorption of groundwater, and (h) inhalation of water vapors as a result of indoor water use (i.e., showering). This evaluation is performed for current and future workers, and hypothetical residents 30, 100, and 1,000 years in the future. Because it is anticipated controls will remain in place for at least 100 years, preferred alternatives are based on the 100-year hypothetical residential scenario and the worker scenario in that 100 years.

The contaminants with the greatest potential for causing adverse human health effects at Waste Area Group 2 include 12 radionuclides, 4 metals, 1 volatile organic compound, and 1 PCB. EPA standards and cleanup decisions are generally set at carcinogenic ***excess risk*** levels slightly greater than 1 chance in 10,000. That is to say, if exposure to site contaminants was calculated to result in one excess cancer occurrence in a human population of 10,000, the agencies may require some type of action. For risk levels between 1 chance in 10,000 to 1 chance in 1,000,000, the agencies make a risk management decision regarding the appropriate level of remedial action required. In general, radionuclide contamination in shallow soils presents the greatest human health risk identified at the Test Reactor Area. In the case of PCBs, the levels of PCBs remaining at the site after excavation activities are below both the defined Applicable or Relevant and Appropriate Requirements and the Office of Solid Waste and Emergency Response directive guidance level of 25 parts per million for residual PCBs at Superfund sites.

Cleanup decisions at Waste Area Group 2 are also based on minimizing exposures to noncarcinogenic contaminants that have been released to the environment. In general, some type of action may be required if the human intake concentrations of noncarcinogenic contaminants at a given release site exceed concentrations that produce adverse noncarcinogenic health effects.

Table 1 summarizes the results of the baseline risk assessment for the eight sites that pose a potential risk to human health or the environment.

Groundwater computer modeling predicted tritium concentrations to be below maximum contaminant levels by the year 2004 and chromium concentrations to be below maximum contaminant levels by the year 2016. This is primarily due to radioactive decay and dispersion of contaminants. Therefore, neither contaminant is expected to produce unacceptable risks from groundwater ingestion at the Test Reactor

Table 1. Baseline Risk Assessment Summary

	Human Health			Environment
	Occupational Scenario	Residential Scenario		Hazard Quotients
Site	Total Cancer Risk [a]	Total Cancer Risk [a]	Hazard Index [b]	Unacceptable [c]
• Warm Waste Pond 1952 and 1957 Cells (TRA-03a)	1 in 100	9 in 1,000	0.6	Yes
• Warm Waste Pond[d] 1964 Cell (TRA-03b)	6 in 10,000,000	4 in 1,000,000	0.1	No
• Chemical Waste Pond (TRA-06)	2 in 1,000,000	2 in 100,000	70	Yes
• Cold Waste Pond (TRA-08)	1 in 10,000	2 in 10,000	1	Yes
• Sewage Leach Pond (TRA-13)	1 in 1,000	5 in 10,000	4	Yes
• Soil Surrounding Hot Waste Tanks at Building 613 (TRA-15)	3 in 10,000	1 in 10,000	0.1	Yes
• Soil Surrounding Tanks 1 and 2 at Building 613 (TRA-19)	2 in 10	8 in 100	0.1	Yes
• Brass Cap Area	2 in 10	8 in 100	0.1	Yes
• Sewage Leach Pond Berm and Soil Contamination Area	2 in 10,000	9 in 100,000	0.1	No

a. Unacceptable risks are those that are between 1 chance in 1 and 1 chance in 10,000 for developing cancer (above the national average). These are shown in shaded boxes. Acceptable range risks are those that are between 1 chance in 10,000 and 1 chance in 1,000,000 for developing cancer (above the national average).

b. All hazard indices for the occupational scenarios are below 1.0, indicating nonadverse noncarcinogenic health effects. Values greater than 1.0 indicate a potential for adverse health effects other than cancer (noncarcinogenic) for the residential 100-year scenario. These are shown in shaded boxes.

c. Unacceptable risks for the environment are those where a hazard quotient greater than 1.0 (exposure to metals) or 0.1 (exposure to radionuclides) indicates a potential for adverse health effects to environmental receptor (e.g., birds, mammals, reptiles, or vegetation).

d. Although the risks are indicated to be within the acceptable range, radionuclide contamination remains in the sidewalls and base of the 1964 cell at levels exceeding the preliminary remediation goal for the primary contaminant of concern (Cs-137).

IDAHO DEPARTMENT OF HEALTH AND WELFARE
DIVISION OF ENVIRONMENTAL QUALITY

The Idaho Department of Health and Welfare is one of the three agencies *identified in the INEL Federal Facility* Agreement, which establishes the scope and schedule of remedial investigations at the INEEL. Correspondence by the Division of Environmental Quality staff concerning this project can be found in the Administrative Record for this project under Operable Unit 2-13.

For additional information concerning the state's role in preparing this proposed plan, contact:

Dean Nygard
Idaho Department of Health and Welfare
Division of Environmental Quality
1410 N. Hilton
Boise, ID 83706
(208) 373-0285, (800) 232-4635

Detailed information concerning the risk calculations shown in Table 1 can be found in Section 5 and Appendix B of the Comprehensive RI/FS report for *OU 2-13.*

Area if residential development occurs there after 100 years. Arsenic is the only other contaminant that is predicted to produce groundwater risks greater than 1 chance in 1,000,000. Arsenic is predicted to be present in the aquifer at concentrations producing risks of 3 chances in 1,000,000 at approximately 1,000 years in the future. However, arsenic concentrations under current conditions are below detection limits as shown by data from 3 years of OU 2-12 post-Record of Decision monitoring.

Ecological Risks

An ecological risk assessment for Waste Area Group 2 was performed to screen contaminated sites identified in the FFA/CO and new sites identified since that time. The screening resulted in release sites identified as either a potential source of contamination and/or a pathway to ecological ***receptors***. These sites were evaluated using the approach presented in the *Guidance Manual for Conducting Screening Level Ecological Risk Assessment for INEL*. The results of the ecological risk assessment are presented as a range of ***hazard quotients*** calculated for ***functional groups*** of ecological species. Because of the uncertainty in the methods used, hazard quotients are used only as a possible indicator of potential risk and should not be interpreted as a final indication of actual adverse effects to ecological receptors.

Receptors - someone or something that may receive an exposure to contaminants.

Hazard quotients - the ratio of contaminant intake concentrations at a release site to concentrations that produce adverse noncarcinogenic (i.e., noncancer causing) human health effects.

Functional groups - subjective assemblages of species carrying similar characteristics demonstrating (1) the potential for contaminant exposure through shared dietary and physical pathways and (2) potential for similar biological response to that exposure.

The **U.S. Environmental Protection Agency** is one of the three agencies identified in the INEL Federal Facility Agreement, which establishes the scope and schedule of remedial investigations at the INEEL. Correspondence by the Region 10 staff concerning this project can be found in the Administrative Record under Operable Unit 2-13.

For additional information concerning the EPA's role in preparing this proposed plan, contact:

Wayne Pierre
Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101
(206) 553-7261

Remedial action objectives - the requirements that must be met by any remedial alternative.

All sites with ecological risks greater than threshold levels are also sites with human health risks greater than allowable levels, except for the Paint Shop Ditch (TRA-02), Radioactive Contaminated Tank at TRA-614 (TRA-16), and the Advanced Test Reactor Cooling Tower (TRA-38). Some level of ecological risk reduction is expected at all sites with human health risks, either by implementing institutional controls such as maintaining existing soil covers or by active remediation. ***Remedial action objectives*** will address ecological risks at sites that will be remediated. Sites TRA-02, -16, and -38 are inside the facility fence, where ongoing operations are expected to discourage ecological receptors from residing within the facility and should reduce the likelihood of exposure to contamination. However, the Waste Area Group 2 ecological risk assessment will provide input into the INEEL-wide ecological risk evaluation that will evaluate whether contamination at all Waste Area Groups contributes to potential risk to populations and communities on an ecosystem-wide basis. The need for remedial action at sites posing an unacceptable ecological risk will be determined based on the results of the INEEL-wide ecological risk assessment.

Uncertainty in Risk Assessments

Uncertainty is inherent in each step of the risk assessment process and detailed discussions of uncertainties are presented throughout the RI/FS report (pages 5-61 through 5-64). To ensure that the risk estimates are conservative, health protective assumptions that bound the plausible upper limits of human health risks were used. As a result, the risks are probably overestimated to compensate for numerous uncertainties in the assessment process. The ecological risk assessment also incorporated various adjustment factors that were designed to be conservative, and the associated risks are most likely overestimated. Remediation that will be performed to reduce human health risks will also help to minimize Waste Area Group 2 ecological risks.

Because of these considerations, the small size of these sites, and the conservatism of the ecological risk assessments, no significant ecological impact is anticipated from these sites. No action is recommended at this time.

Establishing Remedial Action Objectives for the Eight Sites Identified

Remedial action objectives guide determinations of remedial actions that will satisfy the objectives of protecting human health and the environment.

- For protection of human health:
  - Inhibit direct exposure to radionuclide contaminants of concern that would result in a total excess cancer risk of greater than 1 in 10,000 to 1 in 1,000,000.
  - Inhibit ingestion of radionuclide and nonradionuclide contaminants of concern by all affected exposure routes (including soil and groundwater ingestion and ingestion of homegrown produce) resulting in a total excess cancer risk of greater than 1 in 10,000 to 1 in 1,000,000 or would result in a hazard index greater than 1.0.

- Inhibit degradation of any containment alternative cover resulting in exposure of buried waste or migration of contaminants to the surface that would pose a total excess cancer risk (for all contaminants) of greater than 1 in 10,000 to 1 in 1,000,000 or would result in a hazard index greater than 1.0.

- For protection of the environment:

  - Inhibit adverse effects to resident populations of flora and fauna, as determined by the ecological risk evaluations, from soil, surface water, or air containing contaminants of concern.

  - Inhibit adverse effects to sites where contaminants of concern remain in place below ground surface that could result in exposure or migration to surface pathways.

Summary of Alternatives Evaluated

The following five general alternatives and combinations of alternatives are consistent with the objective of this investigation, which is to use experience from previous cleanup actions at other INEEL sites with similar characteristics (i.e., types of contaminants present and affected environmental media) to reduce the number of alternatives requiring evaluation and to accelerate the selection process. Because of predicted natural reduction in contaminant concentrations in the Snake River Plain Aquifer and the Deep Perched Water System, no groundwater remedial alternatives were considered. However, continued groundwater monitoring is recommended to verify that contaminant concentrations decline as predicted. A brief description of each alternative identified for contaminated soil and sediment at the Test Reactor Area sites follows.

Alternative 1, No Action (with Monitoring). The no action alternative does not involve remedial actions. Because contamination would be left in place under this alternative, environmental monitoring would be necessary annually to identify potential contaminant migration or other changes in site conditions warranting future remedial actions. It is anticipated monitoring would be conducted at least annually, but the frequency will be determined during the remedial design. Soil, air, and groundwater environmental monitoring activities would be performed under Test Reactor Area and INEEL-wide comprehensive monitoring programs. Monitoring is an institutional action assumed to remain in effect for a least 100 years. Formulation of a No Action alternative is required by law and serves as the baseline for evaluating other remedial action alternatives.

Alternative 2, Limited Action. A Limited Action alternative was developed for those sites posing an unacceptable risk to current and future workers and for which the radionuclide contamination will decay to acceptable levels within the next 100 years. This alternative would essentially continue management practices currently in place at select subsurface release sites and the windblown surficial contamination site. Current management practices and institutional controls are in place as a result of implementing requirements under the Atomic Energy Act and DOE's implementing orders and procedures to protect worker safety and health. A partial list of the types of programs or procedures followed includes worker medical monitoring, work control, exposure limits, training requirements, and access controls such as security personnel,

The **U.S. Department of Energy** is one of the three agencies identified in the INEL Federal Facility Agreement, which establishes the scope and schedule of remedial investigations at the INEEL.

