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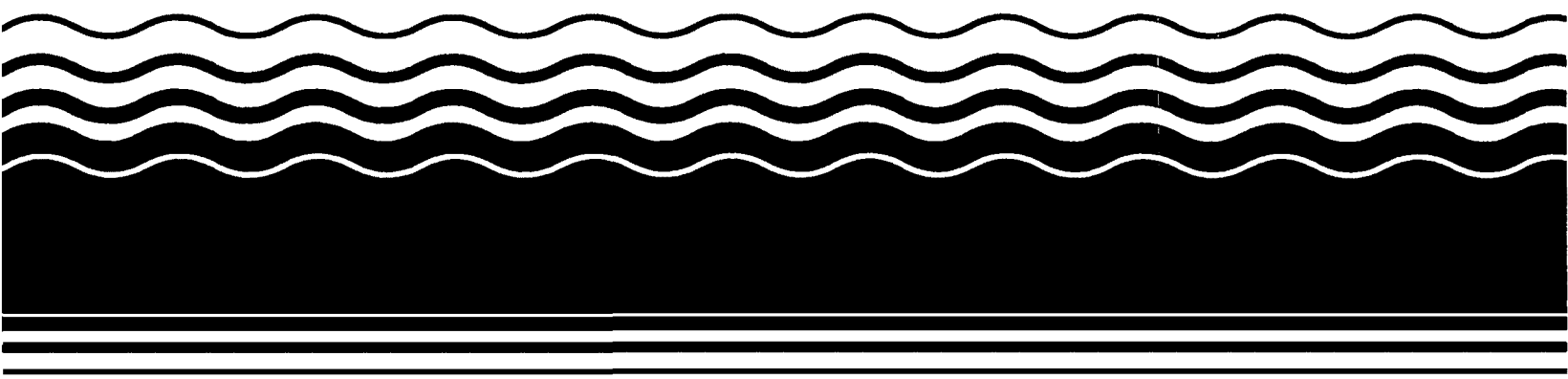
EPA Superfund Explanation of Significant Differences for the Record of Decision:

Idaho National Engineering Laboratory (USDOE), Pit 9 (OU 7-10), Idaho Falls, ID 1/26/95



EXPLANATION OF SIGNIFICANT DIFFERENCES FOR THE PIT 9 INTERIM ACTION RECORD OF DECISION AT THE RADIOACTIVE WASTE MANAGEMENT COMPLEX

IDAHO NATIONAL ENGINEERING LABORATORY

I. INTRODUCTION

This document is an Explanation of Significant Differences (ESD) from the Record of Decision (ROD) for the Pit 9 Interim Action, signed by the United States Department of Energy, United States Environmental Protection Agency, and State of Idaho Department of Health and Welfare (the Agencies), effective October 1, 1993, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, the National Oil and Hazardous Substance Pollution Contingency Plan. This ESD is also prepared in accordance with the terms of the Federal Facility Agreement and Consent Order.

Site Name and Location

Pit 9, Subsurface Disposal Area, Radioactive Waste Management Complex
Waste Area Group 7, Operable Unit 7-10
Idaho National Engineering Laboratory (INEL)

The lead agency for this action is the United States Department of Energy Idaho Operations Office (DOE-ID). The United States Environmental Protection Agency and the State of Idaho Department of Health and Welfare (IDHW) both concur with, and approve the need for, this significant change to the selected remedy. The Agencies participated jointly in preparing this document.

Need and Purpose for an Explanation of Significant Differences

This ESD was prepared in accordance with Section 117(c) of the CERCLA, and 40 CFR 300.435(c)(2)(i) which requires that an ESD be published "when the differences in the remedial or enforcement action, settlement, or consent decree significantly change but do not fundamentally alter the remedy selected in the ROD with respect to scope, performance, or cost." Accordingly, this explanation addresses cost estimates that increased significantly for the selected remedy identified in the Pit 9 ROD and is implemented to: Present revised project cost estimates, including additional costs identified in the firm fixed-price subcontract for the operations and maintenance and capital cost elements.

