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INFORMAL REPORT

**PAD A TREATABILITY STUDY
LONG-RANGE PROJECT PLAN**

J. D. Mousseau

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J. D. Mousseau

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MASTER

PAD A TREATABILITY STUDY LONG-RANGE PLAN, REV. 1

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ABSTRACT

The purpose of the Pad A Treatability Study Project is to identify and demonstrate through lab- and pilot-scale testing, technologies for treating plutonium-contaminated salt waste. This document presents proposed objectives and schedules, scope of work and breakdown structure, cost elements, deployment, benefits, and change controls for the project.

EXECUTIVE SUMMARY

This plan addresses the work to be accomplished by the Pad A Treatability Study Project. The purpose of this project is to investigate potential treatment and separation technologies, identify the best technologies, and to demonstrate by both lab- and pilot-scale demonstration, the most applicable remedial technologies for treating plutonium-contaminated salts at the Pad A site located at the Subsurface Disposal Area (SDA) at the Radioactive Waste Management Complex (RWMC) at the Idaho National Engineering Laboratory (INEL). It is currently anticipated the two most feasible and applicable technologies will be demonstrated through lab- and bench-scale demonstration. These two technologies will be distinct and not related to each other in terms of treatment process. The technologies meeting the lab- and bench-scale requirements and objectives will proceed to pilot-scale demonstration at the INEL. The logic of proceeding in this manner is to provide the highest likelihood of project success with reasonable cost. The conduct of this project will be supported by other DOE laboratories, universities, and private industries, who will provide support for near-term demonstrations of treatment and separation technologies.

The purpose of this long-range planning document is to present the detailed plan for the implementation of the Pad A Treatability Study Project.

The Pad A Treatability Study Project consists of the following nine tasks:

- Task 1. Planning and Project Management
- Task 2. Technology and Vendor Evaluation
- Task 3. Define the Functional and Operational Requirements
- Task 4. Technology and Vendor Selection/Award Contract
- Task 5. Regulatory Compliance/Approval
- Task 6. Perform Lab-Scale Testing for Technology A
- Task 7. Perform Lab-Scale Testing for Technology B
- Task 8. Perform Pilot-Scale Testing for Technology A
- Task 9. Perform Pilot-Scale Testing for Technology B.

The Pad A Treatability Study Project is scheduled to meet seven major milestones:

1. Technology/Vendor Evaluation Report
2. Interim Lab-Scale Test Evaluation Report Technology A
3. Interim Lab-Scale Test Evaluation Report Technology B
4. Lab-Scale Test Evaluation Report Technology A
5. Lab-Scale Test Evaluation Report Technology B
6. Pilot-Scale Evaluation Test Report Technology A
7. Pilot-Scale Evaluation Test Report Technology B.

The total life cycle cost for the Pad A Treatability Study Project is estimated at \$2,360,438.

This document is based upon the latest available information at the time of publishing. Revisions will be made as required based upon changes in strategy, scope, budget, schedule, and resources.

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PAD A TREATABILITY STUDY LONG-RANGE PROJECT PLAN

1. INTRODUCTION

The Idaho National Engineering Laboratory (INEL) has been directed under the Federal Facilities Agreement/Consent Order (FFA/CO) to remediate the waste problems at the RWMC Waste Area Group 7 (WAG #7) under the direction of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). This includes the Pad A Site, which is part of the Subsurface Disposal Area (SDA) at the RWMC.

To streamline the Remedial Investigation/Feasibility Study (RI/FS) process under the CERCLA, a treatability study will be conducted to investigate, demonstrate, and determine the most appropriate waste remediation method, and to aid in the scoping of the RI/FS and the Record of Decision (ROD).

1.1 Technological Need

There is an estimated 8100 m³ of Pu-contaminated salt waste stored at the Pad A site (approximately 80% of the total waste), which is contained in now deteriorating boxes and drums. Remediation of these Pu-contaminated soluble salts is necessary to prevent migration of the contaminants to the groundwater. Treatment and separation technologies must be considered as viable options for this remediation because of their potential for minimizing the waste that results from this process (there is a possibility that the salts could be recycled). Knowledge gained through the successful separation or treatment of the Pu from the salts may provide a practical application to other waste forms.

Currently, there is no known process capable of providing a full-scale remediation of this type of waste. This project will explore the possibility of finding a currently available process that has been demonstrated on an

exact or very similar waste to that stored at the Pad A site. Technology demonstration work on similar wastes has been performed in the past, or is currently being performed at the Rocky Flats Facility and the Oak Ridge National Laboratory.

1.2 Alternatives to Technology Development

Alternatives to treatment or separation technologies for the remediation of Pad A include: a) No Action and b) In Situ treatment.

The "no action" alternative might be detrimental to human health and the environment because of the potential migration of the hazardous and radioactive contaminants toward the aquifer or off the INEL Site.

Potential technologies used at Pad A could entail some type of in situ solidification or containment. These options would show good short-term performance, however, potential resale value of the salts is lost. If the waste is extracted and separated, valuable materials could be recycled, thereby decreasing the overall cost of remediation, while practicing waste minimization.

1.3 Technological Application

The technologies to be demonstrated will have direct application in the full-scale remedial action of the Pad A Site. The efforts of the Pad A Treatability Study and the subsequent results, will also assist other DOE sites (with similar contaminated waste or remediation processes) in their remediation efforts.

2. OBJECTIVES AND PRINCIPLES

2.1 Project Objectives

The primary objective of the Pad A Treatability Study Project is to demonstrate the best remediation method for the Pu-contaminated nitrate salt waste stored at the Pad A site. This involves the investigation and evaluation of all potential treatment and separation technologies applicable to Pu-contaminated salt waste, followed by demonstration of the most applicable technologies through lab- and pilot-scale testing. Other major objectives of the project include the following:

- Strongly consider technologies that support waste minimization
- Perform the Treatability Study in the near-term (< 2 years)
- Keep Waste Management - Environmental Restoration Program updated and provided with all applicable information derived from the Pad A Treatability Study effort.

2.2 Basic Scientific Principles

In the vendor/technology evaluation process, personnel with expertise in this technology field will be brought in as evaluators. In this manner, the scientific principles concerned with this technology can be carefully screened and evaluated.

3. WORK BREAKDOWN STRUCTURE

The work breakdown structure for the Pad A Treatability Study Project is shown in Appendix C. The structure is shown with the Project (level 40), broken down into the major tasks, and then broken down into the subtasks (level 50).

4. WORK SCOPE

The work scope is broken into two sections: 1) Tasks, and 2) Assumptions affecting the work scope. The deliverables and milestones arising from this work scope are detailed in Section 5.

4.1 Work Scope Tasks

The arrangement of the major tasks is slightly different than that presented in the Technical Task Plan (TTP). The method in the Long-Range Project Plan (LRPP) incorporates arranging the performance of the lab- and pilot-scale testing for each technology into a major task, and incorporating each report into the testing phase.

Task 1: Project Management/Planning

The management and planning effort includes the development and updating of planning documents including the TTP and the LRPP; developing and tracking schedule levels 0, 1, and 2; developing and tracking the project budget and costs; developing and presenting project presentations; interfacing with Waste Management personnel; providing direction and support to functional personnel; preparing and submitting weekly and monthly project reports; statuting of others of the project; and external audits of the project after major milestone completions. (i.e., technology selection, lab-scale testing, and pilot-scale testing)

Task 2: Technology and Vendor Evaluation

The technology and vendor evaluation task consists of a review of all technologies that may be applicable to the remediation of the Pad A Pu-contaminated salts. This task will be accomplished by performing a *Commerce Business Daily* (CBD) solicitation, communicating with university and industry experts, review of existing vendor files, review of the Remedial Technology Information System (RTIS), review of EPA documents, and discussion with other DOE facilities. All vendor and university responses are to be

evaluated in this Task in accordance with the following criteria:

- Technology effectiveness
- Technology implementability
- Vendor capital/establishments
- Vendor experience
- Vendor/technology cost.

