Proposed Plan for Sitewide Groundwater, Miscellaneous Sites, and Process for Future Sites, Operable Unit 10-08

U.S. Department of Energy
U.S. Environmental Protection Agency
Idaho Department of Environmental Quality

Idaho Cleanup Project at the Department of Energy Idaho National Laboratory — September 2008

Public Comment Period
September 16 – October 15, 2008

Public Meetings

September 29 – 6 to 8 p.m.
Shilo Inn
Idaho Falls

September 30 – 6 to 8 p.m.
Taylor Student Union Building
College of Southern Idaho
Twin Falls

How You Can Participate:

Read this Proposed Plan and review related documents in the Administrative Record.

Call the State of Idaho, EPA, or DOE to get more information.

Attend a public meeting to learn more, ask questions, and tell us what you think.

Comment on this Proposed Plan by using the postage-paid comment form on the back cover.

See page 22 for more information about public involvement and contact information.

Inside this Plan

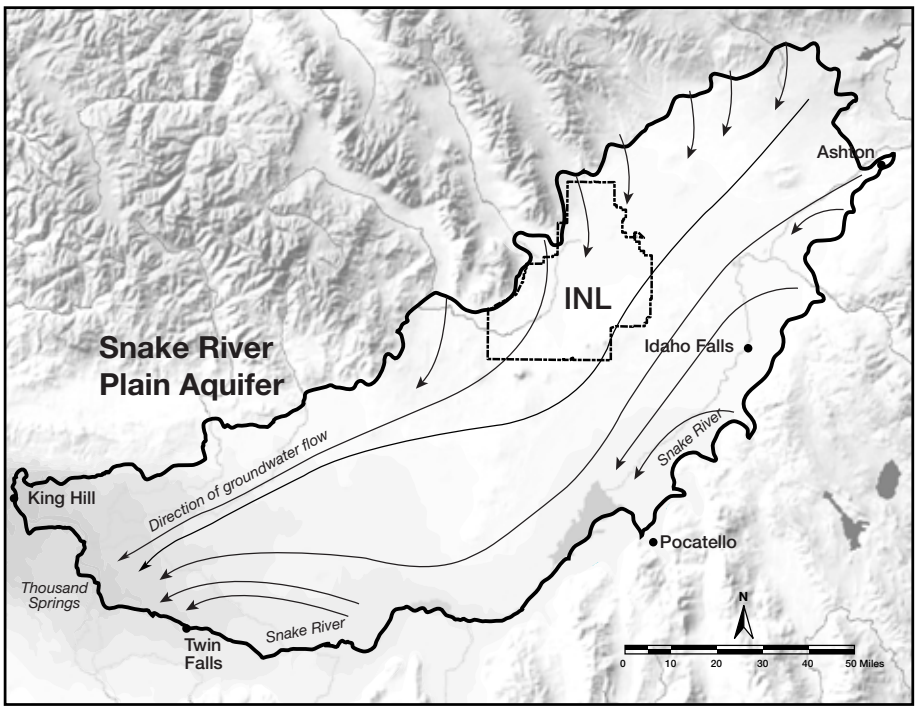

Figure 1. Snake River Plain Aquifer and the Idaho National Laboratory.

INTRODUCTION

The U.S. Department of Energy (DOE) has completed its investigation of Operable Unit (OU) 10-08 Sitewide groundwater and miscellaneous sites at the Idaho National Laboratory Site (INL) in southeastern Idaho (see Figure 1). OU 10-08 in Waste Area Group (WAG) 10 was created to address Snake River Plain Aquifer concerns not covered by other WAGs. Because each individual WAG has addressed the groundwater concerns from its facilities, OU 10-08 addresses the potential for commingling of groundwater plumes from two or more WAGs and the cumulative effects on human health and the environment.

The current risks from INL plumes are at acceptable levels at the boundary of the INL for unrestricted land use. The maximum groundwater contaminant concentrations, which are near INL facilities, are expected to decrease over time to acceptable levels. To ensure contaminants at the boundary remain at acceptable levels, groundwater monitoring will be performed. The OU 10-08 investigation also concluded that, by the time residents could potentially begin living on the INL (the year 2095), groundwater plumes will not commingle either on or off the INL at concentrations that would pose a threat to human health and the environment.

OU 10-08 also consists of 83 miscellaneous sites. None of the 83 miscellaneous sites poses a threat to groundwater. However, some of the sites pose an unacceptable risk or hazard through surface pathways. The miscellaneous sites are divided into

*NOTE: When technical or administrative terms are first used, they are printed in **bold italics** and explained in the margin. Referenced documents are listed at the end of this Proposed Plan.*

indicates additional information.

remedial investigation/baseline risk assessment (RI/BRA)
A study that identifies which contaminants are present in an area and assesses the risk they pose to human health and the environment if no remedial action is taken and if no workers are protected.

feasibility study (FS)
An engineering study using CERCLA methods to screen remedial technologies and develop, evaluate, and compare remedial options.

Agencies (DOE, EPA, and DEQ)
DOE is responsible for the cleanup actions for the ICP. EPA and DEQ are support agencies and are responsible for regulatory oversight. The Agencies (DOE, EPA, and DEQ) are issuing this Proposed Plan as part of their public participation responsibilities under Section 300.430(f)(2) of the National Contingency Plan (NCP)[3] and § 117(a) of CERCLA for responding to releases and threatened releases of hazardous substances, pollutants, or contaminants.

Administrative Record (AR)
The collection of information, including reports, public comments, and correspondence, used by the Agencies to select a cleanup action. A list of locations where the Administrative Record is available appears on page 20.

For the OU 10-08 contaminants, the EPA standards for drinking water are numerically the same as the Idaho groundwater quality standards. The Idaho standards will be referred to in this plan.

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

five groups according to proposed remedy. This Proposed Plan also includes a process for addressing sites that may be identified in the future.

This plan summarizes the results of the ***Remedial Investigation/Baseline Risk Assessment***[1] ***and Feasibility Study***[2] that investigated groundwater and miscellaneous sites. This plan describes the contamination that requires cleanup, explains the set of alternatives for remedial action that has been developed, and evaluates how well each alternative would perform. Preferred alternatives are identified and the reasons for the preferences are explained. The information contained in this plan is provided so that the public can review and comment on the proposed monitoring of Sitewide groundwater and actions to address miscellaneous sites. This document is issued to facilitate public involvement in the remedy selection process.

Three government agencies are involved in cleanup activities at the INL. DOE is the lead agency responsible for cleanup activities. The U.S. Environmental Protection Agency (EPA) and the State of Idaho Department of Environmental Quality (DEQ) provide regulatory oversight. Together, the three are referred to as the ***Agencies***.

EPA and DEQ concur with the preferred alternatives identified by DOE and presented in this plan. This Proposed Plan is based on information presented in the Remedial Investigation/Baseline Risk Assessment[1] and Feasibility Study.[2] These and other documents used by the Agencies to reach this recommendation are contained in the ***Administrative Record***. The Agencies encourage the public to review these documents for a more comprehensive understanding of the INL and the ***Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)*** activities that have been conducted at the INL.

The Agencies will select a final remedy for Sitewide groundwater and miscellaneous sites after reviewing and considering all information submitted during the 30-day public comment period for this Proposed Plan (September 16, 2008, through October 15, 2008). Comments may be submitted as described on page 22. In selecting the final remedy, the Agencies may modify the preferred alternatives presented in this Proposed Plan based on public comments or new information that becomes available after this plan is released. The public is encouraged to review and comment on the alternatives presented in this Proposed Plan. Public comments and the Agencies' responses will be published in the Responsiveness Summary section of the ***Record of Decision,*** which is scheduled for completion in 2009.

SCOPE AND ROLE OF THE ACTION

The Sitewide groundwater and miscellaneous sites remedial action is part of the Idaho Cleanup Project (ICP) at the INL. In 1989, the INL was placed on the ***National Priorities List*** (National Contingency Plan,[3] Appendix B) of hazardous waste sites. In 1991, the Agencies signed a ***Federal Facility Agreement and Consent Order (FFA/CO)***[4] outlining the remedial decision-making process and schedule for the INL. Under the terms of the FFA/CO, DOE will carry out the cleanup and pay for costs associated with it.

The FFA/CO divided the INL Site into 10 WAGs to facilitate environmental remediation efforts. WAGs 1 through 9 generally correspond to facilities.

As identified in the FFA/CO, the boundary of WAG 10 is the INL boundary or beyond, as necessary to encompass real or potential impacts from INL Site activities. A comprehensive Remedial Investigation/Feasibility Study for WAG 10 was already

completed (OU 10-04), which addressed Sitewide ecological risks, miscellaneous sites, and Shoshone-Bannock tribal perspective on risk assessment.[5] The Agencies deferred completion of the Sitewide groundwater investigation until each of the nine other WAGs had completed their groundwater investigations. The Agencies created OU 10-08 to address potential commingling of groundwater plumes from two or more WAGs and additional ***miscellaneous sites***.

The miscellaneous sites in this Proposed Plan were discovered after the other WAGs completed their investigations or were transferred by the Agencies from other WAGs. OU 10-08 is intended to be the last remedial investigation/feasibility study under CERCLA at the INL. As such, this Proposed Plan includes a process for addressing CERCLA sites that may be identified in the future, except those associated with the Naval Reactors Facility (WAG 8), which is not under the jurisdiction of the DOE Idaho Operations Office. There are no WAG 8 sites in OU 10-08.