A detailed comparison of the current cost estimate information with that presented in the ROD is presented in Section III.

This and other relevant documents will become part of the Administrative Record file pursuant to 40 CFR 300.825(a)(2). Copies of this ESD and the Pit 9 Administrative Record are available to the public in the INEL Information Repository sections of the libraries and offices listed on the last page of this Explanation of Significant Differences.

II. SITE HISTORY, CONTAMINATION PROBLEMS, AND SELECTED REMEDY

The INEL is located 32 miles west of Idaho Falls in southeastern Idaho and encompasses approximately 890 square miles of semi-arid desert overlying the Snake River Plain Aquifer. The Subsurface Disposal Area is located at the Radioactive Waste Management Complex, which is located in the southwest portion of INEL (see Figure 1). The area of focus is Pit 9 which is located in the northeast corner of the Subsurface Disposal Area. Pit 9 is designated as Operable Unit 7-10 and is scheduled as an interim action in the Action Plan of the Federal Facility Agreement and Consent Order.

Pit 9 was operated as a waste disposal pit from November, 1967 to June, 1969. It was used to dispose of approximately 110,000 cubic feet (3,114.8 cubic meters) of transuranic waste (as defined in 1969, > 10 nCi/g) from the Rocky Flats Plant and additional low-level wastes (as defined in 1969, $\leq$ 10 nCi/g) from waste generators located at the INEL. The total volume of the pit is approximately 250,000 cubic feet (7,079.2 cubic meters) of overburden, 150,000 cubic feet (4,247.5 cubic meters) of packaged waste, and 350,000 cubic feet (9,910.9 cubic meters) of soil between and below the buried waste. Most of the transuranic waste consists of drums of sludge (contaminated with a mixture of transuranic waste and organic solvents), drums of assorted solid waste, and cardboard boxes containing empty contaminated drums.

The National Contingency Plan expresses a preference for early response action where such action will expedite completion of total site cleanup. The Federal Facility Agreement and Consent Order incorporates that preference. The Pit 9 Interim Action is intended to remove the source of contamination to a level that is protective of human health and the environment, to expedite overall cleanup at the Radioactive Waste Management Complex, and to reduce risks associated with potential migration of hazardous substances to the Snake River Plain Aquifer. The cleanup will also provide information regarding technologies potentially applicable to remediation of similar waste types at the Radioactive Waste Management Complex.

Two proposed plans for remediating Pit 9 were presented to the public: the first in December of 1991 and the second in October of 1992. The Revised Proposed Plan contained details of processes that could be used in association with the preferred alternative that the public had requested during public meetings for the first Proposed Plan. The Agencies' preferred alternative was physical separation/chemicalextraction/stabilization of contaminants in Pit 9. The preferred alternative will stabilize contaminants after physical separation and chemical extraction to minimize migration of contaminants and to achieve reduction in waste volume and risk.

Following review of public comments, the preferred alternative described in the two proposed plans was selected by the Agencies. The selected remedy was documented in the Pit 9 ROD which was signed by the Department of Energy, the Environmental Protection Agency, and the State of Idaho Department of Health and Welfare on October 1, 1993.