Written comments can be submitted to the **U.S. Department of Energy Idaho Operations Office**, and addressed to:

Mr. Jerry Lyle
Assistant Manager
Office of Program Execution
P.O. Box 2047
Idaho Falls, ID 83403-2047

For additional information regarding the Environmental Restoration Program at the INEEL, call (800) 708-2680 or (208) 526-4700.

<u>Alternative 1</u>
No Action:
- Contamination would be left in place
- Environmental monitoring would be necessary for at least 100 years
- Decision would be reviewed every 5 years

<u>Alternative 2</u>
Limited Action (with Monitoring):
- Contamination would be left in place
- Institutional control (access restrictions, management control procedures, routine maintenance, and on-going environmental monitoring for at least 100 years).
- Decision would be reviewed every 5 years

fences, barriers, signs and postings, etc. Actions under this alternative would focus on restricting access, routine maintenance, and environmental monitoring (as described above for the No Action [with Monitoring] alternative).

<u>Alternative 3</u>

Containment and Institutional Controls:

- Contamination would be left in place
- Two types of contaminant covers include a multilayer engineered cover and a native soil only cover
- Institutional controls include cover integrity monitoring and maintenance, surface water diversion, long-term environmental monitoring, and access restrictions for at least 100 years to be implemented annually for the first 5 years following cover completion with the decision reviewed every 5 years.

Alternative 3, Containment and Institutional Controls. This alternative involves both containment actions and institutional controls. Containment refers to a remedy that limits migration of contaminants from a waste site. The two containment types, shown in Figure 3 on page 15, considered for Test Reactor Area sites are Containment with Engineered Cover (Alternative 3a) and Containment with a Native Soil Cover (Alternative 3b).

- An Engineered Cover consists of several layers of geologic materials (i.e., rip rap, cobble gravel, and gravel). It was originally designed for stabilization of abandoned uranium mill tailings. This design was recently constructed at the INEEL Stationary Low-Power Reactor-1 burial ground site.

- A Native Soil Cover consists of a thick layer (i.e., a minimum of 10 feet) of native soil with surface vegetation, rock armor, or other surface cover.

Through isolation of contaminants, potential exposure pathways to human or environmental receptors are reduced. Human health risks, because of the low-level radionuclides at the Test Reactor Area, are predicted to decline to acceptable levels within 1,000 years through radioactive decay; however, risks due to high levels of metals that do not decay will not decline to acceptable levels. Containment technologies must be designed to maintain integrity for as long as contaminants that result in unacceptable cumulative exposure risks are present. The functional life of a particular cover design is based on factors such as erosion prevention, minimization of subsidence and settlement, prevention of slope failure, resistance to infiltration, resistance to biological intrusion, and the materials used for construction. The native soil cover would effectively reduce the potential for human exposure to site contaminants but would be less effective than an engineered cover for preventing biological intrusion and would offer a lesser degree of permanence compared to an engineered cover.

Institutional controls are assumed to remain in effect for at least 100 years. These institutional controls are to include existing soil cover integrity monitoring and maintenance, surface water diversions, access restrictions, and long-term environmental monitoring as for the No Action alternative. In particular, cover integrity monitoring and radiation survey programs (component of long-term environmental monitoring) would be established to verify the function of containment systems and provide early detection of potential contaminant migration. The need for further environmental monitoring would be evaluated and determined by the agencies during subsequent 5-year reviews.

<u>Alternative 4</u>

Excavation, Treatment and Disposal:

- This alternative applies only to the Chemical Waste Pond
- Contamination would be removed
- Treatment involves mercury retorting of Chemical Waste Pond contaminated sediments
- Disposal of any contaminated residual material at an appropriate location
- Decision would be reviewed every 5 years

Alternative 4, Excavation, Treatment, and Disposal. This alternative consists of excavating contaminated soil and debris and treating it to reduce the mobility or toxicity of the contaminants or the volume of contaminated materials. No method exists for destroying radionuclide contaminants or reducing their toxicity. However, volumes of contaminated media may be reduced, and some toxic metals may be rendered less toxic through treatment. Treatment alternatives considered for this option include thermal treatment using plasma torch to decompose organic compounds and solvents, ***mercury retort*** technology to distill and recover mercury from mercury-contaminated soil and sediments such as those found at the Chemical Waste Pond (TRA-06), chemical stabilization, and soil washing. In addition, physical treatment options considered and evaluated in the feasibility study include screening, flotation, attrition scrubbing, and monitor and segmented gate technologies. After the initial evaluation, all treatment options, with the exception of the retorting of Chemical Waste Pond sediments, were eliminated from further consideration because of low effectiveness. Disposal costs are bound by the cost of transporting any contaminated residual solid media to a Resource Conservation and Recovery Act disposal facility.

Mercury retort - heating contaminated soil to approximately 1000°F, volatilizing mercury as a vapor, which is subsequently cooled, and the liquid mercury is recovered.

Alternative 5, Excavation and Disposal. This alternative involves complete removal of material contaminated at unacceptable concentration levels from a human health perspective, to levels of intrusion (maximum of 10 feet or to the maximum depth at which contaminant concentrations exceed preliminary remediation goals, whichever is less). Excavation technologies considered include conventional backhoes and dozers and nonstandard excavation techniques using remotely operated equipment. Remotely controlled excavation techniques were eliminated from further evaluation because they are not expected to be necessary. Dust suppression measures would be taken to ensure windblown migration of contaminants does not occur. Removal of contaminated material is followed by disposal at an appropriate location. Disposal locations considered include on-Site disposal at the Radioactive Waste Management Complex, the Warm Waste Pond 1957 cell, or other proposed on-Site radioactive soil repositories. Also included were an off-Site low-level radioactive-contaminated soil landfill and an off-Site Resource Conservation and Recovery Act-(RCRA) permitted treatment, storage, and disposal facility. Disposal at an on-Site radioactive soil repository other than the Radioactive Waste Management Complex and Warm Waste Pond 1957 cell was not generally evaluated further because the future status of such a facility is uncertain. Disposal costs for this alternative are bounded by off-Site disposal costs. If on-Site disposal were to be considered appropriate, on-Site Radioactive Waste Management Complex disposal costs would present an upper bound estimate. However, there exists the possibility of a less expensive, more effective option that may be considered in the future.

Alternative 5
Excavation and Disposal:
- Contamination would be removed
- Removal of contaminated material would be followed by disposal at an appropriate location
- Decision would be reviewed every 5 years

Many comments received from the public concerning the readability, use of acronyms, candor, and additional document references have been incorporated into this plan. The agencies acknowledge members of a citizens focus group, and others, who have spent many hours reviewing draft documents and offering suggestions for improvement.

Summary of Site-Specific Evaluations

The following paragraphs briefly summarize the contamination present, the potential risks to human health and the environment, the alternatives evaluated, and the selection of the preferred alternative on a group and site specific basis.

Disposal Ponds

Site Descriptions

Warm Waste Pond-1952, 1957, and 1964 Cells (TRA-03). The Warm Waste Pond contamination is composed of (a) sediments, principally cesium-137 and cobalt-60, from radionuclide wastewater discharges to the three cells built in 1952, 1957, and 1964; (b) soil and asphalt consolidated to clean up windblown radionuclide soil contamination from the Warm Waste Pond; (c) material generated during an interim action to clean up the 1964 cell; and (d) soil from miscellaneous radionuclide-contaminated sites across the INEEL. Following the agency-approved interim action

(Note: the following costs are associated with the alternatives listed on page 15.)

Alternative 1: No Action (with Monitoring)

Warm Waste Pond	
Capital Costs	$778,809
O&M* Costs	$2,468,745
Total Costs	$3,247,554
Chemical Waste Pond	
Capital Costs	$778,809
O&M* Costs	$2,175,734
Total Costs	$2,954,543
Cold Waste Pond	
Capital Costs	$778,809
O&M* Costs	$2,216,197
Total Costs	$2,995,006
Sewage Leach Pond	
Capital Costs	$778,809
O&M* Costs	$2,175,734
Total Costs	$2,954,543

Alternative 3a: Containment with Engineered Cover and Institutional Controls

Warm Waste Pond	
Capital Costs	$3,803,101
O&M* Costs	$3,040,115
Total Costs	$6,843,216
Chemical Waste Pond	
Capital Costs	$2,030,462
O&M* Costs	$2,321,995
Total Costs	$4,352,457
Cold Waste Pond	
Capital Costs	$3,785,346
O&M* Costs	$2,015,366
Total Costs	$5,800,712
Sewage Leach Pond	
Capital Costs	$2,091,603
O&M* Costs	$2,383,959
Total Costs	$4,475,562

*Operation and Maintenance

Capital costs - costs associated with all the upfront activities of a project.

Operation and maintenance (O&M) costs - the costs associated with the labor and maintenance necessary to maintain the effectiveness of the response actions.

at the 1964 cell, the 1952 cell was covered with a minimum of 1 foot of clean fill material, and the 1964 cell was covered with approximately 10 feet of clean fill material. The Warm Waste Pond cells were replaced in 1994 with a lined evaporation pond.

Chemical Waste Pond (TRA-06). This site consists of contaminated sediments located in the Chemical Waste Pond, an unlined disposal pond located in the northeastern part of the Test Reactor Area. The pond was put into service in 1962. The Chemical Waste Pond receives demineralization plant mineral salt effluents. In addition, other solid and liquid wastes including corrosives were disposed directly into the pond until 1982. Contaminants evaluated as chemicals of concern were metals (antimony, arsenic, barium, manganese, mercury, and zinc) and one polychlorinated biphenyl (Aroclor-1260).

Cold Waste Pond (TRA-08). This site consists of contaminated sediments located in the Cold Waste Pond, which is composed of two cells. Effluents discharged to the pond have been exclusively nonradioactive. These effluents include cooling tower effluent, and discharges from floor drains, air conditioning units, and other nonradioactive drains. Several metals (arsenic, barium, cadmium, and mercury) and radionuclides (cesium-137, cobalt-60, and europium-154) were in the contaminated sediment. The source of the radionuclides is suspected to be windblown contamination from the Warm Waste Pond.

Sewage Leach Pond (TRA-13). The Sewage Leach Pond is composed of two cells and is located outside the security fence and directly east of the central part of the Test Reactor Area. The system has been used continuously since 1952 to receive sanitary sewer drain effluents from Test Reactor Area facilities. When construction of a new and improved sewage treatment facility was completed in December 1995, the old Sewage Leach Pond was removed from service. Sampling of sediments from the pond showed that only metals (mercury and zinc) and radionuclides (cesium-137 and cobalt-60) were present. The source of the radioactive contaminants is suspected to be windblown from the Warm Waste Pond.