In addition, these criteria are subdivided for further specific evaluation.

Those vendors or other organizations meeting minimum criteria requirements shall be selected to receive a formal Request for Proposal (RFP). Preparation, issuance, and return of RFP's proposals is included in this task. The RFP will be prepared by Pad A Treatability Study project personnel, and issued through the EG&G Idaho Purchasing Department.

Task 3: Define the Functional and Operational Requirements

This task involves defining the functional and operational requirements for the performance of the lab- and pilot-scale demonstration. This document will provide interested vendors detailed requirements and information of the work to be performed on the Pad A Treatability Study Project. This document shall be written in the standard form of a procurement specification.

Task 4: Technology Selection/Award Contract

The Technology Selection/Award Contract task involves the formal evaluation of the RFP's proposals, and the selection of the technologies/vendors to perform the treatability studies.

Task 5: Regulatory Compliance

The required National Environmental Policy Act (NEPA) documentation shall be prepared and approved. It is expected that for the lab-scale

testing, an experimental checklist will need to be prepared and approved. The NEPA for the pilot-scale operation is expected to involve a short Environmental Assessment (EA). The type of NEPA documentation to be submitted shall be better determined as the testing becomes defined. Work on the short EA for pilot-scale testing is to be coordinated with the Environmental Restoration Group (ER), whose primary responsibility is performing waste retrieval for the plant-scale operation.

A safety analysis report (SAR) for both hazard and safety and system safety shall be drafted, submitted, and approved as required. The drafting and issuance of these reports shall be coordinated with ER. Funding and scheduling for the SAR is not yet included in the LRPP.

Task 6: Lab-Scale Testing Technology A

This activity involves the performance of the lab-scale testing for Technology A by one vendor or university. Lab-scale testing will be performed at the vendor's facility. The waste samples for the lab-scale testing are anticipated to be obtained from the Rocky Flats Facility, or other alternatives as defined in Section 4.2. Activities associated with this task include:

- Performance of Technology A Lab-Scale Testing
- Preparation of the Work Plan
- Preparation of test specific Environmental, Safety, and Health, and Quality Plans
- Preparation of Sampling and Analysis Plans
- Direction and Control of the Vendors
- Auditing and Interim Evaluation
- Preparation and issuance of Interim and Final Evaluation Reports.

Task 7: Lab-Scale Testing Technology B

This activity involves the performance of the lab-scale testing for Technology B by one vendor. This technology will differ from Technology A. Lab-scale testing will be performed at the vendor's facility. The waste samples for the lab-scale testing are anticipated to be obtained from the Rocky Flats Facility or other alternatives as defined in Section 4.2.

Activities associated with this task include as follows:

- Performance of Technology B Lab-Scale Testing
- Preparation of the Work Plan
- Preparation of Test Specific Environmental, Safety, and Health, and Quality Plans
- Preparation of Sampling and Analysis Plans
- Direction and Control of the Vendors
- Auditing and Interim Evaluation
- Preparation and Issuance of Interim and Final Evaluation Reports.

Task 8: Pilot-Scale Testing Technology A

After the Technology A lab-scale testing has been completed and has satisfied the suitability requirements and testing objectives, the technology shall proceed to pilot-scale demonstration. It is expected that the Technology A pilot-scale demonstration will be performed at the RWMC Pad A site using actual waste retrieved from that site.

Activities associated with this task include as follows:

- Performance of Technology A Pilot-Scale Testing
- Preparation of the Work Plan
- Preparation of Test Specific Environmental, Safety, and Health, and Quality Plans
- Preparation of Sampling and Analysis Plans

- Direction and Control of the Vendors
- Auditing and Interim Evaluation
- Preparation and Issuance of the Final Evaluation Report.

Task 9: Pilot-Scale Testing Technology B

After the Technology A lab-scale testing has been completed and has satisfied the suitability requirements and testing objectives, the technology shall proceed to pilot-scale demonstration. It is expected that the Technology B pilot-scale demonstration will be performed at the RWMC Pad A site using actual waste retrieved from the Pad A Site.

Activities associated with this task include:

- Performance of Technology B pilot-scale Testing
- Preparation of the Work Plan
- Preparation of Test Specific Environmental, Safety, and Health, and Quality Plans
- Preparation of Sampling and Analysis Plans
- Direction and Control of the Vendors
- Auditing and Interim Evaluation
- Preparation and Issuance of the Final Evaluation Report.

4.2 Work Scope Assumptions

The following assumptions have been made in the preparation of the project work scope:

- Lab-scale testing and treatability study efforts will carry over and be fully funded into FY-92 and FY-93.
- Vendor/technology responses will be evaluated based on the applicability of the technology; implementability; short-term effectiveness; long-term effectiveness; reduction of toxicity, mobility, and/or volume; cost; establishment of company (i.e., size and experience); protection of human health and the

environment; state acceptance; community acceptance; regulatory compliance; and waste minimization potential.

- Certain elements of the pilot-scale tests are most cost effective when performed during the temperate part of the year (May-October).
- Costs estimated were based on information from a white paper (expression of interest proposal) from a vendor and from In Situ Vitrification (ISV) experience. These numbers translated into \$125K per technology for lab-scale/cold pit testing and \$500K per technology for demonstration. Actual costs for the Pad A Treatability study may vary significantly from these numbers.
- Eighty percent of the waste content at Pad A consists of nitrate salts and the remaining 20% is sludge. The Pad A Treatability Study Project is focused on technology demonstration for the remediation of the Pu-contaminated nitrate salts only. No funding has been included in the Cost Estimate Plan (CAP) for Technology Development (TD) on the sludge or contaminated soil wastes. The scope of the Pad A Project could be expanded in the future to support Technology Development on the sludge, if requested by ER.
- Waste characterization information for the lab-scale testing will be obtained from Rocky Flats records and from information obtained from Rocky Flats personnel. Waste characterization information for the pilot-scale operation shall be from the actual Pad A waste. This function shall be performed by ERP. the waste characterization information for pilot-scale testing shall be supplied prior to pilot-scale testing.
- Shipment of contaminated salts will be permitted between the INEL and selected vendors/entities. This same waste, in a treated or untreated form, will be allowed to return to the INEL.
- The Pad A Treatability Study Project will perform evaluation of where the lab-scale samples will be obtained from. Funding necessary for the removal of waste samples, or documentation for removal of waste samples, shall be provided by the ERP.
- Successful retrieval of the drums and preprocessing steps will be performed prior to treatment of contaminated waste. Note: costs are not included under this CAP for the retrieval or any preprocessing of the waste. This function is to be performed by ER.
- Applicable or Relevant and Appropriate Requirements (ARARs) will be provided from the ERP.
- The lab-scale waste samples will be obtained from the Rocky Flats Facility. If this alternative is not feasible, waste samples

shall be obtained from the previously excavated Pad A drum (assuming the drum contains salt waste). If this is not feasible, waste shall be excavated from Pad A, or waste samples shall be made up and spiked to simulate actual waste characteristics.

- The interim action proposed by ER will not affect the schedule developed for the Pad A Treatability Study.
- This document has been prepared based upon the accelerated schedule that ER is pursuing.
- Funding for performance of the SAR and scheduling of such is not included in the LRPP. The requirements for the SAR are to date undefined, as is the involvement by the ERP. Funding and scheduling relating to the SAR will be added as requirements are clarified.

4.3 Major Decisions

The following Major Decision points have been determined in the project:

1. Determination where the lab-scale samples are to come from (07-15-91)
2. From the technology/vendor investigation, select which vendors/technologies to send the formal RFP (07-15-91)
3. From the evaluation of the RFP's, determine which vendors to proceed with the lab-scale and possible pilot-scale operations (09-28-91)
4. Compare the lab-scale testing with the lab-scale criteria to determine if the vendor/technology should proceed to the pilot-scale testing phase of the treatability study (04-15-92).