The final actions for Sitewide groundwater and miscellaneous sites that the Agencies select for OU 10-08 will (a) prevent current and future exposure of workers, the public, and the environment to contamination at miscellaneous sites and (b) monitor groundwater to ensure that there will be no adverse effects to humans or the environment. The remedial actions described in this plan meet the requirements of CERCLA and the National Contingency Plan.

GROUNDWATER

The Agencies are proposing no action with monitoring for Sitewide groundwater.

Background

The INL region is classified as arid to semiarid because of its low average rainfall of 8.7 in./year. The Big Lost River, which flows intermittently depending on weather and the amount of water diverted for irrigation, traverses the western part of the INL.

The relatively dry region between the land surface and the aquifer, referred to as the vadose zone, consists of surface sediments underlain by thick sequences of ***basalt*** flows separated by thinner discontinuous layers of sediment called ***interbeds***. The vadose zone and its interbeds are important features because they tend to filter contaminants and inhibit transport to the underlying aquifer.

The Snake River Plain Aquifer lies below the vadose zone and generally flows in a southwesterly direction. Like the vadose zone, the aquifer also consists of a series of basalt layers and sediment. Regionally, the aquifer is bounded on the north and south by the edge of the Snake River Plain, on the west by the Snake River, and on the northeast by the Yellowstone basin. Depth to the aquifer ranges from approximately 225 ft in the northern INL to over 625 ft along the southwestern boundary of the INL.

Groundwater quality data have been collected from the INL for over 50 years—the U.S. Geological Survey drilled the first wells in 1949. An extensive groundwater monitoring program is in place at the INL, which includes independent monitoring by the U.S. Geological Survey, the State of Idaho, and the Shoshone-Bannock tribes. Monitoring wells are located throughout the INL and along the southern INL boundary.

Record of Decision (ROD)
A legally binding public document that identifies the remedy that will be used at a group of sites and why. The Responsiveness Summary in the ROD contains the public comments received on the proposed actions and the Agencies' responses.

National Priorities List (NPL)
The formal list of the nation's hazardous waste sites that have been identified for possible remediation (cleanup). Sites are included on the list because of their potential risk to human health and the environment. This list can be found in 40 CFR 300,[3] Appendix B.

Federal Facility Agreement and Consent Order (FFA/CO)
An agreement among the DOE, EPA, and State of Idaho to evaluate potentially contaminated sites at the INL, determine if remediation is warranted, and select and perform remediation, if necessary.

miscellaneous sites
OU 10-08 includes potentially contaminated soil, debris, buried pipelines, ponds, shallow wells, and ditches. These sites pose no threat to the aquifer.


In 1949, the U.S. Atomic Energy Commission established the National Reactor Testing Station on the INL. The National Reactor Testing Station was renamed three times: as the Idaho National Engineering Laboratory in 1974, as the Idaho National Engineering and Environmental Laboratory in 1997, and as the INL in 2005. DOE established the Idaho Cleanup Project in 2005.

basalt
Rock that originated as lava extruded onto the earth's surface from a volcanic fissure or vent. Over time, basalt flows may become buried by sediments and subsequent flows.

interbeds
Layers of sediment (silt, clay, sand, and/or gravel) lying between layers of basalt in the subsurface. At the INL, these layers tend to be thinner than the surrounding basalt. Interbeds tend to retard downward water and contaminant transport to the aquifer and are important features in assessing water migration.

Figure 2 shows the distribution of contaminant plumes on the INL that exceeded Idaho groundwater quality standards in 2006. They are:

- **Test Area North (TAN)/WAG 1—**Contaminants currently exceeding the Idaho groundwater quality standards are trichloroethylene, tetrachloroethylene, dichloroethylene, cesium-137, and strontium-90. In situ bioremediation and previous source control actions have been implemented to address groundwater contamination. Groundwater is expected to be restored to Idaho groundwater quality standards before 2095.[a]
- **Reactor Technology Complex (RTC)/WAG 2—**The contaminant currently exceeding the Idaho groundwater quality standard is chromium. Other contaminants include tritium. Groundwater is expected to be restored to Idaho groundwater quality standards by approximately 2012 through previous source control actions.[a]
- **Idaho Nuclear Technology and Engineering Center (INTEC)/WAG 3—**Contaminants currently exceeding the Idaho groundwater quality standard are strontium-90, technetium-99, and nitrate. Other contaminants include tritium and iodine-129. The Snake River Plain Aquifer is expected to be restored to Idaho groundwater quality standards before 2095 by capping and infiltration control.[a]
- **Central Facilities Area (CFA)/WAG 4—**The contaminant currently exceeding the Idaho groundwater quality standard is nitrate. Other contaminants include tritium. Groundwater is expected to be restored to Idaho groundwater quality standards before 2095 through previous source control actions.[a]
- R**adioactive Waste Management Complex (RWMC)/WAG 7—**The contaminant currently exceeding the Idaho groundwater quality standard is carbon tetrachloride. Other contaminants include trichloroethylene and tetrachloroethylene. A remedy to extract and treat organic vapors from the vadose zone has been in operation under OU 7-08 since January 1996. The Agencies are currently addressing public comments received on the Proposed Plan for the RWMC[6] (OU 7-13/14) and preparing a Record of Decision.[a]

Groundwater at the INL boundary currently meets the Idaho groundwater quality standards, and concentrations are well below the standards. Two of the monitoring wells located at the boundary, USGS-105 and USGS-109, are of key interest to OU 10-08 because they are located downgradient of the contaminant plumes (see Figure 2). Contaminants detected in these wells are shown on Table 1 along with the corresponding Idaho groundwater quality standard. The maximum average concentration measured at the boundary during 2005 and 2006 ranged from 12 times lower than the Idaho standard (nitrate/nitrite as nitrogen) to 50,000 times lower (for chlorine-36). For example, the Idaho groundwater quality standard for iodine-129 is 1 ***picocurie*** per liter (pCi/L) and the concentration at the boundary was 0.0027 and 0.0004 pCi/L. Other contaminants, such as tritium, strontium-90, and technetium-99, were not detected.

picocurie (pCi)
One trillionth of a curie. A curie is a unit used to describe the intensity of radioactivity in a sample of material. It is equal to 37 billion atoms disintegrating per second, which is the radioactivity of a gram of radium.

a. Appendix D of the RI/BRA[1] references the decision documents for each WAG where details on the cleanup actions can be found.

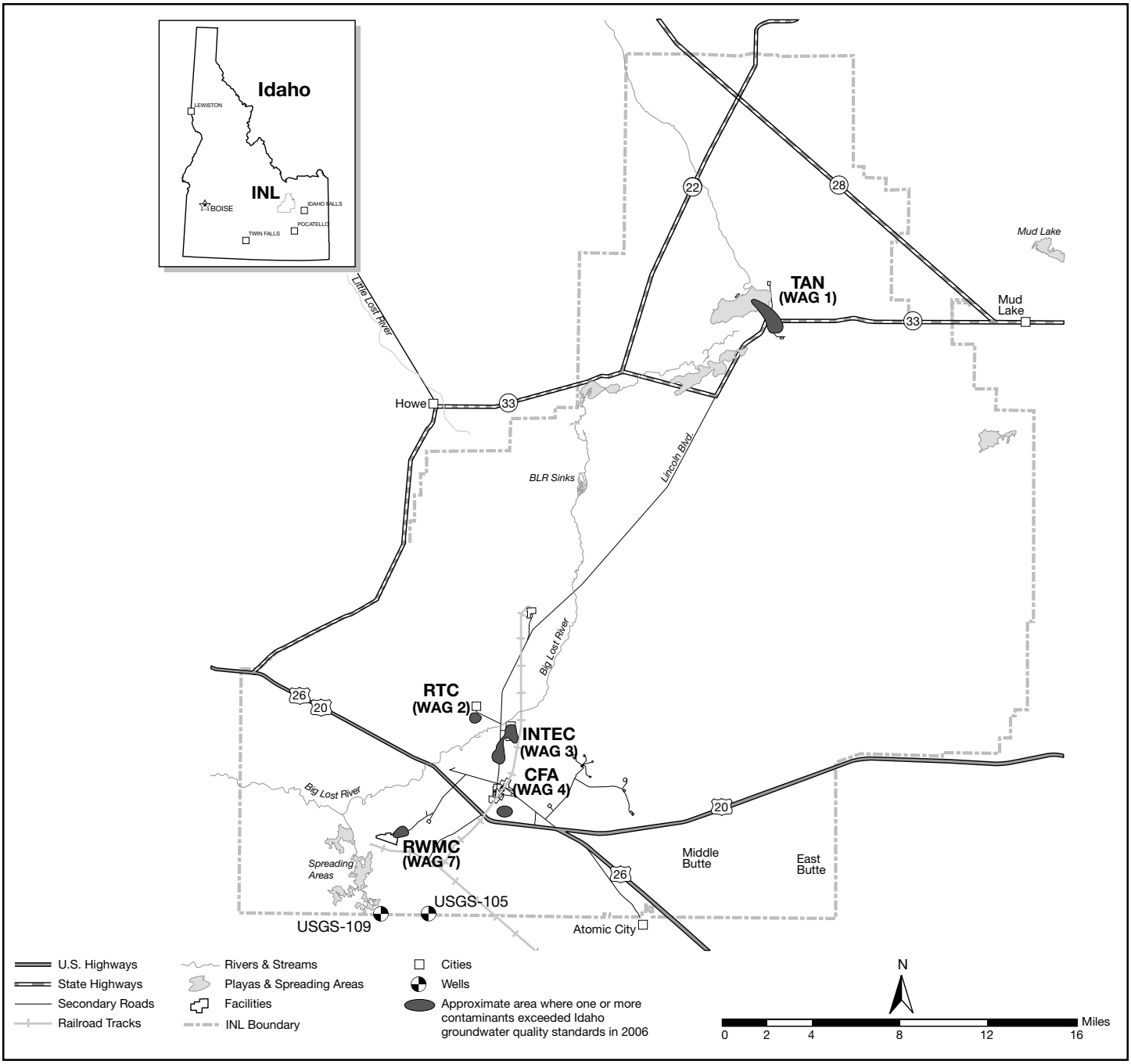

Figure 2. Map showing INL location within Idaho and extent of contaminated groundwater at the INL that exceeded Idaho groundwater quality standards in 2006.