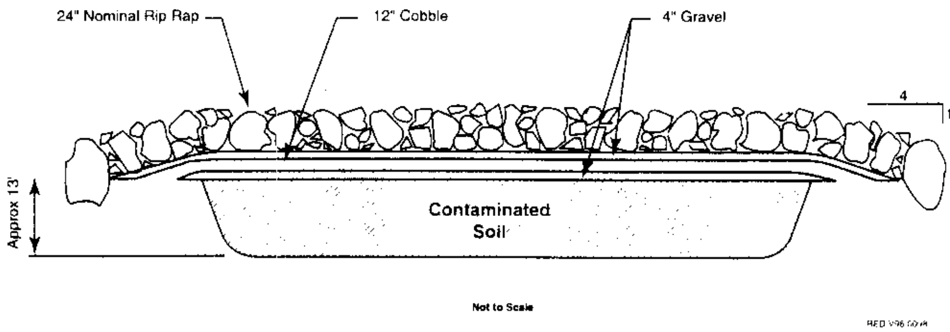
Summary of Disposal Pond Site Risks

As indicated in Table 1, the Warm Waste Pond 1952 and 1957 cells, the Chemical Waste Pond, and the Cold Waste Pond, in the absence of some type of remedial action, had human health risks for either occupational or residential receptors in excess of 1 chance in 10,000 and/or a hazard index greater than 1.0 during one or more of the time periods of concern (0, 30, 100 and 1,000 years). These risks were primarily related to external radiation exposure, soil ingestion, and homegrown produce ingestion.

Summary of Disposal Pond Site Alternatives

The feasibility study portion of the comprehensive investigation for the Disposal Pond Sites considered the Alternatives 1, 3, 4, and 5 for meeting the remedial action objectives as stated on pages 10 and 11. Alternative 2, Limited Action, was not considered further because of low effectiveness. Note that costs in the sidebar are the present worth of capital and operation and maintenance in 1997 dollars. See the Summary of Alternatives Evaluated, page 11, for details on these alternatives.

Engineered Cover Cross-Section



Native Soil Cover Cross-Section

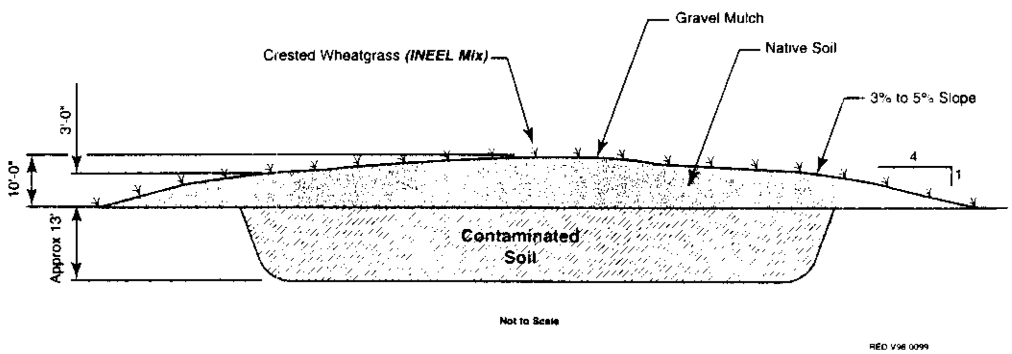


***Figure 3.** Cross-sectional schematic of the engineered cover and the native soil cover.*

Alternative 1: No Action (with Monitoring). These costs are assumed to be relatively constant between sites. ❶Refer to Section 9-1 in the OU 2-13 Comprehensive RI/FS report for a detailed cost element breakdown of this alternative.

Alternative 3a: Containment with Engineered Cover and Institutional Controls. Figure 3 shows a cross-section of the cover. It would be particularly effective in reducing potential biological intrusion. Actual cover design would occur after the Record of Decision is signed. ❶Refer to Section 9.3.4.1 of the OU 2-13 Comprehensive RI/FS report for a detailed cost evaluation of this alternative.

Alternative 3b: Containment with Native Soil Cover and Institutional Controls. The Native Soil Cover would shield against penetrating radiation from contaminated soil, control water balance, and enhance water drainage away from the site. ❶Refer to Section 9.3.4.2 of the OU 2-13 Comprehensive RI/FS report for a cost evaluation of this alternative.

Alternative 4: Containment with Native Soil Cover after Excavation, Treatment, and Disposal. This alternative only applies to the Chemical Waste Pond if some of the sediments are determined to be RCRA-hazardous. Under this alternative, the mercury-contaminated sediments would be removed from the Chemical Waste Pond, treated in a mercury retort unit, and the treated sediments would be returned to the Chemical Waste Pond. The pond would be backfilled with clean soil and capped with a native soil cover.

❶Engineered Cover -
- Isolates contamination and reduces exposure to radiation
- Effective from 200 to 1,000 years
- Requires minimum maintenance
- Inhibits inadvertent human intrusion
- Minimizes plant and animal intrusion.

❶Native Soil Cover -
- Reduces exposure to radiation
- Inhibits direct exposure to contamination
- Inhibits inadvertent human intrusion
- Inhibits plant and animal intrusion.

INEEL mix - the mixture is composed of Siberian Wheatgrass, Ephrain Crested Wheatgrass, and Sodar Streambank Wheatgrass.

Alternative 3b: Containment with Native Soil Cover and Institutional Controls

Warm Waste Pond	
Capital Costs	$6,850,523
O&M* Costs	$3,040,115
Total Costs	$9,890,638
Chemical Waste Pond	
Capital Costs	$1,582,964
O&M* Costs	$2,321,995
Total Costs	$3,904,959
Cold Waste Pond	
Capital Costs	$2,396,201
O&M* Costs	$2,015,366
Total Costs	$4,411,567
Sewage Leach Pond	
Capital Costs	$1,644,873
O&M* Costs	$2,383,959
Total Costs	$4,028,832

Alternative 4: Conventional Excavation, Treatment, and Disposal

Chemical Waste Pond	
Capital Costs	$3,446,471
O&M* Costs	$2,321,995
Total Costs	$5,768,466

Alternative 5: Conventional Excavation and Disposal

Warm Waste Pond	
Capital Costs	$28,092,785
O&M* Costs	$2,453,668
Total Costs	$30,546,453
Chemical Waste Pond	
Capital Costs	$828,163
O&M* Costs	$0
Total Costs	$828,163
Cold Waste Pond	
Capital Costs	$1,592,818
O&M* Costs	$0
Total Costs	$1,592,818
Sewage Leach Pond	
Capital Costs	$5,320,029
O&M* Costs	$0
Total Costs	$5,320,029

Alternative 5: Excavation and Disposal. Under this alternative, long-term monitoring and institutional controls would not be required. Note that long-term monitoring and institutional controls as described for Alternative 3, page 12, would still be required at the Warm Waste Pond 1964 cell, where contamination would remain in place under nearly 10 feet of clean soil and a final surface cover consisting of cobbles or basalt rip rap. For the Chemical Waste Pond (TRA-06), this alternative would only apply if most or all of the pond sediments are contaminated at concentrations less than RCRA-hazardous levels. ⓘ Refer to section 9.4.5 of the OU 2-13 Comprehensive RI/FS report for a detailed cost evaluation of this alternative.

Comparison and Evaluation of Disposal Pond Site Alternatives

The five alternatives were evaluated using seven of the nine evaluation criteria listed in the sidebar on page 18. Table 2 summarizes the detailed analysis of the remedial alternatives against the threshold and balancing evaluation criteria. Community acceptance will be evaluated following the end of the public comment period. ⓘ For more information on how these criteria were evaluated in the feasibility study process, refer to Chapter 10 of the OU 2-13 Comprehensive RI/FS report.

Overall Protection of Human Health and the Environment. For the disposal pond sites, the results of the baseline risk assessment indicate that Alternative 1, No Action (with Monitoring), would not prevent external exposure to contaminated surface soil below acceptable levels. Alternatives 3a and 3b, Containment with Engineered Cover or Native Soil Cover, respectively, eliminate potential exposure from contaminated soil, and there would be minimal exposure risks during cover construction activities. The engineered cover provides better protection than the native soil cover because of the higher level of biological intrusion resistance (i.e., burrowing mammals or plant roots). Both containment options provide adequate shielding from direct radiation exposure and would control ingestion and inhalation pathways as well. The engineered cover option would require less long-term maintenance by providing better resistance to erosion than the native soil cover. Alternative 4, Containment with Native Soil Cover after Excavation, Treatment, and Disposal, applies only to the Chemical Waste Pond (TRA-06) if some of the sediments are determined to be RCRA hazardous and some of the sediments fall in the range between preliminary remediation goals and RCRA-hazardous levels. This alternative would be protective by eliminating potential exposure to RCRA-hazardous contaminated soil through complete removal and treatment followed by containment with a Native Soil Cover of the treated sediments and any residual non-RCRA-hazardous contaminated soils. Recycling and/or reuse of the recovered mercury by an approved and permitted industrial facility is assumed to assure complete elimination of risks to human health and the environment at this site. Short-term risk during excavation and treatment activities is estimated to be low. The alternative with the most effective long-term protection of human health and the environment is Alternative 5, Excavation and Disposal, because all contamination would be removed from the sites and the need for long-term monitoring, with the exception of the Warm Waste Pond 1964 cell, would be eliminated. Protection of human health and the environment under this alternative is contingent on proper disposal in a permitted facility with adequate waste management controls in place to prevent human and environmental exposure to contaminated soils. Short-term risk of direct exposure to workers during excavation is moderate.

Compliance with *Applicable Relevant and Appropriate Requirements.* Primary Applicable Relevant and Appropriate Requirements (ARARs) identified for OU 2-13 are as follows:

Statute and Citation

- Idaho Fugitive Dust Emissions; IDAPA 16.01.01650 et.seq
- Toxic Substances; IDAPA 16.01.01161
- Idaho Hazardous Waste Management Act; IDAPA 16.01.05.004 and 16.01.05.005 (Definition of Solid Waste)
- IDAPA 16.01.05.006 (Hazardous Waste Determination)
- IDAPA 16.01.05.005 (Identification and Listing of Hazardous Waste)
- IDAPA 16.01.05.008 (Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities)
- IDAPA 16.01.05.011 (Land Disposal Restrictions)
- National Emission Standards for Hazardous Air Pollutants (NESHAPS); 40 CFR 61.92 (emission standards for radionuclides other than radon 220 and radon 222 at DOE facilities)
- Rules for the Control of Air Pollution in Idaho (Air Toxics Rules); IDAPA 16.01.01.210, 16.01.01.585, and 16.01.01.586
- Safe Drinking Water Act; 40 CFR 141
- National Historic Preservation Act; 16 USC 470 et seq.
- Storm Water Discharge Requirements; 40 CFR 122.26
- Prevention of Significant Deterioration of Air Quality; IDAPA 16.01.01.581
- Seismic Considerations IDAPA 16.01.05.008
- Idaho Hazardous Waste Management Act; IDAPA 16.01.5.008.

To Be Considered - Though not ARARs, the following have been included for completeness in order to make a more informed remedial action decision.

- Environmental Protection, Safety, and Health Protection Standards; DOE Order 5480.4
- Radioactive Waste Management; DOE Order 5820.2A
- Radiation Protection of the Public and Environment; DOE Order 5400.5.

Alternative 1, No Action (with Monitoring), would not meet ARARs for fugitive dust emissions or storm water discharges because no controls would be implemented. Though not an ARAR, DOE orders limiting exposure to workers and hypothetical future residents would also not be met under this alternative. With the exception of the Chemical Waste Pond, Alternative 3, Containment and Institutional Controls, is considered to be capable of achieving compliance with state of Idaho regulations for controlling emissions of fugitive dust and toxic substances and meeting other identified ARARs. Alternative 4, Containment with a Native Soil Cover after Excavation, Treatment, and Disposal, and Alternative 5, Excavation and Disposal, both provide compliance with all identified ARARs.