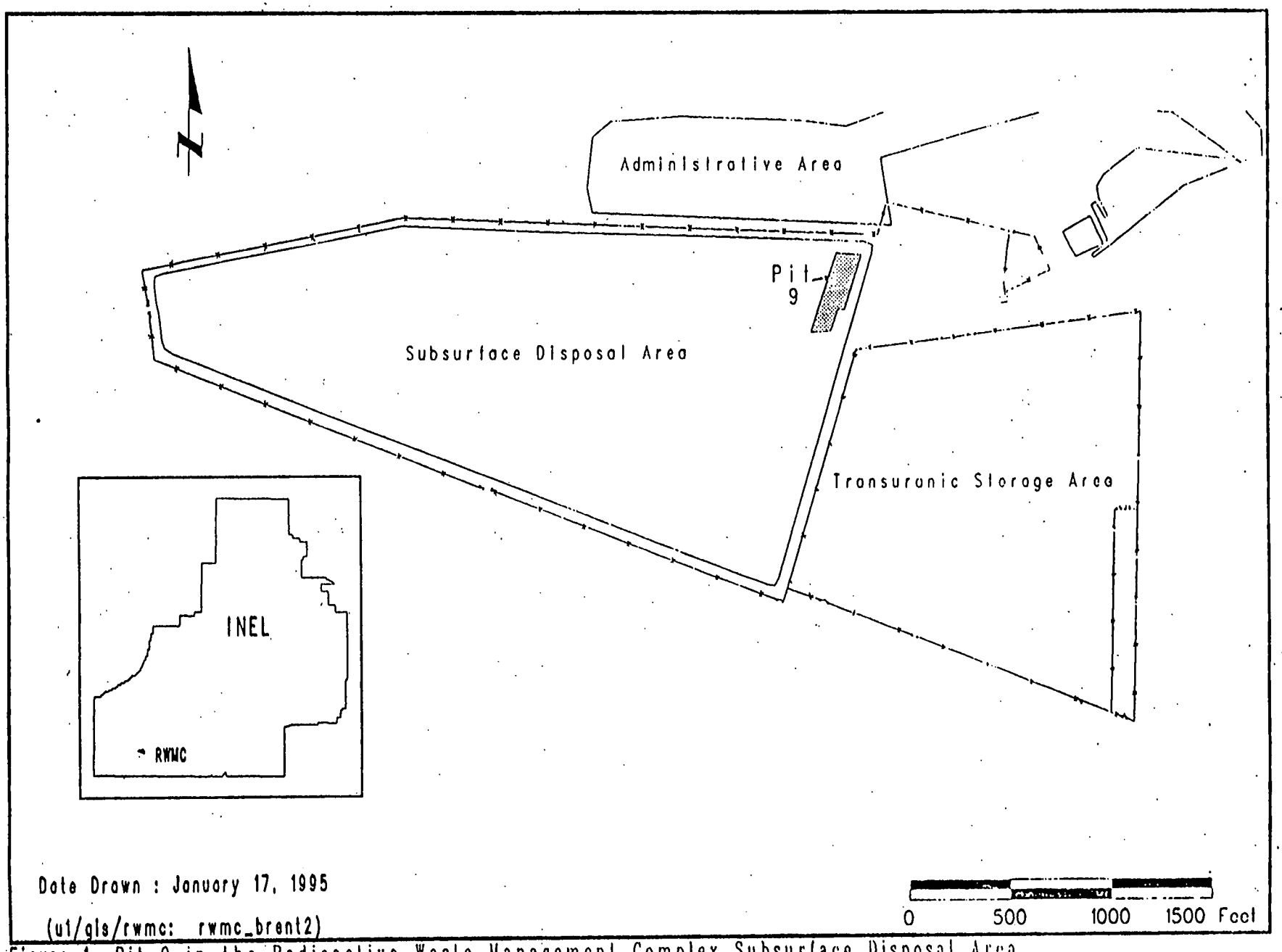


Figure 1. Pit 9 in the Radioactive Waste Management Complex Subsurface Disposal Area

Under the selected remedy of physical separation/chemical extraction/stabilization, Pit 9 will be remotely excavated in a double-contained structure built over the pit. Contaminated materials requiring treatment will be physically separated into waste streams. Waste streams, such as contaminated soil, will be separated from waste containers disposed in the pit, and then each waste stream will be placed in the appropriate waste processing units. Additional physical separation will occur using mechanical methods such as flotation, gravity concentration, sedimentation, and filtration to separate mixtures of solids and contaminants. In addition, chemical extraction processes will be used to remove contaminants. The objective of the separation technology will be to remove organic contaminants and concentrate radioactive contaminants and heavy metals to reduce the volume of waste requiring disposal. The selected remedy also includes a stabilization process using thermal treatment. Detailed information concerning the selected remedy can be found in the ROD for Pit 9.