5. SCHEDULE

5.1 Project Summary Schedule

Table 1 provides a summary of the minor, major, and key milestones for the Pad A Treatability Study Project.

Table 1. Minor, Major, and Key milestones for the Pad A Treatability Project.

<u>No.</u>	<u>Milestone</u>	<u>Type</u>	<u>Date</u>
1.	Long Range Planning Document Completion	()	06-28-91
2.	Initial Technology/CBD Evaluation Report	()	07-15-91
3.	F&OR Document	()	07-15-91
4.	Final Technology Selection Evaluation Report (Supports RI/FS Scoping)	#	09-28-91
5.	Award Treatability Study Contracts	()	10-26-91
6.	NEPA Documentation Approval		
	Lab-Scale	*	11-30-91
	Pilot-Scale	*	04-11-92
7.	Safety Analysis Report (Pilot-Scale)	*	05-20-92
8.	Lab-scale Interim Report Technology A (Supports Proposed Plan/ROD)	#	01-20-92
9.	Lab-scale Interim Report Technology B (Supports Proposed Plan/ROD)	#	01-20-92
10.	Completion of Lab-Scale Testing Technology A	()	04-25-92
11.	Completion of Lab-Scale Testing Technology B	()	04-25-92
12.	Lab-Scale Final Evaluation and Report Technology A	#	05-23-92

Table 1. (continued).

<u>No.</u>	<u>Milestone</u>	<u>Type</u>	<u>Date</u>
13.	Lab-Scale Final Evaluation and Report Technology B	#	05-23-92
14.	Completion of Pilot-Scale Testing Technology A	()	02-13-93
15.	Completion of Pilot-Scale Testing Technology B	()	02-13-93
16.	Pilot-Scale Evaluation and Report Technology A	#	05-08-93
17.	Pilot-Scale Evaluation and Report Technology B	#	05-08-93
<hr/> # - Major Milestone * - Key Milestone () - Minor Milestone			

Appendix F "Project Level 1 Schedule" presents a Level 1 schedule for the Pad A Treatability Study project. Each of the milestones above are shown on the schedule. Appendix A presents a logic diagram for the project.

The WAG #7 Unit of the Environmental Restoration Group is pursuing an aggressive schedule in the remediation of the Pad A site. It was decided by the WAG #7 Unit to perform the majority of the treatability study post-ROD. The following milestones exist through the performance of the ER accelerated schedule:

- RI/FS Becomes Final -- 04-13-92
- Final ROD accepted -- 08-31-92.

5.2 WBS Element Schedules

A list of the major deliverables broken down under which Task they occur is shown as follows. The scheduled date for the deliverable is also presented.

Task 1: Project Management/Planning

- Technical Task Plan Including all Updates (04-10-91, updated once per year)
- Long-Range Project Plans Including all Updates (06-28-91, updated twice per year, or as major changes occur)
- Project Presentations (Initial Presentation Prepared 06-04-91, Updated Quarterly, Presented as Required)
- Weekly and Monthly Project Reports (as required)
- External Project Audits
 - a) Completion of Technology/Vendor Selection (10-14-91)
 - b) Completion of all Lab-Scale Testing (05-28-92)
 - c) Completion of all Pilot-Scale Testing (05-04-93).

Task 2: Technology and Vendor Evaluation

- Technology/Vendor Summary Sheets (06-01-91)
- Formal CBD Technology Vendor Evaluation (07-05-91)
- Issuance of the RFP (07-29-91).

Task 3: Define the Functional and Operational Requirements

- Functional and Operational Requirements Specification (07-15-91).

Task 4: Technology Selection/Award Contract

- Evaluation Report of the RFP responses (09-28-91)

- Award of the Lab-Scale and Pilot-Scale Contracts (10-26-91).

Task 5: Regulatory Compliance

- Approval of appropriate NEPA documentation for:
 - a) Lab-Scale Testing (11-30-91)
 - b) Pilot-Scale Testing (04-11-92)
- Preparation of SAR documentation (05-20-92).

Task 6: Lab-Scale Testing Technology A

- Completion of the Technology A Lab-Scale Testing (04-25-92)
- Technology A Lab-Scale Health, Environmental, and Safety Plans (01-04-92)
- Technology A Lab-Scale Sampling, Analysis, and Quality Plans (01-04-92)
- Technology A Lab-Scale Work Plans (01-04-92)
- Interim Technology A Lab-Scale Testing Performance Report (01-20-92)
- Final Technology A Lab-Scale Testing Evaluation and Report (05-23-92).

Task 7: Lab-Scale Testing Technology B

- Completion of the Technology B Lab-Scale Testing (04-25-92)
- Technology B Lab-Scale Health, Environmental and Safety Plans (01-04-92)
- Technology B Lab-Scale Sampling, Analysis, and Quality Plans (01-04-92)
- Technology B Lab-Scale Work Plans (01-04-92)
- Interim Technology B Lab-Scale Testing Performance Report (01-20-92)

- Final Technology B Lab-Scale Testing Evaluation and Report (05-23-92).

Task 8: Pilot-Scale Testing Technology A

- Completion of the Technology A Pilot-Scale testing (02-13-93)
- Technology A Pilot-Scale Health and Safety Plans (07-18-92)
- Technology A Pilot-Scale Sampling, Analysis, and Quality Plans (07-18-92)
- Technology A Pilot-Scale Work Plans (07-18-92)
- Final Pilot-Scale Technology A Testing Evaluation and Report (05-08-93)

Task 9: Pilot-Scale Testing Technology B

- Completion of the Technology B Pilot-Scale testing (02-13-93)
- Technology B Pilot-Scale Health and Safety Plans (07-18-92)
- Technology B Pilot-Scale Sampling, Analysis, and Quality Plans (07-18-92)
- Technology B Pilot-Scale Work Plans (07-18-92)
- Final Pilot-Scale Technology B Testing Evaluation and Report (05-08-93).

6. BUDGET

6.1 Project Life Cycle Costs

The total estimated cost for the Pad A Treatability Study Project is \$2,360,438. The cost breakdown by major task is detailed in Table 2.

Table 2. Cost breakdown by major task for the Pad A Treatability Study Project

<u>Task</u>	<u>Cost (K)</u>
1. Project Management/Planning	\$153.9
2. Technology and Vendor Evaluation	\$57.0
3. Define the Functional and Operational Requirements	\$22.4
4. Technology Selection	\$49.9
5. Regulatory Compliance	\$23.4
6. Lab-Scale Testing Technology A	\$303.4
7. Lab-Scale Testing Technology B	\$303.4
8. Pilot-Scale Testing Technology A	\$723.7
9. Pilot-Scale Testing Technology B	\$723.7
TOTAL	\$2,360,438

6.2 Annual WBS Budget Projections

The annual WBS projections for the life-cycle of the Pad A Treatability Study Project at the Level 50 are shown in Appendix D "Work Breakdown Structure Cost Breakdown."

The cost basis data used for the development of the cost account for the Pad A Treatability Study Project are presented in Appendix B "Cost Estimate Basis."

Funding is *not* included in the project for the following activities:

- *Waste Characterization*--funding has not been included for further waste characterization activities at the investigation, or lab- or pilot-scale portions of the project. These activities are to be performed as necessary by the Environmental Restoration Program
- *Waste Retrieval*--funding has not been included for any waste retrieval activities from the Pad A Site. These activities are to be performed by the Environmental Restoration Program as necessary
- *SAR Documentation*--funding has not yet been included for the development and approval of the Safety Analysis Report. At the time of preparation of this report and the FY-91 budget, the requirements for this were foggy. It must also be determined who has the lead responsibility for the development (TD or ER), and associated funding details clarified.