Long-term Effectiveness and Permanence. Alternative 1, No Action (with Monitoring), provides the least possible level of long-term effectiveness and permanence based on the residual risk associated with the disposal pond sites. Alternative 3, Containment and Institutional Controls, would provide resistance to erosion and to human and biotic intrusion and would be effective until acceptable risk

Applicable or Relevant and Appropriate Requirements (ARARs) - "Applicable" requirements mean those standards, criteria, or limitations promulgated under federal or state law that are required specific to a substance, pollutant, contaminant, act , location, or other circumstance at a CERCLA site. "Relevant and Appropriate" requirements mean those standards, requirements, or limitations that address problems or situations sufficiently similar to those encountered at the CERCLA site such that their use is well suited to that particular site.

levels are met. The engineered cover would require less maintenance than the native soil cover and would, therefore, provide greater permanence. Alternative 4, Containment with a Native Soil Cover after Excavation, Treatment, and Disposal, and Alternative 5, Excavation and Disposal, provide the highest degree of long-term effectiveness and permanence, because contaminated soil and debris would either no longer exist at the sites or in the case of the Chemical Waste Pond, be substantially reduced. Long-term monitoring, maintenance, and controls would no longer be required for Alternative 5.

Reduction of Toxicity, Mobility, or Volume Through Treatment. This criterion would not be met for any of the alternatives with the exception of Alternative 4 for the Chemical Waste Pond (TRA-06). Mercury retorting is estimated to be potentially capable of removing 90% or more of the mercury present in contaminated sediments at TRA-06. Volume reduction of contaminated soil could be almost 100%, assuming that all the mercury is RCRA-hazardous and enough mercury could be removed so that the treated soils could be returned to the site. Recovered mercury would be recycled.

Short-Term Effectiveness. Alternative 1, No Action (with Monitoring), could be implemented without increasing potential risks to human health or the environment. Alternative 3, Containment and Institutional Controls, would have minimal risk from disturbances related to vehicle and material transport activities associated with construction of the barrier. Existing soil covers would provide shielding against direct exposure to contaminants. Engineering controls such as dust suppression with water would minimize the potential for airborne contaminant transport during construction. Alternative 4, Contaminant with a Native Soil Cover after Excavation, Treatment, and Disposal, and Alternative 5, Excavation and Disposal, would result in a moderate short-term risk and are considered to be least effective for short-term protection because workers could potentially be exposed to contaminated soil and debris. Administrative and engineering controls would be required to ensure worker safety. None of the alternatives is considered to have a significant short-term impact on the environment.

Implementability. Each of the four alternatives retained is technically implementable. Alternatives 4 and 5 are most difficult to implement relative to the others because of the complexity of the remediation process. Alternative 4 involves a treatment process that has been demonstrated to be effective at other INEEL sites. However, it requires additional safety analyses, permit applications, monitoring, and engineering controls beyond those the other alternatives would require. The containment alternatives (3a and b) are readily implementable. The engineered cover option is more difficult to implement than the native soil cover option; however, both designs are relatively simple and have been extensively implemented at other sites including the INEEL. Alternative 1 is easiest to implement.

❶ **Cost.** Detailed estimates of present worth costs can be found in Appendix L of the RI/FS report. The relative ranking of each alternative for the disposal pond sites on the basis of cost is presented in Table 2. Table 2 also provides a summary of the detailed analysis of the remedial alternatives against the threshold and balancing evaluation criteria. Please note that the cost estimates presented in this proposed plan are bounding and are based on conservative assumptions. Operations and maintenance costs appear high because they reflect 100 years of control; however the operation and maintenance costs per year are not unrealistic. In addition, economies of scale have not been considered in these estimates, but will likely result in lower total project costs.

Evaluation Criteria

Threshold Criteria:

1. **Overall Protection of Human Health and the Environment** addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
2. **Compliance with Applicable or Relevant and Appropriate Requirements** (ARARs) addresses whether a remedy will meet all of the ARARs under federal and state environmental laws and/or justifies a waiver.

Balancing Criteria:

3. **Long-term Effectiveness and Permanence** refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.
4. **Reduction of Toxicity, Mobility, or Volume through Treatment** addresses the degree to which a remedy employs recycling or treatment that reduces the toxicity, mobility, or volume of the contaminants of concern, including how treatment is used to address the principal threats posed by the site.
5. **Short-term Effectiveness** addresses any adverse impacts on human health and the environment that may be posed during the construction and implementation period and the period of time needed to achieve cleanup goals.
6. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
7. **Cost** includes estimated capital and operation and maintenance costs, expressed as net present-worth costs.

Modifying Criteria:

8. **State Acceptance** reflects aspects of the preferred alternative and other alternatives that the state favors or objects to, and any specific comments regarding state ARARs or the proposed use of waivers.
9. **Community Acceptance** summarizes the public's general response to the alternatives described in the proposed plan and in the remedial investigation/feasibility study, based on public comments received.

In summary, the No Action (with Monitoring) alternative was found to not meet the remedial action objectives or ARARs for any of the Disposal Pond sites. Containment with Engineered Cover was found to provide a relatively high level of protectiveness of human health and the environment and generally had lower costs than the Excavation and Disposal alternative. The Excavation and Disposal alternative, however, provided the greatest long-term effectiveness and permanence. The Containment with Native Soil Cover alternative met the remedial action objectives and ARARs. It also had relatively low costs to implement, but is regarded as providing less protection to human health and the environment than the engineered cover because of the potential for biointrusion, erosion of the cap, and other processes that could result in the mobilization of contaminants into the environment. Because mercury (a suspected RCRA-hazardous constituent) is present at the Chemical Waste Pond (TRA-06), the Excavation and Disposal alternative was modified to include on-Site treatment and return of the treated sediment to the pond followed by Containment with a Native Soil Cover. This is consistent with remedial actions performed at other mercury-contaminated sites at INEEL. Verification sampling at the Chemical Waste Pond will be conducted prior to implementation of the final remedy to confirm the presence of RCRA-hazardous constituents.

Table 2. *Summary of Comparative Analysis for Disposal Pond Site Alternatives.*

Criterion	No Action	Containment w/ Engineered Cover	Containment w/ Native Soil Cover	Excavation w/ Disposal
Overall Protection	○	◓	∅	●
Compliance w/ARARs	○	●	●	●
Long-Term Effectiveness	○	◓	∅	●
Reduction of Toxicity, Mobility, or Volume	N/A	N/A	N/A	N/A
Short-Term Effectiveness	●	●	●	◓
Implementability	●	◓	◓	∅
Cost				
TRA-03	●	◓	∅	○
TRA-06, 08	◓	○	∅	●
TRA-13	●	◓	◓	∅

● = Best ◓ = Good ∅ = Poor ○ = Worst

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Detailed information concerning the comparative analysis of remedial alternatives used in Table 2 can be found in Section 10 of the Comprehensive RI/FS report for OU 2-13.

Summary of Preferred Alternatives for the Disposal Pond Sites

Preferred alternative - the protective, ARAR compliant remedy that is judged to provide the best balance of tradeoffs with respect to the five primary balancing criteria (see sidebar on page 18).

The ***preferred alternative*** for the Warm Waste Pond 1952 and 1957 disposal pond cells (TRA-03) is Alternative 3a, Containment with Engineered Cover and Institutional Controls. The preferred alternative for the Warm Waste Pond 1964 cell is Containment with a Native Soil Cover and institutional controls combined with a rip rap or cobble layer cover to inhibit intrusion or future excavation. The Warm Waste Pond 1964 cell, sidewalls, and bottom still have contaminants above the preliminary remediation goal of 23.3 pCi/gm. Although the cell was backfilled with clean soil to grade, a basalt rip rap or cobble layer will inhibit future intrusion or excavation and increase the degree of permanence of the remedy. The preferred alternative for the 1957 cell would involve continued filling of the cell to grade with contaminated soils

Total costs for Alternative 3a are estimated to be $6,843,216.

from surrounding sites before construction of the cover. The continued filling would be accomplished by CERCLA removal actions, which is consistent with previous work at the INEEL. Contaminants placed in the 1957 cell will be consistent with what is in the 1957 cell to date in terms of contaminant type and concentration. These alternatives are protective of human health and the environment, comply with ARARs, provide short- and long-term effectiveness, are readily implementable and are cost-effective.

This alternative would reduce human exposure by preventing direct contact with and exposure to contaminants, would reduce the potential for future contaminant migration, and would reduce or eliminate the potential of intrusion of contaminated soils by ecological receptors (i.e., burrowing mammals or deep-rooted vegetation). Institutional controls (see page 12) would be established and would remain in effect for at least 100 years for both containment alternatives. In particular, groundwater monitoring would be continued during the postclosure phase to support a response action if any migration of contaminants to the groundwater is identified.

Toxicity Characteristic Leaching Procedure - an EPA analytical method for determining if a waste is hazardous in which an acidic solution percolates the contaminated material (e.g., soil), and the amount of contaminant that is lost from the material verses the amount that remains in the material is measured. Some material may remain because it is resistant to the acid or it is immobile within material during acidic conditions. The results of the method are used to evaluate contaminants disposed in landfills.

The preferred alternative for the Chemical Waste Pond (TRA-06) is Containment with a Native Soil Cover and Institutional Controls after Excavation, Treatment, and Disposal. Institutional controls (see page 12) would be established and would remain in effect for at least 100 years for this alternative. The details of the preferred alternative depend on the extent of pond sediments that are contaminated with mercury at concentrations exceeding RCRA-hazardous levels. Two possible scenarios are discussed below. All pond sediments are assumed to be contaminated with mercury at concentrations higher than the preliminary remediation goals based on sampling results; however, the volume of sediments that may be RCRA-hazardous is still unknown because the ***Toxicity Characteristic Leaching Procedure*** that is used to determine the RCRA toxic characteristic for metals was not performed on TRA-06 samples.

The lower bound estimated present worth cost of this scenario for the preferred alternative is $828,163.

At least two scenarios may apply. The first is that all sediments are contaminated at concentrations greater than preliminary remediation goals but less than Toxicity Characteristic Leaching Procedure levels. These sediments would present risks to human health and the environment, but are not regulated under RCRA land disposal restrictions. Risks presented by these sediments may be most cost-effectively eliminated by excavation with transportation to an appropriate landfill. This alternative would remove all risks from the site, and no long-term monitoring or institutional controls would be required.

The upper bound cost of this scenario for the preferred alternative, assuming that all of the TRA-06 sediments are hazardous and that they would be treated on-Site prior to disposal, is $1,863,507. Backfilling the pond, capping with a native soil cover and maintaining at least 100 years of institutional controls would raise the cost to $5,768,466.

The second possible scenario is that some of the sediments are RCRA-hazardous, and some fall in the range between preliminary remediation goals and RCRA-hazardous levels. These sediments would present risks to human health and the environment, and the portion contaminated at greater than Toxicity Characteristic Leaching Procedure levels is also controlled by RCRA land disposal restrictions. As for the first scenario, risks presented by these sediments may be most cost-effectively eliminated by excavation with transportation to an appropriate landfill. Again, this alternative would remove all risks from the site, and no long-term monitoring or institutional controls would be required. However, RCRA land disposal restrictions require that the hazardous portion be treated, either on-Site prior to disposal or at the disposal facility.

Total estimated costs for Alternative 5 are $1,592,818. Costs are upper bound and actual costs may likely be lower due to selective "hot spot" excavation.

The preferred alternative for the Cold Waste Pond (TRA-08) is Alternative 5, Excavation with Disposal. Costs were lower for this alternative because of the small thickness of contaminated materials requiring removal (0 to 6 inches) versus the amount of fill materials that would be required under the two containment options. This alternative provides the highest degree of long-term effectiveness and permanence. Only sediments with contaminant concentrations exceeding risk-based cleanup goals would be excavated.

Total estimated costs for Alternative 3b are $4,028,832. Costs are upper bound, and actual costs may likely be lower because of selective "hot spot" excavation.