Table 1. Average detectable contaminant concentration at southern INL boundary from 2005 and 2006.

Contaminant	Unit	Idaho Groundwater Quality Standard [a]	Southern INL Boundary Well	
			USGS-105	USGS-109
Chlorine-36	pCi/L	2,000	0.0394 [b]	0.01654 [b]
Iodine-129	pCi/L	1	0.0027 [b]	0.0004 [b]
Nitrate/nitrite as nitrogen	mg/L	10	0.8	0.8
Carbon tetrachloride	µg/L	5	ND [c]	0.15

a. Idaho groundwater quality standard or derived equivalent.

b. Nonstandard analytical methods used to achieve ultra-low-level detection limits.

c. ND = not detected.

unacceptable exposures
The CERCLA process assesses the increased risk of developing an additional cancer (called ***excess cancer risk***) in a person's lifetime from exposure to contamination. If the risk is greater than 1 in 10,000, the Agencies consider the risk unacceptable.

The INL is expected to remain under government management and control until at least 2095. After that time, the federal government is obligated to continue to manage and control areas that pose a significant health and/or safety risk to the public and workers until risk diminishes to an acceptable level. Portions of the INL will always be under government management and control (for example, RWMC). For many WAGs, the 100 years of federal control was established in 1995.

commingle
In the Snake River Plain Aquifer, any mixing of contaminant plumes from two or more WAGs that each exceed one-tenth the Idaho groundwater quality standard.

rancher
A rancher is defined here as someone who has grown all food and obtained all water from the ranch. The risk assessment covers the first 30 years of life, which includes childhood because children are more sensitive to contaminants than adults.

conservative
Tends to overestimate risk.

excess cancer risk
The increased risk (above the normal rate) of developing cancer resulting from exposure to contaminants at a release site based on EPA guidelines. This does not include the average risk of developing cancer in a lifetime (approximately 4 in 10 people) from other factors such as genetics, lifestyle, or sunlight.

radionuclides
An unstable atom that emits excess energy (that is, decays) in the form of radioactivity (that is, rays or particles). Depending on the type and amount of decay, prolonged exposure may be harmful.

nonradionuclides
Contaminants that do not undergo nuclear decay, such as carbon tetrachloride and nitrate.

Summary of Groundwater Risks

A risk assessment evaluates risk to human health and the environment to determine whether ***unacceptable exposures*** could occur now and in the future. The Agencies assume that DOE will maintain control of the INL until at least 2095 and that no resident will live on the INL until that time. Residential land use on the INL is assumed to begin in 2095. OU 10-08 evaluated whether plumes from different INL WAGs could ***commingle*** and whether this would cause an unacceptable cumulative effect.

Although no residents currently live along the southern INL boundary, the Agencies evaluated current risk to a hypothetical ***rancher*** and ecological receptors from using groundwater at the boundary. Concentration data and trends were used to determine where plumes could potentially commingle along the southern boundary. Current risk was assessed using data from groundwater monitoring wells USGS-105 and USGS-109.

The risk assessment assumed a hypothetical rancher is born and raised on the ranch and uses groundwater for domestic purposes (drinking and bathing), irrigating crops and home-grown produce, and raising cattle and other livestock. Both the measured concentration in the groundwater and calculated concentrations in the soil (based on 30 years of irrigation) were considered in the risk assessment. The risk assessment includes the exposure to contaminants that would occur during the rancher's childhood because children are more sensitive to contaminants than adults. Thus, the rancher scenario is more ***conservative*** because it results in greater exposures to food products grown on the INL and to water than would be expected during typical residential exposures.

The risk assessment determined that the concentrations of contaminants in the wells at the southern INL boundary are within acceptable levels for human and ecological receptors. Table 2 shows that, currently, the highest potential ***excess cancer risk*** from ***radionuclides*** is calculated to be 5 in 100,000,000. This risk is calculated for a hypothetical rancher living on the INL southern boundary. The risk is acceptable because it is lower risk than the acceptable range defined by EPA (1 in 10,000 to 1 in 1,000,000). The Agencies have historically used an excess cancer risk greater than 1 in 10,000 as the threshold for cleanup at the INL. Table 2 shows that the risk from ***nonradionuclides*** is also acceptable. The highest potential risk currently from nonradionuclides is calculated to be 8 in 10,000,000. Some contaminants can potentially cause health effects other than cancer, such as those that affect the nervous system. The threshold value for cumulative toxic effects from noncarcinogens is a ***hazard index*** of 1. As shown on Table 2, the hazard index from nonradionuclides is 0.009, which is acceptable.

Table 2. Estimated current risk and hazard index to hypothetical subsistence rancher from using groundwater at the INL southern boundary.

Contaminant Type	Risk	Hazard Index
Radionuclides	5 in 100,000,000 (5×10^{-8})	Not applicable
Nonradionuclides	8 in 10,000,000 (8×10^{-7})	0.009

Ecological risk was assessed assuming wildlife (animals and birds) consume irrigated produce and drink from water in troughs provided for livestock. All of the concentrations of contaminants were below EPA screening levels.[1] Thus, consuming

produce or drinking water does not present an unacceptable risk to wildlife.

In addition to evaluating current risk, OU 10-08 also evaluated whether plumes from INL WAGs would commingle in the future and whether this would cause an unacceptable cumulative effect. Because individual WAGs have actions in place to protect groundwater or are responsible for restoring groundwater within 100 years and controlling sources, the contaminants that could potentially commingle will decrease in peak concentration during this time period. A regional computer model was developed to predict whether plumes would commingle in 2095; the model predicts that the plumes will not commingle either on or off INL at concentrations that would pose a threat to human health and the environment. Overall, contaminant concentrations at the INL boundary are predicted to decrease in the future. Therefore, no future risk calculation was required.

info

Probability	Exponential Notation	Scientific Notation	Decimal Notation
1 in 1 (certain)	1E+00	1×10^{0}	1
1 in 10	1E-01	1×10^{-1}	0.1
1 in 100	1E-02	1×10^{-2}	0.01
1 in 1,000	1E-03	1×10^{-3}	0.001
1 in 10,000	1E-04	1×10^{-4}	0.0001
1 in 100,000	1E-05	1×10^{-5}	0.00001
1 in 1,000,000	1E-06	1×10^{-6}	0.000001
1 in 10,000,000	1E-07	1×10^{-7}	0.0000001

Proposed Action – No Action with Sitewide Groundwater Monitoring

As explained above, no additional action is required for groundwater. However, DOE will continue to monitor Sitewide groundwater to ensure—as supported by monitoring data and predicted by modeling—that there is no threat to human health or the environment off-INL. Groundwater monitoring will ensure continued protection of off-INL residents and the environment.

Table 3 shows the monitoring costs to ensure that there is no unacceptable cumulative risk to humans or the environment from exposure to commingled groundwater from two or more WAGs. Costs are calculated in terms of Fiscal Year 2008 dollars and ***net present value,*** within an estimated accuracy of +50% to -30%. Costs are broken out as capital and operations and maintenance (O&M) costs. ***Capital costs*** for this proposed action are for preparing groundwater monitoring plans and for project management. ***O&M costs*** cover the labor and maintenance required for monitoring, sampling, and analysis. Periodic costs, which include reporting, are contained in the O&M costs shown in Table 3. Costs were calculated until 2095. Total groundwater monitoring costs until 2095 are $4.41M in Fiscal Year 2008 dollars and $1.9M in net present value. More details on costs for groundwater monitoring can be found in Roseland (2008).[7]

Table 3. Groundwater monitoring costs.

Description of Cost	Cost
Capital cost	$0.07M
O&M cost	$4.34M
Total project cost in Fiscal Year 2008 dollars	**$4.41M**
Total project cost in net present value	**$1.9M**

hazard index
An indicator of potential noncarcinogenic consequences in humans (for example, damage to organs) caused by exposure to contaminants. The hazard index is a sum of contributions from multiple contaminants. The threshold value for toxic effects is a hazard index of 1 or more.

net present value
Net present value compares the value of a dollar today versus the value of that same dollar in the future after taking return and inflation into account.

capital costs
Costs to design, construct, perform, and operate short-term remedial actions.

O&M costs
Costs for long-term remedial action operations and maintenance and institutional controls. Includes periodic (recurring) costs, such as 5-year reviews required under CERCLA.

MISCELLANEOUS SITES

The 83 miscellaneous sites are divided into Groups 1 through 5 according to proposed remedy. The following sections address each group.

GROUP 1 – EXCAVATION, TREATMENT, AND DISPOSAL SITES

All potential release sites are assigned a number to aid in tracking information about each site (for example, CFA-54). The CFA prefix indicates that the site is located at the Central Facilities Area.