6.3 Annual Funding Category Budget Projections

Because all work being performed on the Pad A Treatability Study Project is for demonstration and testing in the support of the full-scale remedial action for the Pad A Site, the funds appropriated are Operations Funds.

7. RESOURCE ALLOCATION

7.1 Annual Resource Projections

Annual resource projections for FY-91, FY-92, and FY-93 are shown in Appendix E "Annual Resource Allocation Summary."

7.2 Estimated Annual Contract Costs

It is anticipated that both lab- and pilot-scale testing will be performed on the Pad A Treatability Study Project. Two lab-scale and two pilot-scale tests are included for performance by two separate vendors, universities or other organizations. It is currently anticipated the two most feasible and applicable technologies will be demonstrated through lab- and bench-scale demonstration. These two technologies will be distinct and not related to each other in terms of process. The technologies meeting the lab- and bench-scale requirements and objectives will proceed to pilot-scale demonstration at the INEL. The basis for determining this process is as follows:

- Technologies presented for demonstration are widely diverse and for the most part untried with similar waste. Applicable technologies for the plutonium-contaminated nitrate salts range from verification of the waste to treatment of the waste, and deal with both the radioactive and hazardous constituents in the waste. Based upon this diversity, the highest likelihood for project success is the testing of two different technologies, or combinations of technologies
- Failure of one of the technologies to meet the testing requirements and objectives established will not result in a restart of the Treatability Study Project. Demonstration would continue with the remaining technology.

Only those lab-scale tests that satisfy the lab-scale testing objectives will proceed to pilot-scale testing.

Lab-Scale Tests

This testing involves performing laboratory-scale testing on small samples of actual waste at the vendors facility. The cost plan accounts for two separate lab-scale studies (Technology A and Technology B) being performed. The lab-scale tests were estimated to cost \$125K each, plus EG&G Idaho procurement administration costs. As previously stated, depending on the technology selected for demonstration, this cost may vary significantly.

Pilot-Scale Tests

This testing involves performing pilot-scale testing on actual waste at the Pad A Site at the RWMC. Only the vendors/technologies that successfully complete the laboratory-scale testing requirements and objectives will perform pilot-scale testing. The pilot-scale tests were estimated to cost \$500K each plus administration costs.

Contract costs of the lab-scale and pilot-scale testing for FY-91, FY-92, and FY-93, including procurement administration costs, are shown in Table 3.

Table 3. Fiscal Year Contract Costs Spending

TESTING	FY-91	FY-92	FY-93
Lab-Scale Testing Technology A	-	\$ 132.5K	-
Lab-Scale Testing Technology B	-	\$ 132.5K	-
Pilot-Scale Testing Technology A	-	\$ 199.3K	\$ 313.3K
Pilot-Scale Testing Technology B	-	\$ 199.3K	\$ 313.3K

8. TECHNOLOGY DEPLOYMENT PLAN

8.1 Cooperative/Collaborative Agreements

The Pad A Treatability Study Project will seek collaborative agreements with private industries, universities, or other organizations in the performance of lab- and pilot-scale testing. A note of this preference has been made in the *Commerce Business Daily* solicitation, and will be made in the Formal Request For Quotation, and if still to no avail, in discussion with the vendor, university, or organization prior to the Best and Final Offer. These type of agreements will be given some preference in the evaluation process.

8.2 Applicable Regulations and Requirements (ARARs)

Work on the Pad A Treatability Study project shall be conducted in accordance with all applicable Federal, state, local, DOE specific, and EG&G Idaho laws, regulations, codes, and requirements. Although many requirements and regulations may be applicable to the work to be performed, only the most significant known to date are listed below. Other requirements and regulations will be identified as the treatment processes become more defined, and the specific ARARs are set in the Functional and Operational Requirements. Specification Assistance from the Environmental Technology Group will be obtained for preparation of ARARs.

The following is a listing of pertinent Federal and State of Idaho regulations, DOE Orders, and EG&G Idaho policies:

Federal Regulations (6)

1. National Environmental Policy Act (NEPA)
2. Comprehensive Environmental response Compensation and Liability Act (CERCLA) as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA)
3. Resource Conservation and Recovery Act (RCRA)
4. Occupational Safety and Health Act (OSHA)

5. Clean Air Act (CAA)
6. Safe Drinking Water Act (SDWA).

State of Idaho Regulations (3)

1. Idaho State Air Quality Standards
2. Idaho State Water Quality Standards
3. Idaho State Hazardous Waste Management Regulations.

DOE Orders (3)

1. DOE Order 5480.1A
2. DOE Order 5480.1B
3. DOE Order 5820.2.

EG&G Idaho Policies (5)

1. EG&G Idaho Safety Manual
2. EG&G Idaho Quality Manual
3. EG&G Idaho Radiological Controls Manual
4. EG&G Idaho Industrial Hygiene Manual
5. EG&G Idaho Waste Technology Development Department Program Directives.

It is planned that a separate Environmental Safety and Health Plan, Sampling Analysis Plan, and a Work Plan will be prepared for each lab- and pilot-scale demonstration test to be performed. It is planned that these will be assembled by the vendor and submitted to EG&G Idaho for thorough review and approval.

8.3 Technology Deployment Strategy

The Waste Management Department, through the efforts of the Environmental Restoration Group's WAG #7 Unit, is responsible for the RI/FS, ROD, and overall remedial action for the Pad A Site. The Waste Technology Development Department, through efforts of the Technology Demonstration Group's Project Demonstration Unit, are in direct support of the efforts of the ER Group through performance of the treatability study. Key outputs from ER to TD and from TD to ER have been determined and are presented as follows:

TD Output to ER

- To support RI/RS scoping based upon the ER accelerated schedule, the technology/vendor evaluation report is to be issued to ER (09-28-91)
- To support the ER proposed Plan and ROD, a interim report of the Lab-Scale Testing is to be prepared and issued (01-20-92)
- All major reports, letters, findings, and significant events are to be reported to ER (as published or made).

ER Output to TD

- Provide waste samples as needed by TD for the lab- and pilot-scale operations (as defined by where sample is to be obtained from) (07-09-92)
- Provide waste characterization information of the Pad A waste as needed by TD (04-15-92)
- All major reports, letters, findings, and significant events are to be reported to TD (As published or made)
- Provide information to TD on the ARARs for the cleanup (07-06-91).

8.4 Technology Transfer

Cooperative Research and Development Agreements (CRADAs) are to be aggressively pursued. The work being conducted and the contracts to be let

through the performance of this project are thought to be conducive of CRADA types of contracts. Measures taken to promote CRADA types of proposals will be to mention the preference to CRADA types of contracts in CBD and RFP solicitations, to work with final vendors in the development of CRADAs prior to contract award, and to give some degree of preference to CRADA types of proposals in the vendor evaluation process. The Project will work closely with the EG&G Idaho Office of Research and Technology Application in the selection of vendors and the award of the contract for the lab- and pilot-scale testing. Concerning timing, CRADA or other types of cost sharing agreements, would need to be established and agreed upon prior to the issuance of the request for purchase of the vendor/technology for the vendor to perform the Pad A Treatability Study. Transition of the technology would occur after the pilot-scale testing had been completed and the results evaluated.

In the analysis of "is the technology being pursued through the performance of this contract thought to be transferable to industry," the following observations are made. For the technology to be widely deployed, it should have a wide application in both the government and private sector. Because of the nature of the waste of this project (Pu-contaminated salts), the application of a developed technology would not have direct application in the private sector because this exact type of waste does not exist. Similar waste forms such as heavy metals, or spin-off technologies derived from the deployment of this project, may have application in the private sector. In addition, it is believed that there are other opportunities in the government sector for the need of this remediation technology. Based upon production activities, the Rocky Flats Facility and the Oak Ridge National Laboratory are two facilities where additional Pu-contaminated salts are thought to exist. Because of industry involvement in these remediation activities, the potential for additional work derived from the technology advanced through the Pad A Treatability Study Project exists, and as stated above, will be pursued.