For the Sewage Leach Pond (TRA-13) the preferred alternative is Alternative 3b, Containment with a Native Soil Cover and Institutional Controls. Before constructing the barrier, the pond would be backfilled with soils from the surface of the berms first, followed by the remaining berm soil and clean soil to grade. This would ensure that any contamination from the berms is placed in the bottom of the pond. This alternative would effectively reduce risks to human health and the environment at relatively low implementation costs versus excavation and disposal. This alternative would effectively reduce the potential for human and environmental exposure to site contaminants, but requires long-term monitoring to ensure migration of contaminants to receptor pathways does not occur. Institutional controls (see page 12) would be established and remain in effect for at least 100 years.

Subsurface Release Sites

Site Descriptions

Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15). This site consists of subsurface soil contamination at the site of an underground tank that leaked. The leaking tank was removed; however, three tanks in concrete basins located 18 feet below ground surface remain. Contamination was detected from near ground surface to a depth of 38 feet below the ground surface. Surface radioactive waste spills and/or leaks from associated warm waste lines are also believed to have contributed to contamination at this site.

Soil Surrounding Tanks 1 and 2 at Test Reactor Area Building TRA-630 (TRA-19). This site consists of soil contamination below the ground surface resulting from releases from four underground catch tanks and associated piping located near Building TRA-630. The four tanks and the concrete vault were replaced with four new tanks and a new vault between 1985 and 1986. The original tanks were intact upon removal; therefore, subsurface contamination is believed to have originated from leaking warm waste lines.

Brass Cap Area. This site consists of radioactively contaminated soil located below the ground surface inside the security fence at the Test Reactor Area. The source of contamination is attributed to a leaking warm waste line. Some contaminated soil and concrete were excavated and removed during repair of the leaking line. The excavation was backfilled with clean soil and the concrete surface was replaced. However, contaminated soil does exist at this site.

Summary of Subsurface Release Site Risks

The results of the human health evaluation for the risks and hazards associated with subsurface release sites (see Table 1 on page 9) indicate that risk for the Soils Surrounding Tanks at Building TRA-630 (TRA-19) and the Brass Cap Area exceed

Alternative 1: No Action (with Monitoring)

Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15)

Capital Costs	$577,548
O&M* Costs	$1,624,349
Total Costs	$2,201,897

Soil Surrounding Tanks 1 and 2 at Building TRA-630 (TRA-19)

Capital Costs	$577,548
O&M* Costs	$1,624,349
Total Costs	$2,201,897

Brass Cap Area

Capital Costs	$577,548
O&M* Costs	$1,624,349
Total Costs	$2,201,897

Alternative 2: Limited Action

Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15)

Capital Costs	$ 696,719
O&M* Costs	$1,615,618
Total Costs	$2,312,337

Alternative 3a: Containment with Engineered Cover

Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15)

Capital Costs	$1,012,788
O&M* Costs	$1,690,693
Total Costs	$2,703,481

Soil Surrounding Tanks 1 and 2 at Building TRA-630 (TRA-19)

Capital Costs	$993,367
O&M* Costs	$3,502,084
Total Costs	$4,495,451

Brass Cap Area

Capital Costs	$1,010,305
O&M* Costs	$1,690,693
Total Costs	$2,700,998

Costs associated with Alternative 5 are shown on page 23.

the 1 chance in 10,000 criterion for the current and 30-year occupational worker and the 100-year resident primarily because of external radiation exposure, followed by ingestion of contaminated soil and ingestion of homegrown produce. For the 100-year residential scenario, risks for Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15) are at the 1 chance in 10,000 level with the primary contributors also being external radiation exposure, ingestion of contaminated soil, and ingestion of homegrown produce. Hazard indices for the three sites are all below 1.0.

Summary of Subsurface Release Site Alternatives

The feasibility study portion of the OU 2-13 Comprehensive RI/FS report considered the following alternatives for controlling risks associated with the subsurface release sites.

Alternative 1, No Action (with Monitoring). This alternative would consist only of environmental monitoring during the institutional control period for sites TRA-15, TRA-19, and the Brass Cap Area. Environmental monitoring would be consistent with what is described on page 11 of this proposed plan for the No Action alternative. ❶Refer to Section 9.1 of the OU 2-13 Comprehensive RI/FS report for a cost evaluation of this alternative.

Alternative 2, Limited Action. This alternative would consist of continuation of existing management control practices as described on page 11 of this proposed plan for the Limited Action alternative. This alternative would meet remedial action objectives only at TRA-15, where risks to hypothetical residents 100 years in the future would be less than or equal to 1 chance in 10,000. Once the specified institutional control actions are either no longer conducted or enforced, the risk to human health and the environment would be equivalent to the No Action alternative. ❶Refer to section 9.2 of the OU 2-13 Comprehensive RI/FS report for a cost evaluation of this alternative. The identification of Limited Action as the preferred alternative with an Excavation and Disposal option contingency is based on the 100-year industrial land use assumption for the Test Reactor Area. The validity of this assumption will be evaluated during the 5-year review process. However, the maximum duration of time for which this assumption may be considered valid is up to 100 years from now.

Alternative 3a, Containment with Engineered Cover and Institutional Controls. The containment alternative would involve the construction of a cover of geologic materials as shown in Figure 3 on page 15. The cover would reduce the potential for human exposure to radionuclide contamination and would reduce the likelihood of biological intrusion. It would also require long-term environmental monitoring and institutional control consistent with Alternative 3 (see page 12), for a least 100 years. ❶Refer to Section 9.3.4.1, of the OU 2-13 Comprehensive RI/FS report for a detailed cost evaluation of this alternative.

Alternative 5, Excavation and Disposal. This alternative involves the removal of contaminated soils surrounding the Hot Waste Tanks at Building TRA-613 (TRA-15), Brass Cap Area, and soil surrounding Tanks at Building TRA-630 (TRA-19) and disposal at an appropriate disposal site. Contaminants would remain in place only at TRA-15 from 10 feet below land surface to 38 feet below land surface, necessitating long-term environmental monitoring and institutional controls at that site after completion of excavation and disposal. ❶Refer to Section 9.4.5, of the OU 2-13 Comprehensive RI/FS report for a detailed cost evaluation of this alternative.

Comparison and Evaluation of Alternatives

The four alternatives retained for detailed analysis for the subsurface release sites (Alternatives 1, 2, 3, and 5) were evaluated against seven of the nine evaluation criteria (see page 18). The results of this analysis are summarized in Table 3.

Overall Protection of Human Health and the Environment. For the subsurface release sites, the results of the baseline risk assessment indicate that Alternative 1, No Action (with Monitoring), would not prevent external radiation exposure to contaminated subsurface soil. Alternative 3a, Containment with Engineered Cover and Institutional Controls, eliminates potential exposure from contaminated soil and there would be minimal exposure risks during cover construction activities. For protection of environmental receptors, the engineered cover reduces the potential for biological intrusion (i.e., burrowing mammals or plant roots). This containment option provides adequate shielding from direct radiation exposure and would control ingestion and inhalation pathways as well. The engineered cover would require long-term maintenance. The alternative with the most effective long-term protection of human health and the environment is Alternative 5, Excavation and Disposal, because all contamination would be removed from the site and the need for long-term monitoring would be eliminated. Protection of human health and the environment under this alternative is contingent on proper disposal in a permitted facility with adequate waste management controls in place to prevent human and environmental exposure to contaminated soils. Short-term risk of direct exposure to workers during excavation is moderate. For TRA-15, Limited Action would prevent external radiation exposure to contaminated subsurface soil.

Compliance with ARARs. Though not an ARAR, the DOE order that requires limiting exposure to workers and hypothetical future residents would not be met by Alternative 1, No Action (with Monitoring). Alternative 3a, Containment with Engineered Cover and Institutional Controls, is considered to be capable of achieving compliance with identified ARARs. Alternatives 2, Limited Action, and 5, Excavation and Disposal, also comply with all identified ARARs.

Long-term Effectiveness and Permanence. Alternative 1, No Action (with Monitoring), provides the least possible level of long-term effectiveness and permanence based on the residual risk associated with the belowgrade release sites. Alternative 2, Limited Action, for TRA-15 provides long-term effectiveness and permanence because after 100 years of institutional controls, the radioactive contamination at this site will have decayed to acceptable levels. Alternative 3a, Containment with Engineered Cover and Institutional Controls, would provide resistance to erosion and to human and biological intrusion and would be effective until acceptable risk levels are met. The engineered cover would require minimal maintenance and would provide a greater degree of permanence. Alternative 5, Excavation and Disposal, provides the highest degree of long-term effectiveness and permanence because contaminated soil and debris would no longer exist at the sites. Long-term monitoring, maintenance, and controls would no longer be required.

Reduction of Toxicity, Mobility, or Volume Through Treatment. This criterion would not be met for any of the alternatives.

Alternative 5: Excavation and Disposal

Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15)	
Capital Costs	$1,376,231
O&M* Costs	$1,615,618
Total Costs	$2,991,849
Soil Surrounding Tanks 1 and 2 at Building TRA-630 (TRA-19)	
Capital Costs	$ 549,110
O&M* Costs	$ 0
Total Costs	$549,110
Brass Cap Area	
Capital Costs	$548,512
O&M* Costs	$0
Total Costs	$548,512

Short-Term Effectiveness. Alternative 1, No Action (with Monitoring), and Alternative 2, Limited Action, could be implemented without an increase in potential risks to human health or the environment. Alternative 3, Containment with an Engineered Cover and Institutional Controls, would have minimal risk from disturbances related to vehicle and material transport activities associated with construction of the barrier. Existing soil from the belowgrade contamination to the surface would provide shielding against direct exposure to contaminants. Alternative 5, Excavation and Disposal, would result in a moderate short-term risk and is considered to be least effective for short-term protection because of potential worker exposure to contaminated soil and debris. Administrative and engineering controls would be required to ensure worker safety. None of the alternatives considered would have a significant short-term impact on the environment.

Implementability. Each of the alternatives retained is technically implementable. Alternative 2, Limited Action is considered easily implemented because the Test Reactor Area currently has existing administrative controls in place to limit occupational exposure not only at TRA-15, but across the entire facility in general. Alternative 5, Excavation and Disposal, is the most difficult to implement because of the complexity of the remediation process. It requires additional safety analyses and environmental assessments compared to the other alternatives retained. Alternative 3a, Containment with an Engineered Cover, is readily implementable because it has a relatively simple design and has been extensively implemented at other sites. Alternative 1 is the easiest to implement because no change to existing site conditions is required.

Cost. Detailed estimates of present worth costs can be found in the RI/FS report. The relative ranking of each alternative for the subsurface release sites on the basis of cost is presented in Table 3. For TRA-15, Alternative 2, Limited Action, is the only alternative recommended because within the next 100 years the radioactive contamination at this site will have decayed to acceptable levels.

Table 3. *Summary of Comparative Analysis for Subsurface Site Alternatives*[a]

Criterion	No Action	Containment w/ Engineered Cover	Excavation w/ Off-Site Disposal
Overall Protection	○	◓	●
Compliance w/ARARs	○	●	◓
Long-Term Effectiveness	○	◓	●
Reduction of Toxicity, Mobility, or Volume	N/A	N/A	N/A
Short-Term Effectiveness	●	●	◓
Implementability	●	◓	∅
Cost (TRA-19, Brass Cap)	◓	∅	●

● = Best ◓ = Good ∅ = Poor ○ = Worst

a. TRA-15 was only evaluated for the Limited Action alternative

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Summary of Preferred Alternatives for the Subsurface Release Sites

The preferred alternative for the Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15) site is Limited Action because risk estimates are only slightly above criteria for workers. Existing administrative controls would be protective of

ⓘ Detailed information concerning the comparative analysis for remedial alternatives used in Table 3 can be found in Section 10 of the Comprehensive RI/FS report for OU 2-13.

Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15)
Limited Action - Institutional controls are already in place at this site; costs are expected to be minimal (near zero).

occupational scenarios. At the end of 100 years, no other action will be required because risk to potential residential receptors is reduced to acceptable levels. For soil surrounding Tanks 1 and 2 at Building TRA-630 (TRA-19) and the Brass Cap Area, the preferred alternative is Limited Action with the contingency that if the controls established under the limited action would not be maintained then an Excavation and Disposal option would be implemented (maximum of 10 feet). This alternative is preferred because the contamination associated with these two sites is located under the ground surface in and around active radioactive waste piping and tank systems and buildings where access is physically limited. Therefore, excavation or containment alternatives are not fully implementable at this time because it cannot be ensured that adequate contamination could be removed to eliminate the need for the controls that would be in place under the Limited Action alternative. If during 5-year reviews it is determined that the controls established under the Limited Action alternative would not be maintainable or continue to be protective, the contingency of Excavation and Disposal would be implemented. Selection of the Limited Action alternative in the ROD would require that existing controls such as access restrictions and worker protection programs be maintained to prevent exposure to workers or future inhabitants above acceptable levels.

Soil Surrounding Tanks 1 and 2 Building TRA-630 (TRA-19)
Limited Action followed with Excavation - $2,312,337. Costs for TRA-19 and Brass Cap Area are upper bound and will likely be much lower because limited action measures are already in place in these areas because of standard operational control measures in place today.

Brass Cap Area
Limited Action followed with Excavation - $2,312,337. Costs for TRA-19 and Brass Cap Area are upper bound and will likely be much lower because limited action measures are already in place in these areas because standard operational control measures are already in place today.

The identification of Limited Action as the preferred alternative with an Excavation and Disposal option contingency is based on the 100-year industrial land use assumption for the Test Reactor Area. The validity of this assumption will be evaluated during the 5-year review process. However, the maximum duration of time for which this assumption may be considered valid is up to 100 years from now.

Windblown Surficial Contamination Site

Site Description

Sewage Leach Pond Berm and Soil Contamination Area. Field radiological measurements indicate contamination of the berm around the Leach Pond. The Soil Contamination Area including the berm is a fenced radiation control area surrounding the Sewage Leach Pond. The source of the contamination has been attributed to windblown sediments from the Warm Waste Pond.

Summary of Windblown and Surficial Soil Contamination Site Risks

The human health risk assessment results for the area of windblown surficial soil contamination (see Table 1, page 9) indicate the risks from the Sewage Leach Pond Berm and Soil Contamination Area to current workers exceed the 1 chance per 10,000 criterion, but will decrease to less than 1 chance per 10,000 within 30 years, because of radioactive decay. Human health risks to hypothetical residents at 100 years are less than 1 chance per 10,000, and less than 1 chance in 1,000,000 after 1,000 years, again because of radioactive decay. The risk assessment results also indicated that no hazard indices greater than 1.0 resulted from any exposure scenario.

Summary of Windblown Surficial Soil Contamination Site Alternatives

The Feasibility Study portion of the comprehensive investigation for Waste Area Group 2 evaluated three remedial alternatives for controlling risks at the windblown surficial soil contamination site. These alternatives are:

Alternative 1: No Action (with Monitoring)

Sewage Leach Pond Berms and Soil Contamination Area	
Capital Costs	$778,809
O&M* Costs	$2,175,734
Total Costs	$2,954,543

Alternative 2: Limited Action

Sewage Leach Pond Berms and Soil Contamination Area	
Capital Costs	$1,293,247
O&M* Costs	$2,203,908
Total Costs	$3,497,155

Alternative 5: Excavation and Disposal

Sewage Leach Pond Berms and Soil Contamination Area	
Capital Costs	$3,457,090
O&M* Costs	$0
Total Costs	$3,457,090

Alternative 1, No Action (with Monitoring). Under this alternative, only environmental monitoring, as described on page 11, for the No Action alternative would be performed for a period of at least 100 years.

Alternative 2, Limited Action. This alternative would consist of continuation of existing management control practices as described on page 12 for the Limited Action alternative. This alternative would meet remedial action objectives where risks 30 to 100 years in the future would be less than or equal to 1 chance in 10,000.

Alternative 5, Excavation and Disposal. This alternative would involve excavation and disposal at an approved radioactive soil landfill. The need for long-term monitoring and institutional controls would be eliminated for the area of surficial soil contamination.

The estimated present value cost for this alternative reflects current industry costs and could be significantly lower if a disposal facility on the INEEL becomes available.

Comparison and Evaluation of Alternatives

The three remedial alternatives selected for the windblown surficial soil contamination site (Alternatives 1, 2, and 5) were evaluated further against seven of the nine evaluation criteria (see page 18). The results of this evaluation are presented in Table 4.

Overall Protection of Human Health and the Environment. For the windblown surficial soil contamination site, Alternative 1, No Action (with Monitoring), would provide no added protection to human health and the environment. Alternative 2, Limited Action, would be protective of human health by restricting access to contaminated soils for the period of concern. Alternative 5, Excavation and Disposal, provides the greatest overall protection because all contamination would be removed from the site and the need for long-term monitoring would be eliminated. Protection of human health and the environment under this alternative is contingent on proper disposal in a permitted facility with adequate waste management controls in place to prevent human and environmental exposure to contaminated soils. Short-term risk of direct exposure to workers during excavation is moderate.

Compliance with ARARs. Alternative 1, No Action (with Monitoring), would not meet the state of Idaho requirements for fugitive dust control or storm water discharge rules. Though not ARARs, DOE orders that require limiting exposure to workers and hypothetical future residents would not be met. Alternative 2, Limited Action, and Alternative 5, Excavation and Disposal, comply with all identified ARARs.

Long-term Effectiveness and Permanence. Alternative 1, No Action (with Monitoring), provides the least possible level of long-term effectiveness and permanence based on the residual risk associated with the windblown surficial soil contamination site. Alternative 2, Limited Action, would provide long-term effectiveness for a period of 100 years because of continuation of existing management practices over that period of time. Because risks to both workers and hypothetical future residents decline to 1 in 10,000 or less, this alternative is considered completely effective and permanent. Alternative 5, Excavation and Disposal, provides the highest degree of long-term effectiveness and permanence because contaminated soil and debris would no longer exist at the sites. Long-term monitoring, maintenance, and controls would not be required.

Reduction of Toxicity, Mobility, or Volume Through Treatment. This criterion would not be met for any of the alternatives.

Short-Term Effectiveness. Alternatives 1, No Action (with Monitoring), and Alternative 2, Limited Action, could both be implemented without an increase in potential risks to human health or the environment. Alternative 5, Excavation and Disposal, would result in a moderate short-term risk and is considered to be least effective for short-term protection because of potential worker exposure to contaminated soil and debris. Administrative and engineering controls would be required to ensure worker safety. None of the three alternatives considered would have a significant short-term impact on the environment.

Implementability. Each of the three alternatives retained is technically implementable. Alternative 5 is the most difficult to implement because of the complexity of the remediation process. It requires additional safety analyses and environmental assessments compared to the other alternatives retained. Alternative 1 is the easiest to implement because no change to existing site conditions is required. Alternative 2 is also easily implemented but would require continuation of existing management practices over the next 100 years.

Cost. ❶ Detailed estimates of present worth costs can be found in the OU 2-13 Comprehensive RI/FS report (Appendix L). The relative ranking of each alternative on the basis of cost is presented in Table 4. The cost estimates for these alternatives assumed that each action is performed independent of the other, including those alternatives for the disposal ponds and subsurface release sites. This was done to provide an upper bound cost estimate for each alternative. In reality, economies of scale will be realized for many of the preferred alternatives resulting in much lower total costs than those provided in this proposed plan. This would be the case for the Sewage Leach Pond Berm and Soil Contamination Area preferred alternative and the Sewage Leach Pond preferred alternative.

Table 4. *Summary of Comparative Analysis for Windblown Surficial Soil Site Alternatives.*

Criterion	No Action	Limited Action	Excavation w/ Disposal
Overall Protection	○	◓	●
Compliance w/ARARs	○	●	◓
Long-Term Effectiveness	○	●	●
Reduction of Toxicity, Mobility, or Volume	N/A	N/A	N/A
Short-Term Effectiveness	●	●	◓
Implementability	●	●	∅
Cost	●	◓	◓

● = Best ◓ = Good ∅ = Poor ○ = Worst

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❶ **Detailed information concerning the comparative analysis for remedial alternatives used in Table 4 can be found in Section 10 of the Comprehensive RI/FS report for OU 2-13.**

Total costs for Limited Action of the Sewage Leach Pond Berms and Soil Contamination Area are $3,497,155.

This assumes that the Sewage Leach Pond Berm would NOT be used as backfill for the Sewage Leach Pond. If the berms are used as backfill material, the need for Limited Action would no longer be necessary, and the costs would be near zero.

Summary of Preferred Alternatives for the Windblown Surficial Soil Contamination Sites

The preferred alternative for the Sewage Leach Pond Berm and Soil Contamination Area is Limited Action, where existing administrative controls would be maintained for a period of at least 100 years. This would be protective of occupational scenarios while achieving acceptable risks for the 100-year residential scenario because of natural radioactive decay. However, consistent with the preferred remedy for the Sewage Leach Pond (see page 21), the berms will be used as backfill for the pond as a Native Soil Cover. Should this remedy be selected for the Sewage Leach Pond, the need for Limited Action at the Sewage Leach Pond Berm and Soil Contamination Area would be eliminated, and the associated costs would approach zero.

Proposed No Action Sites

ⓘ Detailed information regarding the agencies recommendation of No Action for each of the sites listed under OUs 2-01, 02, 03, 04, 05, 06, 07, 08, 09, 11, 12, and 13 can be found in the Administrative Record file for Waste Area Group 2.

The agencies propose that no further action be taken under CERCLA at the following sites. The No Action status of these sites will be verified on an annual basis to determine whether the status has changed. The concern is that the continued operation of the Test Reactor Area may adversely impact these sites, and therefore, such status verification is necessary. A brief description of the agencies' recommendation is included in each of the following paragraphs. ⓘFigure 1-1 of the OU 2-13 Comprehensive RI/FS report shows the locations of these sites.

Rubble Piles (no operable unit specified). There were several sites examined in the initial review of the Test Reactor Area sites. These sites are all uncontaminated rubble piles. Because they contain no hazardous substances, they will not be considered further.

Paint Shop Ditch (OU 2-01). The Paint Shop Ditch is an open ditch that was used for disposal of paint shop waste until 1982. The site has been characterized and concentrations of contaminants are at or below established background levels. A determination of no further action for the site was approved by the agencies in December 1991.

Inactive Fuel Tanks (OU 2-02). This includes five underground storage tanks that contained petroleum products. All five of the tanks have been removed from the ground, and the initial site characterizations found no or minimal contamination (which was removed) at the sites. The sites were all recommended for no further action by the agencies in 1992 and 1993.

Inactive Fuel Tanks, OU 2-02

- TRA-14, Inactive Gasoline Tank at TRA-605
- TRA-17, Inactive Gasoline Tank at TRA-616
- TRA-18, Inactive Gasoline Tank at TRA-619
- TRA-21, Inactive Tank, North Side of MTR-643
- TRA-22, Inactive Diesel Fuel Tank at ETR-648

Miscellaneous Sites (OU 2-03). This operable unit includes six miscellaneous sites where sources of contamination no longer exist. All sites in this operable unit received no further action determinations from the agencies in 1993.