Because some aspects of the remedial technologies had not been proven on radioactively contaminated hazardous waste sites like Pit 9, implementation of the preferred remedial alternative is contingent on successful demonstration that the cleanup criteria and other performance objectives could be met in Proof-of-Process and Limited Production Test phases. The Proof-of-Process Tests were completed by two subcontractor teams, Lockheed Environmental Systems and Technologies Company (LESAT) and Waste Management Environmental Services (WMES), in December, 1993.

Based on the Proof-of-Process Tests and a competitive bidding process, LESAT was selected by an EG&G Idaho Source Evaluation Board to remediate Pit 9. The preliminary (30%) design process has been recently completed, and the remainder of the remedial design activity is scheduled to be completed by March, 1996. The Limited Production Test is currently scheduled to be started in August, 1996.

III. DESCRIPTION OF SIGNIFICANT DIFFERENCES AND BASIS

Remediation of Pit 9 will be completed using the preferred alternative described in the ROD. The overall waste management approach to be used by LESAT is also consistent with that presented in the ROD. The significant change that necessitated preparation of this ESD relates exclusively to unanticipated cost increases. The costs in the negotiated fixed-price subcontract significantly exceeded estimated project costs presented in the ROD. Because the magnitude of the change exceeds that typically expected for CERCLA actions, the Agencies prepared this ESD as notification of the change.

Table 1 presents the preliminary estimated costs as presented in the Pit 9 ROD along with revised costs which are based on current information. Since this Pit 9 operation is a first of a kind facility and operation, much uncertainty existed when the initial estimate was prepared. The Pit 9 ROD cost estimates did not include allowances for project management, contingency, profit, or escalation and underestimated the capital as well as operation and maintenance costs.

The revised costs presented in Table 1 reflect the final contract price for the proof of process test phase and the actual contract price established in the firm fixed-price contract with LESAT resulting from the competitive procurement process for the cleanup. The $185.6 million subtotal in Table 1 for Interim Activity includes $178.6 million for fixed-price subcontract costs for the subcontractor to

install and operate the Pit 9 facility, as well as approximately $7.0 million for preliminary design and safety analysis activities previously conducted by both subcontractors. The estimate for long term storage and offsite disposal has not changed.

The firm fixed price contract established the cost to the Government for the total retrieval and treatment of the Pit 9 waste. An advantage of the fixed-price subcontracting approach being implemented for the Pit 9 project is that the $178.6 million subcontract cost can only change if major project assumptions change. The contract also detailed the price of the major activities to be performed under the contract such as design, nuclear safety analysis and facility startup, equipment and facilities, unit pricing for material processed, decontamination and decommissioning costs, and profit. Significant differences existed between the original ROD estimates and the contract price in most cases.

The fixed price contract included a 15% profit which amounted to a total of $23.3 million. This profit is included in the revised cost numbers discussed below and included in Table 1 for the capital and operations and maintenance costs. The profit was evenly applied to all capital and operations and maintenance costs although no profit will actually be paid until successful completion of the limited production test. Since there was no allowance for profit in the original estimate, this represents a significant fraction of the change in cost. Because it is a fixed-price contract, the allowances for contingency and escalation included in the contract price by LESAT are unknown. These may represent a significant increase over the ROD cost estimate. Any allowances for contingency and escalation would have been included within the contract price for each specific activity (e.g., design, equipment). The contingency allowance is believed to be significant because this is a first-of-a-kind facility and because of the unknowns associated with the pit inventories and retrieval and treatment system performance. Design and operational costs of prototype activities like Pit 9 are typically much higher than the cost of proven technologies and systems.