9. POTENTIAL TECHNOLOGY DEVELOPMENT BENEFITS

The technologies, processes, and vendors selected to be demonstrated on the Pad A Treatability Study Project have direct application and benefit in the full-scale remediation of the Pad A site. Work being done on this project is on the basis of the full-scale remediation of the Pad A Site, as is stated in the project objective. This project is driven by regulatory compliance.

The investigation and demonstration information derived from the work at the Pad A site will also be provided to other organizations within the DOE complex that may have the same or similar types of waste. In addition, the DOE laboratories who have the lead in the technology demonstrated will be kept informed of the project status and findings. The information gained through the performance of the Pad A Treatability Study is thought to have direct application to similar wastes at the Rocky Flats Site and possibly at the Oak Ridge National Laboratories Site. The INEL, through the performance of this project, will instigate presentations and information sharing concerning this project, and the specific type of waste, and treatment processes associated with the project.

The information gained through the performance of this project will also be provided to the Remedial Technology Information System (RTIS) Project.

10. CHANGE CONTROL

Changes to the Pad A Treatability Study Long-Range Planning document will be controlled consistent with the Waste Technology Development Department document control program. Changes to the plan will require issuance of a controlled revision. The original plan will be retained by the Pad A Treatability Study Cost Account Manager in the Pad A Treatability Study Project File.

The Long-Range Plan shall be changed as major changes arise. The Long-Range Plan is intended to provide the best information available on the performance and direction of the Pad A Treatability Study Project. The Technical Task Plan shall be updated once per year to reflect the Long-Range Plan.

The need for a project-wide Configuration Management Plan (CMP) will be evaluated. If project needs can be met through the existing waste technology department directives, no formal CMP will be prepared. Each vendor performing testing will be required to submit a CMP as part of the Quality Plan.

APPENDIX A
PAD A TREATABILITY STUDY PROJECT LOGIC DIAGRAM

ability Study Project
ic Diagram

T31 0317

Stability Study Project Logic Diagram

T91 0317

APPENDIX B
PAD A TREATABILITY STUDY COST ESTIMATE BASIS

Task: A: Project Management - 1

Duration: 26 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	260	N	S-E
4620	G1	80	G	40%-50%
E660	G1	80	J	10%-50%
4650	G1	80	F	S-E
4650	RE	\$250	-	S-50%
4630	G1	120	B	S-50%
E320	J12	\$3000	-	S-E
8000	G1	92	P	S-E

Deliverables

1. Long- range plan
2. Schedules, budgets, costing, presentations

Task: B: Project Management - 2

Duration: 26 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	260	N	S-E
E660	G1	40	J	50%-60%
4650	G1	80	F	S-E
4650	RE	\$250	-	S-E
E320	J12	\$3000	-	S-E
8000	G1	140	P	S-E

Deliverables

1. Schedules, budgets, costing, presentations

Pad A Treatability Study Project
Cost Development

Task: C: Project Management - 3

Duration: 26 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	260	N	S-E
4650	G1	80	F	S-E
4650	RE	\$250	-	S-E
E320	J12	\$3000	-	S-E
8000	G1	140	P	S-E

Deliverables

1. Schedules, budgets, costing, presentations

Task: D: Project Management - 4

Duration: 30 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	300	N	S-E
4650	G1	80	F	S-E
4650	RE	\$250	-	S-E
E320	J12	\$3000	-	S-E
8000	G1	92	P	S-E

Deliverables

1. Schedules, budgets, costing, presentations

Pad A Treatability Study Project
Cost Development

Task: E: Develop F and O Requirements

Duration: 6 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	252	N	S-E
E460	G1	20	M	90%-E
E4620	G1	40	G	66%-E
4630	G1	40	B	66%-E

Deliverables

1. F&OR Docment

Task: F: Technology/Vendor Selection - RFP/Evaluation

Duration: 15 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	420	N	S-E
E560	G1	40	M	60%-75%
E830	G1	60	M	50%-E
E850	G1	60	J	40%-70%
7830	G1	60	R	50%-E
4620	G1	60	G	50%-E
4630	G1	60	B	70%-E
E320	J12	\$6806	-	S-E

Deliverables

1. RFP Evaluation Report - All responded technologies
2. Request for proposal document
3. CBD Evaluation Report

Pad A Treatability Study Project
Cost Development

Task: G: Technology Vender Selection - Re-evaluation/selection

Duration: 4 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	248	N	S-E
E560	G1	24	M	S-33%
E830	G1	24	M	S-33%
E850	G1	24	J	S-33%
7830	G1	24	R	S-33%
4620	G1	80	G	33%-66%
E230	G1	80	L	66%-E
4630	G1	60	B	50%-E
4650	G1	60	F	S-E
4650	HE	\$190	-	S-E

Deliverables

1. Final Technology Selection Report
2. (K.T. analysis session for selection)

Task: H: Award the contract (s)

Duration: 4 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	160	N	S-E

Deliverables

1. RFP (S) issued

Pad A Treatability Study Project
Cost Development

Task: I: Lab-Scale NEPA Documentation

Duration: 13 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	60	N	W-20%
1120	G1	80	K	S-50%

Deliverables

1. Approved NEPA documentation for conducting Lab-Scale Tests

Task: J: Pilot-Scale NEPA Documentation

Duration: 26 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	80	N	S-20%
1120	G1	160	K	S-20%

Deliverables

1. Approved NEPA documentation for conducting Pilot-Scale studies

Pad A Treatability Study Project
Cost Development

Task: K: Lab-Scale Testing - Technology A

Duration: 26 weeks

Org	CE	Hrs/NL\$	SG	Spread
–	M8	\$132,500	–	20%-E
E320	G1	520	N	S-E
E640	G1	80	M	30%-60%
E830	G1	80	M	60%-80%
E850	G1	80	J	60%-80%
7830	G1	40	R	60%-70%
E320	J12	\$9000	–	S-E

Deliverables

1. Completed Lab-Scale testing for Technology A

Task: L: Lab-Scale Testing - Technology A

Duration: 26 weeks

Org	CE	Hrs/NL\$	SG	Spread
–	M8	\$132,500	–	20%-E
E320	G1	520	N	S-E
E640	G1	80	M	60%-80%
E830	G1	80	M	60%-80%
E850	G1	80	J	60%-80%
7830	G1	40	R	60%-70%
E320	J12	\$9000	–	S-E

Deliverables

1. Completed Lab-scale testing for Technology B

Pad A Treatability Study Project
Cost Development

Task: M: Lab-Scale Work Plan - Technology A

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	160	N	S-F
E830	G1	40	M	50%-75%
E850	G1	60	J	40%-70%
E740	G1	60	R	40%-70%
7830	G1	20	R	50%-75%

Deliverables

1. Technology A Lab-Scale Work Plan

Task: N: Lab-Scale Work Plan - Technology B

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	160	N	S-F
E830	G1	40	M	50%-75%
E850	G1	60	J	40%-70%
E740	G1	60	R	40%-70%
7830	G1	20	R	50%-75%

Deliverables

1. Technology B Lab-Scale Work Plan

Pad A Treatability Study Project
Cost Development

Task: O: Lab-Scale Sampling Analysis Plan - Technology A

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	80	N	S-E
E830	G1	80	M	25%-75%
E740	G1	60	R	40%-60%
7830	G1	40	R	40%-60%

Deliverables

1. Technology A Lab-Scale Sampling Analysis Plan

Task: P: Lab-Scale Sampling Analysis Plan - Technology B

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	80	N	S-F
E830	G1	80	M	25%-75%
E740	G1	60	R	40%-60%
7830	G1	40	R	40%-60%