Miscellaneous Sites, OU 2-03

- TRA-01, Acid Spill Disposal Pit (TRA-608)
- TRA-11, French Drain at TRA-645
- TRA-12, Fuel Oil Tank Spill (TRA-727B)
- TRA-20, Brine Tank (TRA-731) at TRA-631
- TRA-40, Tunnel French Drain
- TRA-614, Oil Storage North

TRA-01 is a burial site containing excavated soil from a 1983 sulfuric acid spill. The acid in the soil was immediately neutralized at the spill site prior to excavation and burial. Bounding calculations show that the calcite content of the soil would be sufficient to neutralize more than 10 times the estimated release volume. As no source exists at the site, no further action is appropriate.

TRA-11 is a ***French Drain*** connected to overflow vent of a 1,000-gallon sulfuric acid tank. There are no documented overflows or evidence of spills associated with the site. Computed risk-based calculations demonstrate that the threshold quantity of acid necessary to generate an unacceptable risk would have been appropriately documented. As no source likely exists at the site, no further action is appropriate.

French drain - a manmade drain that discharges liquid into the ground.

TRA-12 is a site where in 1983 an estimated 110 gallons of No. 5 fuel oil overflowed from a 200,000-gallon aboveground storage tank. Two independent eyewitnesses report the flow never reached the ground (because of the high viscosity of the oil), and no ground staining was observed. Bounding calculations show that volatile organic compounds would not be present even if the spill volume was increased by a factor of ten. As no source exists at the site, no further action is appropriate.

TRA-20 is the site of a 15,000-gallon aboveground concrete tank used for processing sodium chloride solution, sodium hydroxide, and sulfuric acid. Prior to using the sodium hydroxide and sulfuric acid in the tank, it was lined with epoxy. The tank lining was found to be intact during a 1992 inspection. Bounding calculations show that the calcite present in 10 cubic yards of soil would be sufficient to neutralize at least 315 gallons of the acid. Computed risk-based calculations indicate the threshold quantity of sulfuric acid is greater than the amount likely to have been spilled. No further action is appropriate.

TRA-40 is the site of a 45-foot concrete lined trench containing piping for demineralizer solutions. A portion of the trench was unlined prior to 1989. Releases prior to 1984 would have involved nonhazardous substances. Subsequently, the system transferred sulfuric acid and sodium hydroxide. There are no documented releases from the site, and an inspection performed in 1992 indicated the system to be in a well maintained condition. Had a leak occurred, approximately equal volumes of acid and base would have been released. As no source exists at the site, no further action is appropriate.

TRA-614 is a site consisting of an earthen berm where small quantities of oil may have been disposed. There is no documentation or evidence of oil disposal at the site. The site is currently beneath Building TRA-628. With excavation of the berm, there is no known source. No further action is appropriate.

Based on these results, a no further action determination is appropriate for all OU 2-03 sites.

Petroleum and PCB Spill Sites (OU 2-04). Sites recommended for no further action include seven sites of mainly petroleum products including three ***polychlorinated biphenyl***-contaminated areas. The other four sites include diesel fuel contamination in a perched water well, contamination beneath an old loading dock, and two areas of fuel oil contamination. The agencies recommend no further action because potential concentrations of contaminants and associated risks do not justify cleanup action or further investigation.

Petroleum and PCB Spill Sites OU 2-04
- TRA PCB Spill at TRA-626
- TRA-627 #5 Oil Spill
- TRA PCB Spill at TRA-653
- TRA-670 Petroleum Product Spill
- TRA Diesel Fuel Contamination in PW-13
- TRA PCB Spill at TRA-619
- TRA-09, Spills at TRA Loading Dock (TRA-722)

Polychlorinated biphenyl (PCB) - a high molecular-weight halogenated organic compound formerly used in dielectric fluids in transformers.

TRA-653 is the site of a PCB transformer spill. After excavation of 8 cubic yards of contaminated soil and backfilling with clean soil in 1990, the highest PCB concentration was found to be 16 parts per million (ppm) under 4 feet of clean soil. The maximum surface concentration was 2 ppm located in a 2 × 8 foot area that was not excavated. The conservative computer screening model demonstrated that the

Parts per million - one part of a contaminant in one million parts of a media, typically water or soil.

concentration of PCB is below that necessary to pose a risk to groundwater. Although the concentration of PCB for the soil ingestion pathway is above the 1 in 1,000,000 concentration of 0.08 ***parts per million*** (ppm) for carcinogenic risk, it is below the 25 ppm cleanup level established under the Toxic Substances Control Act for restricted industrial areas. No further action is appropriate.

TRA-626 is the site of a PCB transformer spill. Approximately 36 cubic yards of soil and concrete were excavated from the site followed by backfilling with clean soil. The highest PCB concentration is 24 ppm under 4 feet of clean soil. Computer model results demonstrate that the concentration of PCB is below that necessary to pose a risk to groundwater. Although the concentration of PCB for the soil ingestion pathway is above the 1 in 1,000,000 concentration of 0.08 ppm for carcinogenic risk, it is below the 25 ppm cleanup level established under the Toxic Substances Control Act for restricted industrial areas and is under 4 feet of clean soil. No further action is appropriate.

PW-13 is a monitoring well site where diesel fuel was discovered at a depth of 65 to 75 feet during drilling operations. After removing approximately 20 gallons of diesel, the borehole was observed for several days without additional influx of diesel being noted. The well was subsequently completed at a depth of 90 feet. The well has been sampled four times (July 1993, October 1993, January 1994, and April 1994) and analyzed for total petroleum hydrocarbons. The well was sampled and analyzed twice for benzene, toluene, ethylbenzene, and xylene. All analyses were reported as nondetects with the exception of ethylbenzene, which was detected in samples at concentrations ranging from nondetect (April 1994) to 5.41 parts per billion (July 1993). These levels are well below the allowable drinking water maximum contaminant level of 700 parts per billion.

TRA-09 is the site of a former loading dock used to store petroleum products and solvents where, as a result of transfer operations, small quantities of this material may have been spilled. Bounding calculations performed demonstrated that the hazardous constituents from small incidental spills would have volatilized in the 8 years since the dock was removed. Soil staining observed in 1985 when the dock was removed is no longer visible, qualitatively indicating natural degradation of the spill constituents.

TRA-670 is the site of surficial oil staining at the former location of two 500-gallons aboveground waste oil storage tanks. Anecdotal information indicates that the tanks had been overfilled on at least one occasion and that small incidental spills would occur during routine transfer operations. The tanks and stained soil were removed from the site in 1987, and the area was backfilled with clean soil. It is unlikely that sufficient contamination remains at this location to pose an unacceptable risk.

TRA-627 is the site of oil stained soils at an oil transfer pump house. The pump house was used to transfer No. 5 fuel oil from trucks to storage tanks. Incidental spills occurred during the transfer as lines were connected and disconnected. Whenever these spills occurred, however, it was standard practice to use and to absorb the spill. The sand was then put into a "sand box" prior to disposal at the Central Facilities Area landfill. The only hazardous constituents of No. 5 fuel oil are low levels of polycyclic aromatic hydrocarbon. The high viscosity of No. 5 fuel oil would have prevented significant infiltration prior to removal of the spills.

North Storage Area including North Storage Area Soil Contamination Area. Localized areas of radionuclide-contaminated soil were located in the North Storage Area and north of the North Storage Area fence at the Test Reactor Area. This soil contamination area was removed in the summer of 1995 and 1996 as part of an INEEL-wide cleanup of radioactively contaminated surface soil. Confirmation samples show that removal of this contamination was effective. No further cleanup action is necessary.

Based on these results, a no further action determination is appropriate for OU 2-04.

Hot Waste Tanks (OU 2-05). This operable unit contains two tank sites used for hot waste disposal. Site TRA-16 is an underground hot waste storage tank. The contents of the tank were sampled in April 1993 and found to be an ignitable waste contaminated with low levels of radionuclides, primarily uranium isotopes. The tank contents were removed and the tank was excavated in August 1993. The risk evaluation of the site found no unacceptable risk from exposure through any complete pathway. At the TRA 603/605 tank, there had been no evidence of leaks. It is unlikely that a source of contamination remains at the site. The process water pipe loop is constructed of 0.25-inch stainless steel and is unlikely to have lost sufficient integrity to allow leaking. In addition, any leaks would be collected in a sump within the building where the portion of the loop being used for storage is located. There have been no reports of leaks. It is unlikely that there is a source of contamination at this site. The agencies concurred in 1994 that no further action is necessary for these two tank sites.

Hot Waste Tanks, OU 2-05
- Inactive radioactive-contaminated tank at TRA-614
- TRA-603 Tank

Rubble Sites (OU 2-06). This operable unit comprises three separate rubble piles generated by previous construction activities at the Test Reactor Area. These piles are located outside the existing fenced perimeter and were used intermittently from 1952 through 1971. No source of hazardous waste contamination exists at any of the three sites; therefore, no complete pathways were identified. After a limited investigation, the agencies concurred in October 1993 that no further action is necessary at these three sites. Historical data, including photographs, information from operations personnel, and field screening data obtained during site visits provided the basis for this evaluation.

Rubble Sites, OU 2-06
- Beta Building Rubble Site
- TRA West Rubble Site
- Rubble Site East of West Road near Beta Building Rubble Pile

Cooling Tower Sites (OU 2-07). This operable unit consists of areas surrounding the cooling tower basins and cooling towers associated with the Engineering Test Reactor, the Materials Test Reactor, and the Advanced Test Reactor. The sites were suspected of being contaminated with hexavalent chromium. However, the majority of chromium detected in the soil had been reduced to the less toxic trivalent state and/or is in the elemental state. Risk evaluations conducted for current occupational and future residential scenarios indicated the potential risk for all pathways and all scenarios does not exceed 1 chance in 1,000,000. Based on these results, DOE-ID recommended, and EPA and IDHW concurred that no further action is appropriate.

Cooling Tower Sites, OU 2-07
- TRA-653 chromium-contaminated soil
- Engineering Test Reactor Cooling Tower Basin
- Advanced Test Reactor Cooling Tower Basin
- Materials Test Reactor Cooling Tower Basin

Materials Test Reactor Canal (OU 2-08). For approximately 8 years, the canal, installed in 1952, leaked significant quantities of water contaminated with radionuclides. During an investigation in 1994, historical data (including operating procedures), monitoring data, and information from site personnel were collected and evaluated. Potential contaminants in the subsurface are only available for release to the groundwater pathway, as the base of the canal is 14 to 32 feet below ground level.

Materials Test Reactor Canal, OU 2-08
- Materials Test Reactor Canal in basement of TRA-603

More INEEL Information

General information concerning INEEL's mission and its major programs can be found in INEEL Information Repositories. Visit one of the repositories or call (800) 708-2680 to ask about INEEL activities or request background information.

The following is an abbreviated title list of the primary documents available for public review in the Administrative Record:

- Work Plan for Waste Area Group 2 Operable Unit 2-13 Comprehensive RI/FS: INEL-94/0026, April 1995.
- Post-Record of Decision Monitoring for the Test Reactor Area Perched Water System: INEL-96/0305, August 1995.
- Test Reactor Area Warm Waste Pond Interim Action: Remedial Action Report 02.010.2.1.209.01, June 1994.
- Federal Facility Agreement and Consent Order for INEL: December 1991.
- Decision Statement for the Track 2 Summary Report for Operable Unit 2-11 Test Reactor Area, TRA-03, TRA-04, TRA-05: Administrative Record Document Number 5859, January 1995.
- Scoping Track 2 Summary Report for Operable Unit 2-11 at the Test Reactor Area: EGG-ERD-101518, March 1993.
- Remedial Investigation Report for the Test Reactor Area Perched Water System: EGG-WM-10002, June 1992.
- Declaration for the Warm Waste Pond at the Test Reactor Area: DOE, December 1991.
- Environmental Characterization Report for the Test Reactor Area: Vol. 1 and 2, EGG-WM-9690, August 1991.
- Comprehensive Remedial Investigation/ Feasibility Study for the Test Reactor Area Operable Unit 2-13, DOE/ID-10531, February 1997.