The Agencies are proposing excavation, treatment, and disposal for two of the 83 sites to reduce risk to acceptable levels. The two sites in Group 1 are CFA-54 and TRA-74.

Background and Risk

None of the surface sites, including CFA-54 and TRA-74, pose a threat to groundwater. The risks to future residents and ecological receptors from exposure to the top 10 ft of soil were assessed for sites requiring a baseline risk assessment. The Agencies assume that these sites could be released for residential use in 2095. The reason 10 ft is used is because this is the depth that a resident might dig a basement. Assessing future residential use is more conservative than assessing industrial use.

The baseline risk assessment concluded that two sites—CFA-54 and TRA-74—would pose an unacceptable risk to future residents and ecological receptors through surface pathways. These sites and results of the risk assessments are described below:

- **CFA-54, 6-in. Clay Pipe—**This site consists of an abandoned pipe and surrounding contaminated soil approximately 4 to 5 ft below ground at the Central Facilities Area. The pipe led from the former Chemical Engineering Laboratory, which was in use from 1953 to 1965, to the CFA-04 pond. Mercury in soil and residual material in the pipe pose unacceptable hazards to future residents and ecological receptors. As shown on Table 4, the human health hazard index is 24, primarily from ingestion of soil and homegrown produce. The hazard was also unacceptable to plants, birds, and wild animals. As shown on Table 5, the maximum ***ecological hazard quotient*** is 400.
- **TRA-74, Overhead Water Tank Soil Contamination—**Soil under the overhead water tank (see Figure 3) at the Reactor Technology Complex (formerly called Test Reactor Area [TRA]) was contaminated in 1984, when the tank was sandblasted prior to repainting. Paint chips containing lead and arsenic fell to the ground. The contaminated soil is covered with a temporary synthetic liner and 1 to 2 in. of soil and gravel to stabilize the area and prevent migration of contaminants. Lead concentrations in the soil exceed the EPA residential screening level of 400 mg/kg. Arsenic poses an unacceptable risk of 30 in 10,000 and an unacceptable hazard index of 4 for humans, primarily from ingestion of soil (see Table 4). The maximum ecological hazard quotient is 20 from arsenic, which exceeds acceptable levels (see Table 5).

ecological hazard quotient
A measure of adverse effects to plants and animals.

Unacceptable exposures for flora and fauna are those that would result in a long-term decrease in the size of local populations and communities from which they could not recover.

Remedial Action Objectives

Remedial action objectives describe what site cleanup must accomplish. None of the miscellaneous sites pose a threat to groundwater. Remedial action objectives for OU 10-08 are:

- Limit total human health excess cancer risk to 1 in 10,000 for workers and future residents
- Limit noncancer effects to a hazard index of less than 1 for workers and future residents
- Limit unacceptable exposure to populations of flora and fauna or to individual fauna listed as threatened and/or endangered.

Table 4. Human health risks for sites that exceed acceptable levels.[a]

Site	Human Health Risk Residential Scenario (future)		
	Contaminant of Concern	Excess Cancer Risk	Hazard Index
CFA-54	Mercury	9 in 100,000 (9×10^{-5})	24
TRA-74	Arsenic and lead [b]	30 in 10,000 (3×10^{-3})	4

a. Data from RI/BRA,[1] Section 5 and Appendix C.

b. Arsenic and lead are human health contaminants of concern at TRA-74. There is no toxicity information available for lead; thus, health risk levels for lead could not be calculated. Lead concentrations exceed the EPA residential screening level for lead (400 mg/kg), which was used to determine that lead occurs at unacceptable levels.

Note: Shaded numbers indicate risks that exceed acceptable levels.

Table 5. Ecological risk assessment results for sites that exceed acceptable levels.[a]

Site	Ecological Risks	
	Contaminant of Concern	Maximum Hazard Quotient
CFA-54	Mercury	400
TRA-74	Arsenic	20

a. Data from RI/BRA,[1] Section 5 and Appendix C.

Note: Shaded numbers indicate hazard quotients that exceed acceptable levels.

Preliminary remediation goals are measurable quantities used to demonstrate that remedial action objectives are satisfied. A 1-in-10,000 excess cancer risk or a hazard index of 1, whichever is more restrictive, to hypothetical future residents at the end of the institutional control period in 2095 is the primary basis for determining preliminary remediation goals for soil. The preliminary remediation goals to address ecological risks are based on soil concentrations associated with a hazard quotient that is protective of populations of ecological receptors. For contaminants with both human health and ecological preliminary remediation goals, the more protective value is used. Table 6 lists preliminary remediation goals for the two sites that pose unacceptable risk. More information on preliminary remediation goals can be found in Section 2 of the OU 10-08 Feasibility Study.[2]

Table 6. Preliminary remediation goals.

Site	Contaminant of Concern	Preliminary Remediation Goal (mg/kg)		Detected Concentrations (mg/kg)	
		Human Health	Ecological	Minimum	Maximum
CFA-54	Mercury	9.4	8.4	0.042	508
TRA-74	Arsenic	22	18	3.8	350
	Lead	400	400	7.0	5,750

Note: Shaded numbers denote the preliminary remediation goal for the given contaminant (i.e., the lower and more protective goal).

Figure 3. Photograph of site TRA-74 with overhead water tank.

preliminary remediation goals
A measurable level of contamination that is safe for human health and the environment. Preliminary remediation goals are established during the Feasibility Study[2] based on scientific information and are used as a target. Alternatives are developed and evaluated based on how well they meet the goals. Final remediation goals are set in the ROD.

CERCLA Evaluation Criteria

Threshold Criteria

✔ ***Overall protection of human health and the environment***
Does the alternative protect human health and the environment in both the short and the long term by eliminating, reducing, or controlling the risk?

✔ ***Compliance with applicable or relevant and appropriate requirements (ARARs)***
Does the alternative comply with environmental laws?

Balancing Criteria

✔ ***Long-term effectiveness and permanence***
How certain is it that the alternative will be successful? Once cleanup goals have been met, will protection be maintained? What risks do the untreated waste or post-treatment residuals pose? How adequate or reliable are the controls, such as institutional controls, used to manage treatment residuals and untreated wastes?

✔ ***Reduction of toxicity, mobility, or volume through treatment***
How much of the contamination will be treated? What will treatment accomplish? Is the treatment permanent? How much and what type of residuals will remain after treatment?

✔ ***Short-term effectiveness***
Does the alternative pose any risks to the community, workers, or the environment during implementation? How soon will protection be achieved?

✔ ***Implementability***
Is the proposed technology feasible and reliable? Can its effectiveness be monitored? Are the necessary materials, equipment, specialists, and services available?

✔ ***Cost***
What are the estimates for capital costs and for operations and maintenance costs? Are the costs in proportion to the overall effectiveness of the alternative?

Modifying Criteria

✔ ***State acceptance***
Does the state concur with the preferred alternative?

✔ ***Community acceptance***
Which aspects of the alternatives does the public support or oppose?

CERCLA Evaluation Process

Under CERCLA, the Agencies assess the ability of remedial alternatives to meet remedial action objectives. The Agencies apply criteria defined by CERCLA to evaluate alternatives and consider relative trade-offs among alternatives when identifying their preferred alternative. During evaluation, each alternative is first assessed individually against the CERCLA criteria. A comparative analysis then assesses overall performance of each alternative relative to the others.

The first two evaluation criteria are threshold criteria: (1) overall protection of human health and the environment and (2) compliance with ***applicable or relevant and appropriate requirements*** (ARARs). An alternative must meet the threshold criteria or it cannot be selected. The next five criteria are balancing criteria used to weigh major trade-offs among alternatives. These criteria are (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility, and volume through treatment; (3) short-term effectiveness; (4) implementability; and (5) cost. Each alternative is ranked in terms of how well it satisfies these criteria (high, medium, or low). The final two criteria are modifying criteria that factor in state and community acceptance.

Description of Alternatives

The Feasibility Study formulates alternatives that will meet remedial action objectives and evaluates them in detail. Section 3 of the Feasibility Study[2] developed three complete alternatives for these two sites. The three complete alternatives are: (1) ***no action*** (with monitoring), (2) limited action (that is, no further action with institutional controls), and (3) removal and disposal.

Alternative 1 – No Action Alternative

Alternative 1 consists of environmental monitoring with no remediation. This alternative includes sampling and analysis of surface soil and biota for each site until 2095.

Alternative 2 – No Further Action with Institutional Controls

The ***no further action with institutional controls*** alternative consists of ***institutional controls***. Activities include monitoring, institutional controls to restrict land use and manage access to contaminated media by using fences and signs, site surveillance and maintenance, control of activities, and 5-year reviews. Enforcing institutional controls and maintaining signs and fences (for example, repair and periodic replacement) until 2095 are the major differences between Alternatives 1 and 2 as evaluated in the Feasibility Study. Monitoring costs are the same.

Alternative 3 – Removal and Disposal with Treatment - Preferred Alternative ☑

Alternative 3 consists of removal and disposal with treatment. Alternative 3 evaluates removal, treatment by ex situ grouting to satisfy ARARs or Waste Acceptance Criteria, and disposal of debris and soil. For purposes of cost estimating, it was assumed that the waste will be treated and disposed off-INL at a treatment, storage, and disposal facility.