Deliverables

1. Technology B Lab-Scale Sampling Analysis Plan

Pad A Treatability Study Project
Cost Development

Task: Q: Lab-Scale Health and Safety Plan - Technology A

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	80	N	S-E
E620	G1	60	L	25%-75%
7830	G1	60	R	25%-60%
E850	G1	40	J	25%-75%

Deliverables

1. Technology A Lab-Scale Health and Safety Plan

Task: R: Lab-Scale Health and Safety Plan - Technology B

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	80	N	S-E
E620	G1	60	L	25%-75%
7830	G1	60	R	25%-75%
E850	G1	40	J	25%-75%

Deliverables

1. Technology B Lab-Scale Health and Safety Plan

Pad A Treatability Study Project
Cost Development

Task: S: Lab-Scale Evaluation Reports - Technology A

Duration: 12 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	288	N	S-E
E830	G1	120	M	25%-75%
7830	G1	80	R	33%-66%
4620	G1	80	G	40%-90%
4650	G1	40	F	40%-90%
4630	G1	60	B	40%-80%
E320	J12	3000	-	S-E
4650	RE	125	-	40%-80%

Deliverables

1. Evaluation Report of Technology A Lab-Scale Demonstration

Task: T: Lab-Scale Evaluation and Reports - Technology B

Duration: 12 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	288	N	S-E
E830	G1	120	M	25%-75%
7830	G1	80	R	33%-66%
4620	G1	80	G	40%-90%
4650	G1	40	F	40%-90%
4630	G1	60	B	40%-80%
E320	M8	3000	-	5%-E%
4650	RE	\$125	-	40%-80%

Deliverables

1. Evaluation Report of Technology B Lab-Scale Demonstration

Pad A Treatability Study Project
Cost Development

Task: U: Pilot-Scale Testing - Technology A

Duration: 40 weeks

Org	CE	Hrs/NL\$	SG	Spread
-	M8	\$512,620	-	10%-E
E320	G1	680	N	S-E
E640	G1	80	M	25%-75%
E830	G1	80	M	25%-75%
E850	G1	80	J	25%-75%
7830	G1	80	R	25%-75%
E320	J12	\$12,000	-	S-E
E560	G1	120	M	S-50%
E620	G1	80	L	S-E

Deliverables

1. Completed Pilot-Scale Testing for Technology A

Task: V: Pilot-Scale Testing - Technology B

Duration: 40 weeks

Org	CE	Hrs/NL\$	SG	Spread
-	M8	\$512,620	-	10%-E
E320	G1	680	N	S-E
E640	G1	80	M	25%-75%
E830	G1	80	M	25%-75%
E850	G1	80	J	25%-75%
7830	G1	80	R	25%-75%
M8	J12	\$12,000	-	S-E
E560	G1	120	M	S-50%
E620	G1	80	L	S-E

Deliverables

1. Completed Pilot-Scale Testing for Technology B

**Pad A Treatability Study Project
Cost Development**

Task: W: Pilot-Scale Work Plan - Technology A

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	160	N	S-E
E830	G1	40	M	50%-75%
E850	G1	60	J	40%-70%
E740	G1	60	R	40%-70%
7830	G1	20	R	50%-75%

Deliverables

1. Technology A Pilot-Scale Work Plan

Task: X: Pilot-Scale Work Plan - Technology B

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	160	N	S-F
E830	G1	40	M	50%-75%
E850	G1	60	J	40%-70%
E740	G1	60	R	40%-70%
7830	G1	20	R	50%-75%

Deliverables

1. Technology B Pilot-Scale Work Plan

Pad A Treatability Study Project
Cost Development

Task: Y: Pilot-Scale Sampling Analysis Plan - Technology A

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	80	N	S-E
E830	G1	80	M	25%-75%
E740	G1	60	R	40%-60%
7830	G1	40	R	40%-60%

Deliverables

1. Technology A Sampling Analysis Plan - Pilot-Scale

Task: Z: Pilot-Scale Sampling Analysis Plan - Technology B

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	80	N	S-E
E830	G1	80	M	25%-75%
E740	G1	60	R	40%-60%
7830	G1	40	R	40%-60%

Deliverables

1. Technology B Sampling Analysis Plan - Pilot-Scale

Pad A Treatability Study Project
Cost Development

Task: AA: Pilot-Scale Health and Safety Plan - Technology A

Duration: 8 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	80	N	S-E
E620	G1	60	L	25%-75%
7830	G1	60	R	25%-75%
E850	G1	40	J	25%-75%

Deliverables

1. Technology A Pilot-Scale Health and Safety Plan

Task: BB: Pilot-Scale Health and Safety Plan - Technology B

Duration: _____

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	80	N	S-E
E620	G1	60	L	25%-75%
7830	G1	60	R	425%-75%
E850	G1	40	J	25%-75%

Deliverables

1. Technology B Pilot-Scale Health and Safety Plan

Pad A Treatability Study Project
Cost Development

Task: CC: Pilot-Scale Evaluation and Report - Technology A

Duration: 20 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	200	N	S-E
E320	G1	320	N	30%-70%
4650	G1	80	F	60%-80%
4660	G1	80	C	95%-E
E830	G1	80	M	40%-60%
7830	G1	40	R	50%-60%
4650	RE	\$250	-	60%-80%
4620	G1	80	-	60%-80%

Deliverables

1. Evaluation Report of Technology A Pilot-Scale Demonstration

Task: DD: Pilot-Scale Evaluation and Report - Technology B

Duration: 20 weeks

Org	CE	Hrs/NL\$	SG	Spread
E320	G1	200	N	S-E
E320	G1	320	N	30%-70%
4650	G1	80	F	60%-80%
4660	G1	80	C	95%-E
E830	G1	80	M	40%-60%
7830	G1	40	R	50%-60%
4620	RE	80	-	60%-80%
4650	G1	\$250	-	60%-80%

Deliverables

1. Evaluation Report of Technology B Pilot-Scale Demonstration

Pad A Treatability Study Project
Cost Development

Work Package No.

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	ST or CT	\$	Description		
E320	260				A. Project Management - 1 Project Management - based upon 10 hr/wk for 26 weeks	
E4620	80				Technical writing support - based upon 40 hr/wk for 2 weeks	
E660	80				Project Management Assistant - 20 hr/wk for 4 weeks	
4650	80				Graphic Arts support - 40 hr/wk for 2 weeks	
4630	120				Electronic Publishing support - 40 hr/wk for 3 weeks	
4650			\$250	Graphic Arts Materials	\$125 per 40 hrs labor of 4650	
E320			\$3,000	Travel	2 trips @ \$1,500 each	
8000	92				1 1/2% of total cost for first 26 weeks (20%) 	

Fiscal Year 91 - 93

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	ST or CT	\$	Description		
E320	260				B. Project Management - 2 Project Management - based upon 10 hr/wk for 26 weeks	
E660	40				Project Management Assistant - 40 hr/wk for 1 weeks	
4650	80				Graphic Arts support - 40 hr/wk for 2 weeks	
4650	-		\$250	Graphic Arts Materials	\$125 per 40 hrs labor of 4650	
E320	-		\$3,000	Travel	2 trips @ \$1,500 each	
8000	140				1 1/2% of total cost for second 26 weeks (30%)	

Work Package No. _____

[illegible]

Work Package No.