The upper bound estimated cost for continued monitoring of the Snake River Plain Aquifer and Deep Perched Water System is $5.2 million.

The groundwater pathway was qualitatively evaluated using a conservative computer screening model. The results of the modeling indicate the contaminants of concern (cadmium, beryllium, cesium, and cobalt) are relatively immobile based on their respective computed travel times to the underlying aquifer. In addition, the potential for contaminant migration from moisture infiltrations is limited by the fact that the major portion of the canal is located below the Materials Test Reactor building and the portion that extends beyond the building is under pavement. Based on this information, the risk to human health and environment to exposure to contaminants in the canal is considered low. DOE-ID recommended, and EPA and IDHW concurred, that no further action is appropriate for this site.

Sewage Treatment Plant (OU 2-09). Because there is no evidence of a release of a hazardous material, this site was determined to not require further action. However, this facility is scheduled for decontamination and decommissioning beyond the year 2000. Any observed or suspected releases will have to be addressed at that time as part of the 5-year review associated with the OU 2-13 Record of Decision.

Retention Basin, Injection Well, Cold Waste Sampling Pit and Sump (OU 2-11). The warm waste retention basin is a large underground concrete basin. The retention basin received the waste routed to the Warm Waste Pond. It was originally designed to hold radioactive wastewater and all short-lived radionuclides while they decayed. The disposal well, sampling pit, and sump system were used for the disposal of cooling tower effluent water between 1964 and 1982. The site was evaluated in 1992, and it was determined that the well (TRA-05) does not pose an unacceptable risk. Soil contamination was identified surrounding the Warm Waste Retention Basin from releases associated with the basin, piping, and sumps. The results of the OU 2-13 comprehensive baseline risk assessment indicate that the risks associated with the site are within allowable levels. The recommendation from the agencies for these sites is that no further action is appropriate.

Perched Water (OU 2-12). This operable unit comprises the perched water zones underlying the Test Reactor Area. These zones are a result of water from the Cold Waste Pond, Warm Waste Pond, Chemical Waste Pond, and Sewage Leach Pond infiltrating the ground and perching on low permeability layers (i.e., silts and clays) in the underlying basalt. The investigation of the shallow and deep perched water zones was completed in 1992, and a Record of Decision was signed in December 1992, recommending long-term monitoring and evaluation of monitoring results. After three years of post Record of Decision monitoring, chromium and tritium concentrations in two of the Snake River Plain Aquifer monitoring wells remain above drinking water standards. However, insufficient data have been collected to determine the statistical significance of these results. Overall, good agreement between actual and expected concentrations for other contaminants exists on the basis of the three years of study since the OU 2-12 Record of Decision was signed. The Deep Perched Water System wells show that removing the Warm Waste Pond from service has reduced concentrations with time. In general, all monitoring wells show a decreasing contaminant concentration trend with the exception of one well with chromium (USGS-53) and one well with tritium (USGS-58) that show a statistical increase with time. Continued monitoring of the Snake River Plain Aquifer and the perched water below the Test Reactor Area is recommended. Groundwater monitoring performed in compliance with the OU 2-12 Record of Decision will be integrated into the OU 2-13 Comprehensive Record of Decision. The CERCLA 5-year review process will be used to verify that this recommendation remains protective.

New Sites (OU 2-13)

Hot Tree Site. The Hot Tree Site is located in the center of Test Reactor Area. Screening of the branches of a spruce tree indicated it was contaminated with gamma-emitting radionuclides. The tree was removed, boxed, and dispositioned in May 1994. Subsequent to the removal of the tree, 10 shallow soil boring samples were collected for field screening. The samples were collected approximately 2 feet below land surface in the immediate area surrounding the former tree location, and the tree's root system was surveyed. In addition, three surface soil samples were collected and submitted for analysis. The highest radiologically contaminated areas were located west of the Hot Tree Site, suggesting that a nearby abandoned warm waste line was the contamination source. Adjacent trees were surface screened in August 1994. Although not definitive, the surface screening of adjacent trees did not indicate contamination. Surface radiation surveys of the Hot Tree Site indicated a radiation dose rate of 30 to 40 ***microrem***/hr at waist height (i.e., Test Reactor Area background levels). This suggests that the contamination was confined to the Hot Tree Site.

The warm waste line, which is the suspected contamination source, is located approximately 10 feet west and 6 feet below land surface of the removed tree. The waste transferred through this line was low-pressure, demineralized acidic water. The acidic condition of the waste could have contributed to the deterioration of the line, leading to potential releases. The line was cut and capped in 1983, so it is not suspected to be a potential source of continuing releases.

Because only cesium-137 was detected in two 1994 surface soil samples, it is the only contaminant of potential concern. Cesium-137 was reported at 0.62 ***picocurie***/gram and 3.2 picocurie/gram (unvalidated results). Based on the Hot Tree Site, sampling information by Test Reactor Area facility personnel and process knowledge of the warm waste line, only the gamma-emitting radionuclides, cesium-137 and cobalt-60, and the beta-emitting radionuclide strontium-90 were identified as contaminants of potential concern at the Hot Tree Site.

Additional sampling was conducted to better characterize the subsurface contamination profile. The results of this sampling effort were evaluated in the baseline risk assessment. The baseline risk assessment showed that an unacceptable risk does not exist at this site. No further action is recommended for this site.

Engineering Test Reactor Stack. The Engineering Test Reactor Stack is located outside and east of the Test Reactor Area perimeter fence and west of the Warm Waste Pond. The site was suspected to have PCB contamination because tar-containing PCBs were used to coat the inside of the stack, and this tar coating had deteriorated since 1957 when the stack was put in operation and started to leak out the north access door. Because of this process knowledge, no other contaminants of potential concern are associated with this site. In addition, samples collected by the facility indicated low levels of PCBs in the soil immediately adjacent to the concrete pad where the stack was located.

Three soil/concrete samples and one duplicate were collected from the base of the stack. Analysis of the samples indicated that very low levels of PCB contamination are present at this site. The maximum concentration was 2.3 ppm of the Aroclor-1260 PCB in one sample. The Toxic Substances Control Act requires cleanup of PCB-contaminated soils at an industrial site if the PCB concentration is

New Sites, OU 2-13
- Hot Tree Site
- Engineering Test Reactor Stack
- French Drain associated with TRA-653
- Diesel Unloading Pit

microrem - a unit of biological damage produced by ionizing radiation. One microrem is equal to one-millionth of a rem.

picocurie - a unit of measure for radioactivity. One curie corresponds to 37 billion disintegrations per second; one picocurie is one trillionth of a curie.

INEEL Information Repositories

INEEL Technical Library
DOE-ID Public Reading Room
1776 Science Center Drive
Idaho Falls, ID 83415
(208) 526-1185

Marshall Public Library
113 S. Garfield
Pocatello, ID 83204
(208) 232-1263

Shoshone-Bannock Library
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Bannock and Pima Streets
Fort Hall, ID 83202
(208) 238-3882

INEEL Boise Office
805 W. Idaho St., Suite 301
Boise, ID 83703
(208) 334-1056

University of Idaho Library
University of Idaho Campus
Moscow, ID 83843
(208) 885-6344

Select documents will be included in the following locations:

Boise Public Library
715 South Capitol Blvd.
Boise, ID 83702
(208) 384-4076

Twin Falls Public Library
434 2nd Street East
Twin Falls, ID 83301
(208) 733-2964

Idaho Falls Public Library
457 Broadway
Idaho Falls, ID 83402
(208) 526-1450

Public Meeting Locations

Idaho Falls

March 25,1997
Shilo Inn

Boise

March 26,1997
Boise State University
Student Union Building

Moscow

March 26,1997
University Inn

6:30 pm - Availability session with project managers

7 pm - Public meeting begins

Briefings for other communities can be arranged by calling the INEEL's toll-free number at (800) 708-2680.

A court reporter will record public comments received and will prepare a transcript of the public meetings. Transcripts from all three public meetings will be available to the public in the Administrative Record Section (under Operable Unit 2-13) of the INEEL Information Repositories listed on page 33.

25 ppm or higher. Because the maximum concentration detected was 2.3 ppm cleanup is not required. No further action is recommended.

French Drain Associated With TRA-653 (TRA-41). The French Drain is located in the south central portion of Test Reactor Area. The French Drain comprises an 8-inch conduit extending from ground surface to approximately 2 feet below land surface. This French Drain is still in place and operational. Process knowledge indicates volatile organic contaminants and semivolatile organic contaminants are the only contaminants of potential concern. Sampling was conducted at the French Drain in August 1993 during a Site-wide assessment of shallow injection wells. The material sampled was a sludge with a black tar-like appearance. The analytical data indicated that this new site had probably been contaminated by the TRA-653 mechanical shop operations. The wastes suspected are solvents, fuel residues, and oily wastes. The composite sample result was sufficient to characterize the sludge material.

A Test Reactor Area facility maintenance action was completed in 1995 to remove sludge inside the drain. During the maintenance action, approximately two 55-gal drums of material were removed from the drain. Confirmation sampling was conducted following removal of the sludge to verify total contamination removal. The results of the baseline risk assessment indicate that an unacceptable risk is not posed by this site. No further action is recommended.

Diesel Unloading Pit (TRA-42). The diesel unloading pit is located in the northeast corner of Test Reactor Area. The unloading pit for No. 2 diesel consists of a 4-inch. flow line encased in an approximately 3-ft × 3-ft × 8-ft concrete vault. The connection has been used since the late 1950s. Over the years, the unloading operations have resulted in minor releases into the bottom of the pit. When the pit was cleaned, it was discovered that the pit had an unlined soil and sand floor, not a concrete floor, as expected. Any diesel spills may have penetrated the surface soil of the pit surrounding the connection.

No additional field characterization was conducted. A conservative estimate of the volume of diesel that may have been spilled at the site indicates that the volume is insufficient to migrate to groundwater using the computer model. In addition, the computer model indicated that the potential residual concentration of benzene that might be leached into groundwater is insufficient to pose a risk for groundwater consumption. This site was eliminated from further evaluation on the basis that a source of contamination is no longer present. No further action is recommended.

Public Involvement Activities

After you review this plan, you are encouraged to contact representatives of the DOE, INEEL Community Relations Plan office, state of Idaho, or Region 10 of the EPA. You may wish to ask questions, request a briefing, or seek additional background information regarding this proposed plan. Public meetings will be held at the locations listed in the margin at left.

From 6:30 to 7 p.m., representatives from the agencies will be available to informally discuss any concerns and issues related to this proposed plan before the meeting begins. At 7 p.m., there will be a presentation by the agencies, followed by a question and answer session and an opportunity to provide written and/or verbal comments.

Comments continued. Attach additional pages if necessary.

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What's Your Opinion?

The agencies want and need to hear from you to effectively decide what action to take at the Test Reactor Area.*

Comments: ______________________________

(Continued on reverse)

* *If you want a copy of the Record of Decision and Responsiveness Summary, make sure your mailing label shown below is correct.*

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