Evaluation of Alternatives

The alternatives for Group 1 sites were evaluated against the CERCLA criteria:

- **Overall protection of human health and the environment and compliance with ARARs—**Alternatives 2 and 3 meet threshold criteria (provide overall protection of human health and the environment and comply with ARARs). Alternative 1 (no action) does not satisfy these criteria for CFA-54 and TRA-74 and is not a viable option. However, Alternative 1 will be included under balancing criteria for comparative purposes.

- **Long-term effectiveness and permanence—**Alternative 3 ranks highest for long-term effectiveness and permanence because all contaminated media would be removed from the two sites and land use would be unrestricted. Alternative 2 would rely on long-term management. Access restrictions for Alternative 2 would protect humans from residual contamination but would be less effective in protecting ecological receptors. Alternative 1 would not reduce long-term risk for CFA-54 and TRA-74. In terms of adequacy and reliability of controls, Alternative 3 would rank highest because long-term controls would not be required. Alternative 2 would be least reliable, requiring long-term maintenance, monitoring, and institutional controls.
- **Reduction of toxicity, mobility, and volume through treatment—**Only Alternative 3 involves treatment by ex situ grouting for sites CFA-54 and TRA-74 and is ranked higher than the other alternatives on this criterion. Ex situ grouting would be applied to stabilize soil contaminated with mercury, lead, or arsenic.
- **Short-term effectiveness—**Alternative 1 (no action) was ranked the highest with respect to this criterion. Soil contamination would be left undisturbed. Alternative 2 would pose a slightly higher short-term risk because the construction phase would be limited to installing fences and signs. Contaminated media would not be disturbed. Alternative 3 would pose the most short-term risk. However, risk incurred during construction would be of short duration and could be readily managed.
- **Implementability—**All alternatives are easily implemented from a technical perspective. Administrative implementability is greatest for Alternative 3. Because all contaminated media would be removed, long-term management would not be required. Administrative burden would be incurred for Alternative 2 to manage long-term surveillance, maintenance, monitoring, and institutional controls.
- **Cost—**Table 7 includes the cost of Alternatives 1 through 3 for the duration of the remedy. More details on costs for Alternatives 1 through 3 can be found in Appendix B of the Feasibility Study[2] and costs for the preferred alternative can be found in Roseland (2008).[7] The total costs for the alternatives range from $0.9M to $2.49M in Fiscal Year 2008 dollars and from $0.3M to $2.2M in net present value.

Preferred Alternative

Alternative 3 is preferred because it is the only alternative that encompasses the National Contingency Plan's preference for treatment to reduce mobility and toxicity. It ranks highest in long-term effectiveness by removing the contamination. The increased cost is balanced by the overall protection of human health and the environment and long-term effectiveness.

Table 7. Remedial action costs for Group 1.

Description of Cost	Alternative 1	Alternative 2	Alternative 3 - Preferred Alternative
Capital cost	$0.0M	$0.09M	$2.46M
O&M cost	$0.9M	$1.39M	$0.03M
Total project cost in Fiscal Year 2008 dollars	**$0.9M**	**$1.47M**	**$2.49M**
Total project cost in net present value	**$0.3M**	**$0.5M**	**$2.2M**

applicable or relevant and appropriate requirements (ARARs)
The body of federal, state, and local laws, regulations, and standards with which the selected cleanup alternative must comply.

To evaluate potential treatment technologies under the five CERCLA balancing criteria, the Agencies examined more than 20 factors specified in EPA guidance,[8] including:

- Availability of storage and disposal facilities
- Reliability of the alternative
- Ability to construct and operate
- Monitoring considerations
- Administrative feasibility
- Time to completion
- Worker protection
- Primary waste volume
- Irreversibility of treatment
- Treatment residuals.

no action
Sites that can be released for unrestricted land use because they pose no unacceptable risk. A no action alternative is required to be considered under CERCLA. It can include monitoring.

no further action with institutional controls
Sites that cannot be released for unrestricted land use, requiring management.

institutional controls
Administrative and engineering measures to protect human health and the environment from exposure to contamination. Institutional controls are maintained until requirements are met for safe, unrestricted land use. Active controls include site surveillance, maintenance, monitoring, site surveys, access restrictions, and other measures that involve routine or periodic human presence at the site. Passive controls are administrative measures that do not require routine human presence (for example, deed restrictions and land-use restrictions).

CERCLA release
Release of hazardous substances or contaminants in the environment that may present an unacceptable risk or hazard to human health or the environment.

GROUP 2 – NO ACTION SITES

On the basis of a review of information, the Agencies have determined that no action under CERCLA is appropriate for five of the 83 sites because there is no evidence of a ***CERCLA release***. These five sites are summarized below:

- **MISC-04, Diesel-saturated Dirt Pile—**Originally identified in 1994 because of a diesel-oil-type odor, this site consists of a small pile of dirt and gravel, approximately 2 to 3 ft tall and 4 to 5 ft wide. Sample results in 1995 showed elevated total petroleum hydrocarbons. Twelve years later, in 2007, observers visiting the site noted plants and an animal burrow with no apparent odor.
- **MISC-25, Empty Mounds, Cans, and Drums—**This site consists of debris from the 1960s and 1970s (for example, metal buckets and weathered wood) and small piles of dirt scattered over an area of approximately 0.25 acre.
- **MISC-30, Debris on Richard Butte—**Agricultural and domestic debris at this site probably predates 1949 (that is, before the INL Site existed). Debris includes weathered wood, wire, and old closed-cell batteries. The site has well-established native vegetation and there is no evidence of stained or discolored soil. Lead was not detected during field screening.
- **MISC-49, Empty 55-Gallon Drums—**This site consists of two empty drums welded together, standing upright, and partially buried. No contamination was identified using detectors for radiation and organic vapors and no other large metal objects were found using metal detectors.
- **TRA-62, Abandoned Discharge Lin**e**—**This site consists of approximately 570 ft of gravity-drained vitreous clay pipe between the Demineralization Building and the former Chemical Leach Pond (TRA-701) at the RTC. The pipe is 6 to 8 ft below ground surface. Although the Chemical Leach Pond was contaminated with mercury, the pond received waste from other sources besides the pipeline. The pipe managed wastewater associated with a demineralizer facility in addition to wastewater associated with TRA operations. No releases from this pipeline were identified. When the facility undergoes decontamination and decommissioning (D&D) in the future, if evidence of a CERCLA release is discovered associated with this piping, this new information will be evaluated under CERCLA.

Preferred Alternative

No action without monitoring under CERCLA for MISC-04, MISC-25, MISC-30, MISC-49, and TRA-62 is the preferred alternative because there is no evidence of a CERCLA release at these sites. As a housekeeping measure, DOE will pick up and dispose of the debris (batteries, fuel cans, and empty cans) on the surface and properly manage the waste. There are no CERCLA costs associated with no action for these five sites.

GROUP 3 – NO FURTHER ACTION WITH INSTITUTIONAL CONTROL SITES

On the basis of a review of information, the Agencies determined that no further action with institutional controls is appropriate for four of the 83 sites. The four no further action with institutional controls sites have contamination left in place that does not present an unacceptable risk to workers or the environment but cannot be released for unrestricted residential land use at this time. These four sites are summarized below:

- **TRA-63, Warm Waste Pipeline—**The soil at TRA-63 was contaminated from a warm waste pipeline leak at the RTC. The maximum cesium-137

concentration in the soil is 8.2 pCi/g and the site requires institutional controls until the cesium decays to levels acceptable for unrestricted residential use.

- **TSF-08, Area 13B, Mercury Spill along the Railroad Tracks—**Residual mercury remains in the soil at the site after several cleanups. Although mercury concentrations are at acceptable risk-based levels, some uncertainty remains due to the difficulty in sampling and removing mercury.
- **TSF-54, Soil beneath Decontamination Shop Sump—**TSF-54 consists of soil that was beneath the sump at the former TAN Decontamination Shop. The building was demolished and the soil cleaned up to meet remediation goals. The maximum cesium-137 concentration in the soil is 4.5 pCi/g and the site requires institutional controls until the cesium decays to residential levels.
- **TSF-59, Soil beneath TAN-603 Northwest Sump—**This site consists of contaminated soil that was beneath the sump at the TAN Service Building/ Steam Plant. The building and sump were removed in 2007 and the soil cleaned up to meet remediation goals. The maximum cesium-137 concentration in the soil is 6.8 pCi/g and the site requires institutional controls until the cesium decays to residential levels.

Proposed Action – No Further Action with Institutional Controls

The Agencies propose no further action with institutional controls for these sites. The costs for implementing institutional controls at these four sites are shown on Table 8. The total costs are $0.69M in Fiscal Year 2008 dollars and $0.3M in net present value. These costs include implementing and maintaining institutional controls and evaluating these sites during the 5-year reviews to determine whether they may be released for unrestricted residential use.

Table 8. Remedial action costs for Group 3.