[illegible]

Rev. No. 1 Fiscal Year 91 - 93[illegible]

Work Package No

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	SF or CT	\$	Description		
E320	420				E. Develop F&O Requirements Lead evaluation effort - 1 indiv. 24 hr/wk for 10 weeks, 1 indiv. 12 hr/wk for 15 weeks Electrical Engineering support - 20 hr/wk for 2 weeks Chemical Engineering support - 20 hr/wk for 3 weeks Environmental Eng. support - 20 hr/wk for 3 weeks Chem/Rad Risk Assessment - 20 hr/wk for 3 weeks Technical Writing support - 20 hr/wk for 3 weeks Electronic Publishing support - 20 hr/wk for 3 weeks 4 man trips @ \$1,500 ea and \$800 library expenses	
E560	40					
E830	60					
E850	60					
7830	60					
4620	60					
4630	60					
			\$6,800	Travel		

WORK PACKAGE DOCUMENTATION

Resource Summary

Date Prepared 5/20/91 Rev. No. 1 Fiscal Year 91 - 93 Work Package No. _____

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	ST or CT	\$	Description		
E320	248				G. Technology/Vendor Selection - Re-evaluation/Selection	
E560	24				Lead evaluation effort - 1 FTE for 4 weeks, 1 indiv. 22 hr/wk for 4 weeks	
E830	24				Electrical Engineering support - 20 hr/wk for 2 weeks	
E850	24				Chemical Engineering support - 20 hr/wk for 2 weeks	
7830	24				Environmental Eng. support - 20 hr/wk for 2 weeks	
4620	80				Risk Assessment - 20 hr/wk for 3 weeks	
E230	80				Technical Writing support - 40 hr/wk for 2 weeks	
4630	60				Cost Estimating support - 40 hr/wk for 2 weeks	
4650	60				Electronic Publishing support - 20 hr/wk for 3 weeks	
4650			\$190	Graphic Arts materials	Graphic Arts support - 20 hr/wk for 3 weeks	
4650					\$125/40 hrs labor from 4650	

Work Package No. _____

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	ST or CT	\$	Description		
E320	160				H. Award the Contract Mechanical Engineering - 40 hr/wk for 4 weeks	

Work Package No. _____

[illegible]

WORK PACKAGE DOCUMENTATION

Resource Summary

Date Prepared 5/20/91 Rev. No. 1 Fiscal Year 91 - 93 Work Package No. _____

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	ST or CT	\$	Description		
E320	80				J. Pilot-scale NEPA Documentation	
1120	160				Mechanical Engineering - 20 hr/wk for 4 weeks	
					Environmental Compliance - 40 hr/wk for 4 weeks	

91 - 93

[illegible]

Date Prepared 5/20/91 Rev. No. 1 Fiscal Year 91 - 93 Work Package No. _____

[illegible]

Date Prepared 5/20/91 Rev. No. 1 Fiscal Year 91 - 93 Work Package No. _____

[illegible]

91 - 93

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	ST or CT	\$	Description		
E320	160				N. Lab-scale Work Plan - Technology B	
E830	40				Mechanical Engineering - 20 hr/wk for 8 weeks	
E850	60				Chemical Engineering - 20 hr/wk for 2 weeks	
E740	60				Environmental Compliance - 30 hr/wk for 2 weeks	
7830	20				Measurement Systems - 30 hr/wk for 2 weeks	
					Risk Assessment - 20 hr/wk for 2 weeks	

Work Package No. _____

[illegible]

[illegible]

5/20/91

[illegible]

Work Package No.

[illegible]

Work Package No.

[illegible]

Work Package No.

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	ST or CT	\$	Description		
E320	288				T. Lab-scale Evaluation and Reports Technology B	
E830	120				Mechanical Engineering - 24 hr/wk for 12 weeks	
7830	80				Chemical Engineering - 20 hr/wk for 6 weeks	
4620	80				Risk Assessment - 20 hr/wk for 4 weeks	
4650	40				Technical Writing - 20 hr/wk for 4 weeks	
4630	60				Graphic Arts - 20 hr/wk for 2 weeks	
E320			\$3,000	Travel	Electronic Publishing - 20 hr/wk for 3 weeks	
4650			\$125	Graphic Arts materials	Travel to vendor facility - 2 trips @ \$1,500 each	
					\$125 per 40 hrs labor - 4650	

Date Prepared 5/20/91

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	ST or CT	\$	Description		
E320	680				U. Pilot-scale testing Technology A	
E640	80				Mechanical Engineering - 17 hr/wk for 40 weeks	
E830	80				Quality Engineering - 10 hr/wk for 8 weeks	
E850	80				Chemical Engineering - 10 hr/wk for 8 weeks	
7830	80				Environmental Engineering - 10 hr/wk for 8 weeks	
E560	120				Risk Assessment - 10 hr/wk for 8 weeks	
E620	80				Electrical Engineering - 20 hr/wk for 6 weeks	
E320			\$12,000	Travel	Safety Engineering - 4 hr/wk for 20 weeks	
M-8			\$512,620	Pilot-scale\ test	Travel to vendor facility - 8 trips @ \$1,500 each	
					1 ea. \$501,000 - w/2% adder and 16% G&A	

Fiscal Year 91 - 93

Performing Organization	Labor		Non-Labor		Estimate Basis	Performing Organization Acknowledgment
	Hours	ST or CT	\$	Description		
E320	680				V. Pilot-scale testing Technology A	
E640	80				Mechanical Engineering - 17 hr/wk for 40 weeks	
E830	80				Quality Engineering - 10 hr/wk for 8 weeks	
E850	80				Chemical Engineering - 10 hr/wk for 8 weeks	
7830	30				Environmental Engineering - 10 hr/wk for 8 weeks	
E560	120				Risk Assessment - 10 hr/wk for 8 weeks	
E620	80				Electrical Engineering - 20 hr/wk for 6 weeks	
E320			\$12,000	Travel	Safety Engineering - 4 hr/wk for 20 weeks	
M-8			\$512,620	Pilot-scale\ test	Travel to vendor facility - 2 trips @ \$1,500 each	
					1 ea. \$501,000 - w/2% adder and 16% G&A	

Date Prepared 5/20/91

[illegible]

WORK PACKAGE DOCUMENTATION

Resource Summary

Date Prepared 5/20/91 Rev. No. 1 Fiscal Year 91 - 93 Work Package No. _____

[illegible]

[illegible]

WORK PACKAGE DOCUMENTATION

Resource Summary

Date Prepared 5/20/91 Rev. No. 1 Fiscal Year 91 - 93 Work Package No. _____

[illegible]

Date Prepared 5/20/91

[illegible]

91 - 93

[illegible]

WORK PACKAGE DOCUMENTATION

Resource Summary

Date Prepared 5/20/91 Rev. No. 1 Fiscal Year 91 - 93 Work Package No. _____

[illegible]

91 - 93

Work Package No.

APPENDIX C
PAD A TREATABILITY STUDY PROJECT
WORK BREAKDOWN STRUCTURE

Pad A Treatability Work Breakdown

Stability Study Project Work Breakdown Structure (WBS)

T91 0265

APPENDIX D
PAD A TREATABILITY STUDY
WORK BREAKDOWN STRUCTURE COST BREAKDOWN

Table D-1. Pad A Treatability Study WBS Cost Breakdown

TASK	CHARGE NUMBER	FY-91	FY-92	FY-93
Project Management - 1	32D212101	\$ 38.6 K	\$ 6.2 K	-
Project Management - 2	32D212110	-	\$ 38.2 K	-
Project Management - 3	32D212111	-	\$ 26.1 K	\$ 9.6 K
Project Management - 4	32D212112	-	-	\$ 35.1 K
Develop F&O Requirements	32D212103	\$ 22.4 K	-	-
Technology Evaluation	32D212102	\$ 57.1 K	-	-
Technology Selection	32D212120	\$ 38.4 K	-	-
Award Contract(s)	32D212121	-	\$ 11.5 K	-
Lab-Scale NEPA	32D212130	\$ 7.7 K	\$ 1.0 K	-
Pilot-Scale NEPA	32D212131	-	\$ 14.7 K	-
SAR Documentation	32D212132	-	-	-
Technology A Lab-Scale Testing	32D212040	-	\$197.5 K	-
Technology A Lab-Scale Work Plan	32D212041	-	\$ 24.0 K	-
Technology A Lab-Scale ES&H Plan	32D212042	-	\$ 16.7 K	-
Technology A Lab-Scale SA&Q Plan	32D212043	-	\$ 19.0 K	-
Technology A Lab-Scale Evaluation and Reports	32D212044		\$ 46.0 K	
Technology B Lab-Scale Testing	32D212050	-	\$197.5 K	-
Technology B Lab-Scale Work Plan	32D212051	-	\$ 24.0 K	-
Technology B Lab-Scale ES&H Plan	32D212052	-	\$ 16.7 K	-
Technology B Lab-Scale SA&Q Plan	32D212053	-	\$ 19.0 K	-
Technology B Lab-Scale Evaluation and Reports	32D212054		\$46.0 K	

Table D-1. (continued).