For operations and maintenance costs, the ROD estimate was $29.1 million while the contract price was $76.1 million. The ROD estimate was based on treatment of 150,000 cubic feet of material (at a cost of $22.1 million), while the contract price is based on treating 250,000 cubic feet of material (at a cost of $64.8 million). It should be noted that the 250,000 cubic feet of material requiring treatment identified in the contract is considered a maximum. If the quantity differs from 250,000 cubic feet, the cost of the remediation may decrease or increase accordingly. The ROD estimate was also based on the removal of 270,000 cubic feet of the soil cover and material not requiring treatment (at a cost of $60,000), while the contract price is based on 500,000 cubic feet of this material (at a cost of $5.6 million). The contract price includes sampling, analysis and handling of this material while the ROD estimate assumed this material was clean and no analysis or additional handling would be required. The ROD estimate assumed the facility would be required to operate 5 days a week (40 hours/week) for a year period to complete the LPT and full scale remediation while the fixed price contract is based on a 24 hour per day, five day per week operation for 16 months to complete LPT and full scale remediation. This difference in operating strategy, although not quantified, is expected to contribute significantly to the cost increase. Facility decontamination and removal costs were estimated in the ROD to be approximately $6.9 million while the contract price is $4.8 million. The ROD estimate also did not include some miscellaneous costs under the operations and maintenance category which the contract included at a price of approximately $900,000.

For capital costs, the estimate in the ROD was $20.7 million while the revised cost amount was $109.5 million. Under this category, the estimate for design was $3.4 million while the design costs to date plus the contract price is $56.8 million. This extremely large discrepancy is attributed primarily to funding two design teams at a cost of $7 million until a contract selection was made and the final contract price ($49.8 million) which included costs for off site full scale test facilities to provide design data and to be used in the real time resolution of operational issues in an uncontaminated environment during the Pit 9 project. Under the original project estimate and assumptions, the need for offsite test facilities was not envisioned, therefore there was no cost allowance for offsite test facilities in the estimate. The remaining capital costs associated with buildings and equipment was estimated at $17.3 million for the ROD while the contract price was $52.7 million. This cost difference is believed to be influenced primarily by the complexity of integrating the various facilities and components, a more extensive use of remotely operated systems, and more rigorous containment structures than was envisioned in the ROD estimate.

In summary, building design and construction required considerable modification from the original ROD estimate. In particular, storage requirements for chemicals used in the process, physical separation equipment, control requirements for the plasma-arc furnace, chemical extraction processing systems, air emissions controls, and engineering requirements for the containment structure have been considerably refined from the original estimates which were based on conceptual design information; therefore, costs are now better defined.

Table 1. Interim Action cost estimate (millions of dollars).

Description	ROD Costs[a]	Revised Cost
Proof-of-Process Test		
Subtotal	$16.0	$ 16.4[b]
Interim Activity		
Capital	20.7	109.5
Operations and Maintenance	29.1	76.1
Subtotal	49.8	185.6
Long-Term Storage and Off-Site Disposal		
Subtotal	62.0	62.0
Total	127.8	264.0

a. ROD costs rounded to nearest one-tenth of a million dollars
b. Actual costs for Proof-of-Process Tests

IV. AFFIRMATION OF THE STATUTORY DETERMINATION

As presented in the ROD, each alternative evaluated (in situ-vitrification; ex-situ vitrification; the selected remedy; and complete removal, storage, and off-site disposal) would provide adequate overall protection of human health and the environment by minimizing potential contaminant migration from Pit 9. The alternatives would also comply with the Applicable or Relevant and Appropriate Requirements of Federal and State laws and regulations identified in the ROD. The following discussion affirms that the selected remedy continues to provide the best balance of trade-offs in terms of long-term effectiveness, reducing toxicity, mobility and volume of the contaminants, implementability, short-term effectiveness, and cost.

The selected remedy, as well as the ex-situ vitrification alternative presented in the ROD, both use a stabilization component to immobilize the contaminants, thereby achieving some degree of long-term effectiveness. The selected remedy provides a greater degree of reduction of waste volume before stabilization via the physical/chemical treatment process so that the amount of waste requiring monitoring during storage and ultimately requiring disposal will be greatly reduced. The reduced volume of waste requiring long-term monitoring, storage, and disposal increases the overall long-term effectiveness of the selected alternative in comparison to ex-situ vitrification and the complete removal, storage, and off-site disposal option.