Description of Cost	Cost
Capital cost	$0.05M
O&M cost	$0.64M
Total project cost in Fiscal Year 2008 dollars	$0.69M
Total project cost in net present value	$0.3M

GROUP 4 – TRANSFERRED SITES

The Agencies transferred two of the 83 sites, ANL-04 and TSF-07, into OU 10-08 from previous Records of Decision to implement the remedy. These two sites are summarized below:

- **ANL-04, Sanitary Sewage Lagoons—**The site consists of three active sanitary sewage lagoons at the Materials and Fuels Complex (MFC), which are expected to remain in use until MFC closes. The site was originally in OU 9-04, which assessed the future risk once the pond becomes dry and the sediments are exposed at the surface. The maximum concentration of mercury in pond sediments is 3.2 mg/kg; however, concentrations could change due to future use of the pond. The OU 9-04 risk assessment determined that mercury in the sediment could pose an unacceptable risk to ecological receptors. The Agencies selected phytoremediation with contingent excavation and disposal because mercury exceeded the remediation goal in the OU 9-04 Record of Decision (ROD).[9] Because the ponds are still in use, the Agencies deferred remediation of ANL-04 until the MFC mission is complete. An Explanation of Significant Differences[10] stated that a final decision for ANL-04 would be made after resampling and recalculation of risks using the latest human

health and ecological data available at the time of closure. If the site still poses unacceptable risk, the lagoons will be remediated. To facilitate closure of WAG 9, the Agencies administratively transferred the site to OU 10-08. Because phytoremediation was not successful at other sites remediated under OU 9-04 that had both higher and lower mercury concentrations, the contingent remedy was included in the cost estimate for OU 10-08. If the concentrations when the ponds are closed and resampled are less than the remediation goals for OU 10-08, no action would be required.

- **TSF-07, Disposal Pond—**Limited action consisting primarily of institutional controls was selected for the TSF-07 disposal pond in the ROD for OU 1-10.[11] Historically, the pond received waste from several processes. Based on sampling data, the Agencies concluded that concentrations of cesium-137 in a limited portion of the pond (that is, fewer than 5 of 35 acres) precluded unrestricted land use. However, the pond was still operational under a Wastewater Land Application Permit when other elements of the OU 1-10 ROD were completed. To facilitate close-out of the OU 1-10 ROD, the Agencies administratively transferred TSF-07 to OU 10-08 for implementation of the selected remedy.[12] In preparation for closure of the pond, discharges to the pond have recently ceased, the wastes have been removed from the discharge system, and the discharge system has been flushed. The site will be sampled again and data will be evaluated in the next CERCLA 5-year review, to occur in 2010, to determine if the selected remedy is appropriate or whether a different remedy should be selected.

Proposed Action – Remedy Implementation

The Agencies administratively transferred ANL-04 and TSF-07 into OU 10-08 to implement the remedy that was previously agreed to and to facilitate the close-out of WAGs 1 and 9. The costs are shown on Table 9. These costs include maintaining institutional controls at the TSF-07 pond and providing input to the annual and 5-year reviews. For ANL-04, the costs include excavation, treatment, and disposal. The cost for implementing the decisions for the two transferred sites is $1.82M in Fiscal Year 2008 dollars and $0.7M in net present value.

Table 9. Remedial action costs for Group 4.

Description of Cost	Cost
Capital cost	$1.17M
O&M cost	$0.65M
Total project cost in Fiscal Year 2008 dollars	$1.82M
Total project cost in net present value	$0.7M

GROUP 5 – OTHER SITES NOT REQUIRING CLEANUP

The Agencies propose that no remediation will be conducted under CERCLA for 70 other miscellaneous sites in OU 10-08. Based on information, such as previous site investigations and historical research, no residual sources of contamination are associated with the 70 no action sites listed on Table 10. There are no costs associated with these sites.

Table 10. Group 5 – Other no action sites under CERCLA. These sites do not require institutional controls, annual inspections, monitoring, or 5-year reviews.

Site	Description	RI/BRA[1] (* = Appendix A, except as noted)
CFA-10A	Soil-filled concrete ring adjacent to CFA-667	*
CFA-53	Soil beneath CFA-617 wastewater piping and drains	*
IET-12[a]	Soils beneath subgrade sumps within TAN-620/656	*Section 5*
MISC-01	Debris near RWMC	*
MISC-02	Auto parts south of Highway 33 on INL boundary road	*
MISC-03	Auto parts adjacent to the Big Lost River	*
MISC-05	Excavation pit/mound and debris near Guard Gate 3	*
MISC-06	Debris north of NRF	*
MISC-07	Debris near cinder pit	*
MISC-08	Debris near the intersection of Highways 33 and 22	*
MISC-09	Debris south of Highway 33	*
MISC-10	Debris west of Guard Gate 3	*
MISC-11	Debris west of Highway 22	*
MISC-12	Debris north of Highway 33	*
MISC-13	Debris west of canal	*
MISC-14	Debris in the Big Lost River sinks area	*
MISC-15	Debris southwest of NRF	*Section 4.2*
MISC-16	Debris in Big Lost River sinks area	*
MISC-17	Staining on East Butte Road	*
MISC-18[b]	Uncapped well in Big Lost River sinks area, secured in 2001	*
MISC-19	Debris along Birch Creek	*
MISC-20	Stained road near NRF	*
MISC-21	Staining on Road 17 from STF to Portland Road	*
MISC-22	Debris adjacent to Highway 28	*
MISC-23	Debris in Birch Creek drainage gravel pit	*
MISC-24	Debris northwest of SMC/TAN	*
MISC-27	Mound near East Portland/East Ogden intersection	*
MISC-28	Debris near Lincoln Blvd.	*
MISC-29	Asphalt near main guard gate	*
MISC-31[c]	Two inert 8-in.-diameter projectiles part of site ORD-03	*Section 4.3*
MISC-32	Mound near RWMC gravel pit	*
MISC-33	Experimental test drum in EOCR-01 leach pond (removed in 2006)	*
MISC-34	Howe Peak diesel spill cleaned up in the early 1990s	*
MISC-36	Debris southwest of Highway 28	*
MISC-37	Trash can lid and container by the Experimental Field Station Dairy Farm	*
MISC-38[b]	Uncapped USGS seismic profiling well east of ANL, destroyed in the 1960s and subsequently welded shut	*
MISC-39	Expended ammunition debris in EOCR area	*
MISC-40	Mound southeast of EOCR buildings	*
MISC-41	Pits/mounds northeast of EOCR	*
MISC-42	Construction debris northeast of EOCR	*
MISC-43	Construction pit northwest of EOCR	*
MISC-44	Concrete-lined depression west of CFA	*
MISC-45[a]	Dirt pile with naval smoke cans near INTEC	*Section 5*
MISC-46	Test apparatus (metal cabinet, solar panel, and wood frame) west of CFA	*
MISC-47	Small fuel tank north of INTEC containing no residual fuel and no evidence of a release	*
MISC-48	Mud Lake previously remediated agricultural dump site	*Section 4.2*
PBF-33	Abandoned debris trench	*
PBF-34	Abandoned debris located near MWSF	*
PBF-35	Abandoned power and control cables between buildings	*
PBF-38	Abandoned radioactive waste lines (PER-620 to PER-732)	*Section 4.2*
TAN-30	Fire station wastewater system discharge drainage ditch	*
TRA-56	Acid transfer line from TRA-631 to TRA-645	*Section 4.2*
TRA-57	Abandoned buried diesel fuel line from TRA-727 and TRA-775 to ETR	*Section 4.2*
TRA-58	Abandoned buried fuel oil lines	*Section 4.2*
TRA-59	Abandoned buried acid line from TRA-631 to TRA-671	*Section 4.2*
TRA-60	Fenced area north of TRA-608	*
TRA-64[b]	Shallow injection well 5-TRA connected to valve pit TRA-669	*
TRA-67[b]	Shallow injection well 13-TRA	*
TRA-68[b]	Shallow injection well 14-TRA	*
TRA-69[b]	Shallow injection well 15-TRA	*
TRA-70[b]	Shallow injection well 19-TRA	*
TRA-71[b]	Shallow injection well 20-TRA	*
TRA-72[b]	Shallow injection well 21-TRA	*
TRA-73[b]	Shallow injection wells 29-TRA, 30-TRA, and 31-TRA	*
TSF-49[b]	Shallow injection well 1-TAN	*
TSF-50[b]	Shallow injection well 2-TAN	*
TSF-52	TAN-607 Decontamination Shop waste discharge pipe remediated under the NTCRA	*Section 4.2*
TSF-55[a]	Contaminated soil west of TAN-666 discovered during D&D and closure of TAN-616	*Section 5*
TSF-57	Underground fuel lines between TAN-609 and TAN-625	*
TSF-58	Soil beneath the TAN-666 filter vault	*

a. OU 10-08 baseline risk assessment resulted in no unacceptable risk.

b. No CERCLA action is required. Well may require action under the current Idaho Department of Water Resources regulations.

c. The inert projectiles should have been identified as part of ORD-03 in OU 10-04; therefore, MISC-31 is eliminated as a separate site.

ANL – Argonne National Laboratory
CFA – Central Facilities Area
D&D – decontamination and decommissioning
EOCR – Experimental Organic-Cooled Reactor
ETR – Engineering Test Reactor
INTEC – Idaho Nuclear Technology and Engineering Center
MWSF – Mixed Waste Storage Facility
NRF – Naval Reactors Facility
NTCRA – Non-time-critical removal action
RI/BRA – remedial investigation/baseline risk assessment
RWMC – Radioactive Waste Management Complex
TAN – Test Area North
STF – Security Training Facility
SMC – Specific Manufacturing Capability
USGS – United States Geological Survey

☑ PREFERRED ALTERNATIVES AND PROPOSED ACTIONS

The preferred alternatives and proposed actions are:

- **Groundwater—**No action with Sitewide groundwater monitoring.
- **Group 1—**Excavation, treatment, and disposal for CFA-54 and TRA-74.
- **Group 2—**No action for MISC-04, MISC-25, MISC-30, MISC-49, and TRA-62 because there is no evidence of a CERCLA release.
- **Group 3—**No further action with institutional controls for sites TRA-63, TSF-08 Area 13B, TSF-54, and TSF-59. The status of these sites will be reviewed during the annual institutional controls assessment and 5-year reviews. DOE will maintain established institutional controls for these sites until these sites can be released for unrestricted residential land use.
- **Group 4—**Transferred sites ANL-04 and TSF-07. No change to ANL-04 from the Explanation of Significant Differences for OU 9-04[10] at this time. A final decision for ANL-04 will be made after closure of the sanitary sewage lagoons, sampling, and recalculation of the risks using the latest human health and ecological data available at the time of closure. For cost-estimating purposes, future excavation and disposal was assumed. There is no change to TSF-07 from the OU 1-10 Record of Decision at this time. A final decision for TSF-07 will be made in the next 5-year review, based on additional characterization data. For cost-estimating purposes, continued limited action (no further action with institutional controls) for TSF-07 was assumed.
- **Group 5—**No action for 70 additional sites.