TASK	CHARGE NUMBER	FY-91	FY-92	FY-93
Project Management - 1	32D212101	\$ 38.6 K	\$ 6.2 K	-
Technology A Pilot-Scale Testing	32D212060	-	\$ 246.8 K	\$362.1 K
Technology A Pilot-Scale Work Plan	32D212061	-	\$ 24.0 K	-
Technology A Pilot-Scale ES&H Plan	32D212062	-	\$ 16.7 K	-
Technology A Pilot-Scale SA&Q Plan	32D212063	-	\$ 19.0 K	-
Technology A Pilot-Scale Evaluation and Reports	32D212064			\$ 55.1 K
Technology B Pilot-Scale Testing	32D212070	-	\$246.8 K	\$362.1 K
Technology B Pilot-Scale Work Plan	32D212071	-	\$ 24.0 K	-
Technology B Pilot-Scale ES&H Plan	32D212072	-	\$ 16.7 K	-
Technology B Pilot-Scale SA&Q Plan	32D212073	-	\$ 19.0 K	-
Technology B Pilot-Scale Evaluation and Reports	32D212074	-	-	\$ 55.1 K
TOTALS (Operations)	-	\$ 164.2 K	\$1317.1 K	\$879.1 K

APPENDIX E
PAD A TREATABILITY STUDY
ANNUAL RESOURCE ALLOCATION SUMMARY

Table E-1. Pad A Treatability Study Resource Allocations - (hours)

RESOURCE	UNIT	FY-91	FY-92	FY-93
Cost Estimator	E230	-	80	-
Mechanical Engineer	E320	724	2728	1148
Project Engineer	E320*	466	1500	1010
Config. Management	E460	20	58	22
Electrical Engineer	E560	64	228	12
Safety Engineer	E620	-	192	88
Quality Engineer	E640	-	232	88
Project Management Assistant	E660	80	40	-
Measurement Engineer	E740	-	592	88
Chemical Engineer	E830	84	952	88
Environmental Engineer	E850	84	592	88
Env't. Regs Personnel	1120	62	178	-
Technical Writer	4620	260	160	160
Electronic Publishing	4630	232	240	88
Graphic Arts	4650	100	200	240
Printing	4660	-	-	160
Risk Assessment	7830	84	680	40
Planning and Budgets	8000	74	260	130

* Project management functions

APPENDIX F
PAD A TREATABILITY STUDY PROJECT LEVEL 1 SCHEDULE

Table F-1. Pad A treatability study schedule milestones

No.	Milestone	Type	Date
1.	Long-Range Planning Document Completion	()	06-28-91
2.	Initial Technology/CBD Evaluation	()	07-15-91
3.	F&OR Document	()	07-15-91
4.	Final Technology Selection Evaluation Report (Supports RI/FS Scoping)	#	09-28-91
5.	Award Treatability Study Contracts	()	10-26-91
6.	NEPA Documentation Approval		
	Lab-Scale	*	11-30-91
	Pilot-Scale	*	04-11-92
7.	Safety Analysis Report (Pilot-Scale)	*	05-20-92
8.	Lab-Scale Interim Report Technology A (Supports Proposed Plan/ROD)	#	01-20-92
9.	Lab-Scale Interim Report Technology B (Supports Proposed Plan/ROD)	#	01-20-92
10.	Completion of Lab-Scale Testing Technology A	()	04-25-92
11.	Completion of Lab-Scale Testing Technology B	()	04-25-92
12.	Lab-Scale Final Evaluation and Report Technology A	#	05-23-92
13.	Lab-Scale Final Evaluation and Report Technology B	#	05-23-92
14.	Completion of Pilot-Scale Testing Technology A	()	02-13-93
15.	Completion of Pilot-Scale Testing Technology B	()	02-13-93
16.	Pilot-Scale Evaluation and Report Technology A	#	05-08-93
17.	Pilot-Scale Evaluation and Report Technology B	#	05-08-93
# - Major Milestone, * - Key Milestone, () - Minor Milestone			

- Δ -- Nodes
 — -- Header Task Durations
 () -- Minor Milestone
 * -- Key Milestone
 # -- Major Milestone

Task Name	Duration	1771		
		771	33	20
PROJECT MANAGEMENT	108.0 week			
PROJECT MANAGEMENT - 1	25.0 week			
PROJECT MANAGEMENT - 2	25.0 week			
PROJECT MANAGEMENT - 3	25.0 week			
PROJECT MANAGEMENT - 4	30.0 week			
TECHNOLOGY & VENDOR SELECTION	23.0 week			
DEVELOP IUD REQUIREMENTS	5.0 week			
QUOTES/EVALUATION/REPORT	15.0 week			
TECHNOLOGY SELECTION	4.0 week			
AWARD CONTRACT	4.0 week			
MEPA DOCUMENTATION	32.0 week			
LAB SCALE MEPA IOD	13.0 week			
PILOT SCALE MEPA IOD	25.0 week			
LAB SCALE TESTING	25.0 week			
TECHNOLOGY A LAB SCALE TESTING	25.0 week			
TECHNOLOGY B LAB SCALE TESTING	25.0 week			
LAB SCALE WORK PLANS	8.0 week			
TECHNOLOGY A WORK PLAN	8.0 week			
TECHNOLOGY B WORK PLAN	8.0 week			
LAB SCALE SPP	8.0 week			
TECHNOLOGY A SPP	8.0 week			
TECHNOLOGY B SPP	8.0 week			
LAB SCALE HDS PLANS	8.0 week			
TECHNOLOGY A HDS PLAN	8.0 week			
TECHNOLOGY B HDS PLAN	8.0 week			
LAB SCALE EVALUATION & REPORTS	12.0 week			
TECHNOLOGY A EVAL & REPORTS	12.0 week			
TECHNOLOGY B EVAL & REPORTS	12.0 week			
PILOT SCALE TESTING	40.0 week			
TECHNOLOGY A PILOT SCALE TEST	40.0 week			
TECHNOLOGY B PILOT SCALE TEST	40.0 week			
PILOT SCALE WORK PLANS	9.0 week			
TECHNOLOGY A WORK PLAN	8.0 week			
TECHNOLOGY B WORK PLAN	8.0 week			
PILOT SCALE SPP	8.0 week			
TECHNOLOGY A SPP	8.0 week			
TECHNOLOGY B SPP	8.0 week			
PILOT SCALE HDS PLANS	9.0 week			
TECHNOLOGY A HDS PLAN	8.0 week			
TECHNOLOGY B HDS PLAN	8.0 week			
PILOT SCALE EVAL & REPORTS	20.0 week			
TECHNOLOGY A EVAL & REPORTS	20.0 week			
TECHNOLOGY B EVAL & REPORTS	20.0 week			

PRO A TREATABILITY STUDY

LEVEL 1 SCHEDULE

J. D. MOUSSEAU

END

**DATE
FILMED**

2 / 05 / 92