At the time of the ROD, the early developmental stage of the in-situ vitrification process limited the ability of the Agencies to determine the efficiency and long-term effectiveness of the process on the heterogeneous wastes found in Pit 9. Continuing uncertainties associated with the effectiveness of in-situ vitrification include its effectiveness on heterogeneous materials such as those in Pit 9 and the ability to confirm complete vitrification/stabilization of the pit contents. The soil at the RWMC lacks some of the glass-forming materials such as silica and aluminum oxide that are necessary for efficient vitrification. It may be difficult to control subsurface and surface migration of the vaporized volatile organics that are present in significant amounts in Pit 9 wastes. In addition, the presence of a large volume of metallic objects within the pit may result in arcing between the electrodes and in incomplete vitrification. It is presently estimated that the in-situ vitrification alternative requires several more years of development before being available for use in an application such as the Pit 9 Interim Action.

The selected remedy remains superior to all alternatives evaluated with respect to implementability and/or volume reduction; therefore, the ability to achieve ROD remedial action objectives is best for the selected remedy.

The selected remedy would provide overall effectiveness proportional to its costs. The Agencies have concluded that the relative cost comparisons are basically unchanged from that presented in the ROD. Considering the revised cost estimates, the Agencies believe that the selected remedy remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. In addition, the selected remedy meets the statutory requirements to use permanent solutions and treatment technologies to the maximum extent possible. The Agencies prefer a potential permanent solution whenever possible and, in the case of Pit 9, the goal is to meet the objectives of an interim action and provide a potentially permanent treatment solution.

V. PUBLIC PARTICIPATION ACTIVITIES

A notice publishing the availability of this ESD has been placed in the Post Register - Idaho Falls, Idaho State Journal - Pocatello, Times-News - Twin Falls, Southern Idaho Press - Burley, Idaho Statesman - Boise, Lewiston Morning Tribune - Lewiston, and Daily News - Moscow. Consistent with Section 300.435(c)(2)(i) of the National Contingency Plan, this ESD has been placed in the Administrative Record Section of the INEL Information Repositories listed below upon publication of the Notice of Availability. A postcard announcing the availability of this ESD was sent to the INEL mailing list participants. This ESD and the contents of the Pit 9 Administrative Record are available for public review. In addition to the Administrative Record on file for the ROD, the Administrative Record for this action includes a copy of this ESD and relevant newspaper notices associated with the explanation (refer to the binder for OU 7-10). Additional supporting information on current Pit 9 project activities is included in the INEL Information Repositories.

The revised cost of the selected remedy does not represent a fundamental change from that contained in the ROD, and therefore, a formal comment period is not required. Additional information or briefings may be requested by contacting the office listed below or calling the toll-free number for the INEL at (800) 708-2680.

Reuel Smith
INEL Community Relations Plan Office
P.O. Box 2047
Idaho Falls, Idaho 83403-2047
(208) 526-6864

LIBRARIES AND OFFICES CONTAINING INFORMATION REPOSITORIES

DOE Reading Room
INEL Technical Library
1776 Science Center Drive
Idaho Falls, Idaho

INEL Pocatello Office
1651 Al Ricken Drive
Pocatello, Idaho

INEL Twin Falls Office
233 Second Street North,
Suite B
Twin Falls, Idaho

INEL Boise Office
816 West Bannock
Suite 360
Boise, Idaho

University of Idaho Library
U of I Campus
Moscow, Idaho

Shoshone-Bannock Library
HRDC Building
Bannock and Pima Streets
Fort Hall, Idaho

EXPLANATION OF SIGNIFICANT DIFFERENCES
Concurrence

Site Name: Idaho National Engineering Laboratory
Pit 9 (OU 7-10) Interim Remedial Action

INITIAL	MJN					
NAME	Nearman	Pierre	Oesterle	Gearheard	Smith	Clarke
DATE	1/20/95	1/20/95	1-23-95	1-23-95	1/24/95	1/26/95
	RPM	Sec. Chief	ORC	Br. Chief	Div. Dir.	RA