The preferred alternatives and proposed actions would protect human health and the environment, meet remedial action objectives by cleaning up to risk-based criteria, and comply with ARARs. Although the risk from commingled plumes is acceptable, the proposed actions include long-term groundwater monitoring to ensure that the risk remains acceptable as predicted by the modeling and monitoring data trends. The preferred alternative for Group 1 would reduce toxicity by treating contaminated soil removed from sites CFA-54 (mercury) and TRA-74 (arsenic and lead) by ex situ grouting to stabilize the waste as necessary to meet ARARs or waste disposal criteria. For the no action sites, no monitoring will be required because there is no evidence of CERCLA releases to the environment. The Group 3 sites do not pose an unacceptable risk to workers or the environment but require institutional controls until they can be released for unrestricted land use. For the ANL-04 sewage lagoons, no change will be made to the OU 9-04 Explanation of Significant Differences[10] at this time. The lagoons will be sampled after closure and an appropriate remedy selected at that time. The date for final closure for MFC is indeterminate. For cost-estimating purposes, it was assumed to be 2033. The costs to implement the contingent remedy of excavation and disposal have been updated and included in the project costs. Similarly, costs of continued limited action at the TSF-07 disposal pond are included in the preferred alternative until additional characterization data either confirm the previously selected remedy or lead to a change in the remedy as part of the next 5-year review.

Based on the information available at this time, the Agencies conclude the preferred alternatives and proposed actions would be protective of human health and the environment, would comply with ARARs, would be cost-effective, and would use permanent solutions and alternative treatment technologies to the maximum extent practicable. The preferred alternatives and proposed actions may be modified or changed by the Agencies in response to public comment or new information that becomes available after this plan is released. The Agencies deem it necessary to implement the preferred alternatives and proposed actions identified in

Proposed Action Summary

- Sitewide groundwater monitoring.
- Excavation, treatment, and disposal for Group 1 sites (CFA-54 and TRA-74) to mitigate unacceptable risk.
- No action for Group 2 sites (MISC-04, MISC-25, MISC-30, MISC-49, and TRA-62) because no evidence of a CERCLA release.
- No further action with institutional controls for Group 3 sites (TRA-63, TSF-08 Area 13B, TSF-54, and TSF-59). Contaminants either will decay to acceptable levels or posed no unacceptable risk but there is uncertainty as to residual contamination.
- Implementation of previous decision for Group 4 transfer sites. Contingent excavation and disposal for ANL-04 pending resampling when sewage ponds are closed. Implementation of previous decision (limited action) for TSF-07 pending resampling and evaluation in next 5-year review.
- No action for 70 Group 5 sites.

Can a Record of Decision be changed?

Yes. Under CERCLA, the Agencies review the remedy at least once every 5 years to ensure that the remedy is protective; however, the Agencies can evaluate at any time whether a remedy change is warranted. This flexibility under CERCLA ensures that a ROD can be changed when necessary to ensure that the remedy is protective or to improve the remedy.

this Proposed Plan to protect public health and welfare from actual or threatened releases of contaminants into the environment.

The costs of the preferred alternatives and proposed actions for OU 10-08 are shown on Table 11. The total project cost is $9.4M in Fiscal Year 2008 dollars and $5.2M in net present value.

Table 11. Total OU 10-08 costs.

Description of Cost	Cost
Capital cost	$3.7M
O&M cost	$5.7M
Total project cost in Fiscal Year 2008 dollars	$9.4M
Total project cost in net present value	$5.2M

PLUG-IN APPROACH AND REMEDIES FOR FUTURE RELEASES

This Proposed Plan presents a plug-in approach to streamline CERCLA remedial decision-making when addressing certain types of future releases, including threats of releases, of hazardous substances anywhere within the Idaho National Laboratory Site. The plug-in approach will allow the Agencies to apply or "plug-in" one of three selected remedies to address newly discovered releases of hazardous substances that fit a ***remedy profile***.

remedy profile
Site conditions that must be present for the remedy to be effective. These may include such factors as whether contaminants will decay or degrade to acceptable levels by 2095, cost considerations, depth of contamination, site logistics (such as excavation may interfere with active underground lines), worker safety, or impact to groundwater.

This plug-in approach is being proposed because future releases that are discovered are expected to be similar to those addressed in previous cleanup actions at INL. The three ***plug-in remedies*** and the remedy profiles are based on similar releases at INL for which remedies have already been selected and implemented under CERCLA. These remedies are protective of human health and the environment and compliant with applicable or relevant and appropriate requirements. In developing the plug-in approach, the Agencies analyzed these and other feasible alternative remedies. They concluded these three remedies, which are limited in scope, are preferred and can be readily implemented for future sites that are small. Cleanup actions will proceed under the plug-in approach without the need to reevaluate each release via the entire CERCLA remedial action process (that is, a separate remedial investigation/feasibility study, proposed plan, and Record of Decision will not be developed for each release). Those sites that do not meet the profile for the plug-in remedy will be candidates for CERCLA responses, such as a time-critical removal action, non-time-critical removal action, or remedial investigation/feasibility study.

plug-in remedies
Standard remedial actions used in order to streamline cleanup. The Agencies develop a remedy profile that the site conditions must fit in order to qualify for this plug-in approach.[13]

The three remedies proposed for the plug-in approach are:

1. **Institutional Controls.** This remedy would be implemented for sites containing contamination from CERCLA hazardous substances at levels that would currently cause an unacceptable risk to human health or the environment. However, by 2095, the sites would be acceptable for unrestricted use due to natural processes, such as radioactive decay. Sites would be added to the existing INL Institutional Controls Plan and subjected to institutional controls, such as administrative restrictions, policies, and procedures to prohibit, restrict, or control access and site disturbances and to ensure appropriate management of disturbed soil and debris.

2. **Excavate, Treat, and Dispose.** This remedy would be implemented for sites with releases of CERCLA hazardous substances to soil, structures, and/or debris that pose an unacceptable risk to human health or the environment. This remedy would involve excavating, removing, treating (if needed), and disposing of contaminated soil and debris. Waste characterization would be performed to facilitate proper management of removed soil and debris. As needed, treatment of soil and debris would be performed prior to disposal at an appropriate on- or off-INL facility. The site would then be backfilled and revegetated as necessary.
3. **Capping.** This remedy would be implemented for sites with releases of CERCLA hazardous substances that pose an unacceptable risk to human health or the environment. The remedy would require installation of a soil cover, engineered barrier, or other cap and then establishment of institutional controls to protect cap integrity. This remedy could be implemented if the site is near an existing cap, the release poses an unacceptable risk to humans or the environment, or excavation poses a high risk to workers.

To implement one of these plug-in remedies, the release must satisfy the following remedy profile requirements:

- **Type of contaminants—**Releases are limited to radiological or chemical constituents (including metals).
- **Type of contaminated environmental media—**Environmental media is limited to soil.
- **Type of contaminated waste material—**Types of waste material are limited to concrete, metal, wood, or other debris.
- **Depth of remediation—**The depth of remediation is limited to 10 ft below ground surface or the bottom of the engineered structure.
- **Cost of the cleanup—**Cost of the cleanup is limited to $100,000 for institutional control sites, $2.5 million for construction costs for excavation and disposal actions (excluding treatment), or $2 million for the construction of a cap.
- **Impact to groundwater—**Sites where the plug-in remedy is implemented would not pose an unacceptable risk to groundwater following remedy implementation. A plug-in approach would not be used to implement a groundwater treatment remedy, such as a pump and treat technology.

The Agencies are proposing to implement the plug-in approach in the following manner:

1. **Make Initial Assessment.** After a release or threat of release to soil is discovered, an initial assessment will be made as to whether the release is a likely candidate for the plug-in approach. Existing information will be considered. Sampling may be necessary to determine if the release can satisfy the remedy profile requirements listed above. If sampling is required, an existing field sampling plan will be modified or a new field sampling plan will be created. Field sampling plans will be approved by the Agencies before sampling is conducted.
2. **Determine if CERCLA Action Required.** The Agencies will then compare contaminant concentrations to remediation goals to determine whether the release requires remediation under CERCLA. The remediation goals will be developed using the same criteria as for Group 1 sites (see page 9). These goals are consistent with those that have been established in previous Records of Decision at INL to ensure protectiveness and comply with applicable or relevant and appropriate requirements (ARARs). In addition, the remediation goals must be protective of the Idaho groundwater quality standards in the Snake River Plain Aquifer. If contaminants are below remediation goals, no action is required

under CERCLA. If the contaminants are above these goals and the remedy profile requirements are met, cleanup will go forward using the plug-in approach.

3. **Identify Plug-In Remedy and ARARs.** For a release that qualifies, the Agencies will next identify which plug-in remedy and ARARs apply using past experience with similar types of releases. For example, for soil that is contaminated only with radionuclides that will decay to allow unrestricted use by 2095, institutional controls will likely be the selected plug-in remedy. The remedy to excavate, treat as necessary, and dispose is expected to be the remedy for most of the contaminated soil that is above remediation goals for unrestricted use. The capping remedy is expected to be constrained primarily to contaminated soil located near existing capped areas. Plug-in remedies must comply with ARARs that will be in the Record of Decision for OU 10-08.

4. **Documentation.** If the Agencies determine and agree, based on either sampling results or existing information, that (a) the release meets the remedy profile requirements, (b) the release warrants action under CERCLA due to a risk in excess of cleanup goals or ARARs, and (c) a plug-in remedy applies, that decision will be documented in a memorandum that is reviewed and approved by the Agencies. The memorandum will include the following information: (a) a summary of the results of any sampling and/or existing information, (b) a justification that each remedy profile requirement is met and action is warranted, and (c) an identification of the remedy and ARARs that will apply to the release. Documentation of the above in a memorandum is required before a plug-in remedy can be implemented.

5. **Public Involvement in the Plug-In Approach.** This Proposed Plan represents the public's opportunity to comment on the proposed remedies incorporated in the plug-in approach prior to the Agencies' selection of these remedies, under Section 117 of CERCLA and the National Contingency Plan (NCP, 40 CFR Part 300). The Agencies will evaluate newly discovered CERCLA sites and determine whether a plug-in remedy is appropriate for implementation at the site. If the new site meets the remedy profile and the remedy is appropriate, the Agencies will document the plug-in decision in an Explanation of Significant Differences (ESD). The Agencies will issue periodic ESDs to inform the public that plug-in remedies were recently implemented, or will be implemented in the near future, for one or more sites. The ESDs will provide a brief summary of each release, selected plug-in remedy, the ARARs, and the basis of the decision, consistent with CERCLA and the NCP. During the subsequent 5-year review, the Agencies will evaluate the effectiveness of such remedies and determine if additional actions are necessary.

REFERENCES

The following list of source material is provided for readers who want more detailed information than is presented in this Proposed Plan. These documents are available in the Administrative Record or other federal archives. Locations of the Administrative Record are listed in the margin of this page.

1. Cahn, L. S., W. L. Jolley, S. O. Magnuson, M. S. Roddy, R. L. VanHorn, 2008, *Operable Unit 10-08 Sitewide Groundwater and Miscellaneous Sites Remedial Investigation/ Baseline Risk Assessment,* DOE/ID-11332, Rev. 0, U.S. Department of Energy Idaho Operations Office, April 2008.

2. Holdren, K. J., T. E. Bechtold, L. S. Cahn, L. C. Tuott, R. P. Wells, 2008, *Operable Unit 10-08 Sitewide Groundwater and Miscellaneous Sites Feasibility Study,* DOE/ID-11338, Rev. 0, U.S. Department of Energy Idaho Operations Office, April 2008.

3. 40 CFR 300, 2008, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations,* Office of the Federal Register, May 2008.

4. DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory and Action Plan,* Administrative Record No. 1088-06-29-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare, December 4, 1991.

5. DOE-ID, 2001, *Comprehensive Remedial Investigation/Feasibility Study for Waste Area Groups 6 and 10, Operable Unit 10-04,* DOE/ID-10807, Rev. 0, U.S. Department of Energy Idaho Operations Office, August 2001.

6. DOE-ID, 2007, *Proposed Plan for Radioactive Waste Management Complex Operable Unit 7-13/14,* DOE/ID-11288, U.S. Department of Energy Idaho Operations Office; Idaho Department of Environmental Quality; U.S. Environmental Protection Agency, Region 10, October 2007.

7. Roseland, R. D., CWI, memorandum to H. S. Forsythe, CWI, July 17, 2008, "Operable Unit 10-08 Sitewide Groundwater and Miscellaneous Sites Proposed Plan/Preferred Alternative (Project # 23368)," RDR-05-08.

8. EPA, 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final,* EPA/540/G-89/004, OSWER Directive 9355.3-01, U.S. Environmental Protection Agency, 1988.

9. DOE-ID, 1998, *Final Record of Decision Argonne National Laboratory – West, Operable Unit 9-04,* W7500-000-ES-04, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency; Idaho Department of Health and Welfare, Division of Environmental Quality, September 1998.

10. DOE-CH, 2000, *Explanation of Significant Difference Argonne National Laboratory – West, Operable Unit 9-04,* Document ID 10831, U.S. Department of Energy Chicago Operations Office; U.S. Environmental Protection Agency; Idaho Department of Health and Welfare, Division of Environmental Quality, February 2000.

11. DOE-ID, 1999, *Final Record of Decision for Test Area North Operable Unit 1-10,* DOE/ID-10682, Rev. 0, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency; Idaho Department of Health and Welfare, Division of Environmental Quality, December 1999.

The Idaho Cleanup Project Administrative Record is available to the public at the following locations:

INL/ICP Technical Library
DOE Public Reading Room
1776 Science Center Drive
Idaho Falls, ID 83415
208-526-1185

Albertsons Library
Boise State University
1910 University Drive
Boise, Idaho 83725
208-385-1621

The Administrative Record may also be accessed on the Internet at http://ar.inel.gov.
Any library with Internet access can connect you to the Administrative Record.

Information about the Idaho Cleanup Project at the INL is available on the Internet at https://idahocleanupproject.com.

12. DOE-ID, 2008, *Remedial Action Report for OU 1-10 Sites at the Test Area North, WAG 1*, DOE/ID-11262, Rev. 0, U.S. Department of Energy Idaho Operations Office, April 2008.

13. DOE-EH, 1999, *The Plug-In Approach: A Generic Strategy to Expediting Cleanup,* DOE/EH-413-9903, U.S. Department of Energy, Office of Environmental Management, Office of Environment, Safety & Health, May 1999.

The Agencies

Nicole Hernandez,
Idaho Cleanup Project,
U.S. Department of Energy
Idaho Operations Office,
P.O. Box 1625 Mail Stop 1222,
Idaho Falls, ID 83415-1222
208-526-8949

Matt Wilkening,
U.S. Environmental Protection Agency,
1435 North Orchard St.
Boise, ID 83706
208-378-5760

Daryl Koch,
Idaho Department of Environmental Quality,
1410 North Hilton,
Boise, ID 83706
208-373-0492

More Information

Contact: Erik Simpson, the ICP Community Relations representative, at 208-360-0426 or at erik.simpson@icp.doe.gov.
For general information, call 1-800-708-2680, or send mail to P.O. Box 1625, Mail Stop 2501, Idaho Falls, ID 83415-2501

PUBLIC INVOLVEMENT

The public comment period for this Proposed Plan extends from September 16, 2008, through October 15, 2008. Citizens are encouraged to review this Proposed Plan, attend a public meeting or briefing, and provide comments.

Community acceptance is an important criterion in the evaluation of the CERCLA alternatives. The Agencies will review and consider comments from citizens about this Proposed Plan and may modify the preferred alternatives and proposed actions presented in this plan based on the comments they receive. Agency responses to all comments on this plan will be published as part of the Record of Decision for OU 10-08, which is scheduled to be completed in 2009.

Two public meetings will be held during the public comment period. They will be held in Idaho Falls on September 29, 2008, at the Shilo Inn, 780 Lindsay Boulevard, and in Twin Falls on September 30, 2008, at the Taylor Student Union Building at the College of Southern Idaho, 315 Falls Avenue. The meetings will begin at 6:00 p.m. with an opportunity for informal discussion with Agency and project representatives. A court reporter will record formal public comments and the transcripts will be placed in the Administrative Record.

Written comments can be submitted to one of the project representatives at the meeting or mailed. A form is included in this Proposed Plan for your convenience. Written comments can be mailed to:
Nicole Hernandez,
Idaho Cleanup Project,
DOE Idaho Operations Office,
Mail Stop 1222, P.O. Box 1625, Idaho Falls, ID 83415-1222.
This Proposed Plan and a form for submitting comments are also available online at https://idahocleanupproject.com. To arrange briefings in other communities, call the ICP toll-free number, 1-800-708-2680.

Comments (continued)

Fold Here. Please Use Only Clear Tape to Seal.

IDAHO CLEANUP PROJECT ICP
Safely plan, motivate, and deliver

P.O. BOX 1625
IDAHO FALLS ID 83415

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 61 IDAHO FALLS, IDAHO

POSTAGE WILL BE PAID BY ADDRESSEE

NICOLE HERNANDEZ
IDAHO CLEANUP PROJECT
DOE IDAHO OPERATIONS OFFICE, MS 1222
P.O. BOX 1625
IDAHO FALLS ID 83403-9987

Please return this form by October 15, 2008

Tell Us What You Think

*The Agencies want to hear from you to decide what actions to take for the Sitewide Groundwater, Miscellaneous Sites, and Process for Future Sites, Operable Unit 10-08.**

Comments

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

IDAHO CLEANUP PROJECT ICP

Safely plan, motivate, and deliver

P.O. Box 1625
Idaho Falls, ID 83415-3940
Address Service Requested

PRESORT STD
U.S. POSTAGE
PAID
IDAHO FALLS, ID
PERMIT NO. 73