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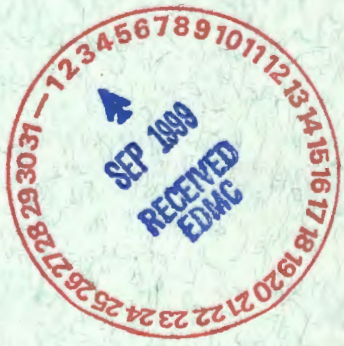
Draft A

Engineering Evaluation/Cost Analysis for the 600 Area Purgewater Storage and Treatment Facility



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The approval signatures on this page indicate that this document has been authorized for information release to the public through appropriate channels. No other forms or signatures are required to document this information release.

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Draft A

Engineering Evaluation/Cost Analysis for the 600 Area Purgewater Storage and Treatment Facility

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CONTENTS

TABLE

APPENDIX

1.0 INTRODUCTION

This engineering evaluation/cost analysis (EE/CA) is intended to aid the Washington State Department of Ecology in selecting a response action alternative for removing the potentially contaminated liners, steel sidewalls, sludge, and soil from the Purgewater Storage and Treatment Facility (PSTF) site. This EE/CA evaluates possible alternative response actions for this removal.

2.0 SITE DESCRIPTION

2.1 SITE DESCRIPTION AND BACKGROUND

The PSTF is a storage and treatment unit for extracted groundwater. The PSTF is located at latitude 46 degrees 33 minutes 51 seconds, longitude –119 degrees 30 minutes 15 seconds, and consists of two aboveground open containment vessels designed and built to store purgewater from the Hanford Site. The ModuTanks™[1] are free-standing, self-supporting units installed on a planar earthen surface 55 m (180 ft) above groundwater (based on 1995 groundwater contours). They are constructed of steel components and have a capacity of 3,785,400 L (1,000,000 gal) each. Both tanks are double-lined with 80-mil high-density polyethylene, and contain a leak detection system between the two liners. The one active ModuTank has been in operation since 1989. The second ModuTank has never been used and is not a part of the evaluation conducted in this EE/CA.

2.2 PREVIOUS REMOVAL ACTIONS

There have been no previous removal actions at the PSTF site.

2.3 SOURCE, NATURE, AND EXTENT OF CONTAMINATION

The PSTF was constructed to receive purgewater and other wastewater for storage and solar evaporation from *Comprehensive Environmental Response Compensation and Liability Act of 1980* (CERCLA) activities, and *Resource Conservation and Recovery Act of 1976* (RCRA) activities related to groundwater wells. A volume of 8,800 liters per day can be treated in the single operational ModuTank. The U.S. Environmental Protection Agency listed waste codes F001, F002, F003, F004, F005, and the characteristic waste code D019 (carbon tetrachloride concentration > 0.5mg/L) are reflected in the PSTF Dangerous Waste Part A Permit Application (DOE/RL 1998).

[1] ModuTank is a tradename of ModuTank, Inc., Long Island City, New York.

3.0 IDENTIFICATION OF REMOVAL ACTION SCOPE, GOALS, AND OBJECTIVES

3.1 GOAL

The goal of this CERCLA removal action is to eliminate the potential for soil and groundwater contamination due to the release of potentially contaminated purgewater from the PSTF. This leads to a course of action to cease operation of the PSTF and close the site.

3.2 REMOVAL SCOPE

The scope of this removal action is total site cleanup of the PSTF site pursuant to the closure requirements of WAC 173-303-610 for clean closure of a chemical, physical, and biological treatment unit, and removal of hazardous substances pursuant to CERCLA.

3.3 REMOVAL OBJECTIVES

Specific objectives for the CERCLA removal action are the closure performance standards of WAC 173-303-610(2) that require the owner/operator of a treatment, storage, or disposal unit to close the unit in a manner that accomplishes the following:

1. Minimizes the need for further maintenance necessary to protect human health and the environment

2. Controls, minimizes, or eliminates postclosure escape of dangerous waste or waste constituents to the extent necessary to protect human health and the environment

3. Returns the land to the appearance and use of surrounding land areas.

3.4 REMOVAL SCHEDULE

This removal action is scheduled to begin its planning phase in the fourth quarter of 1999 and complete the action in the third quarter of 2000.

4.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Alternatives under consideration for closure and removal of the ModuTanks are as follows:

- No action
- Landfill closure
- Clean closure.

The no action alternative would include the cessation of operations but continuing maintenance and inspection activities.

The landfill closure alternative would remove and dispose the clean Modutank, and leave or collapse all components of the operational ModuTank into a pile or ditch at the site and then cover with a soil landfill cap. Surrounding soil would be sampled for contamination and included under the cap if found to be contaminated. A postclosure care plan would be developed to describe the postclosure inspection, maintenance, and monitoring activities that would be conducted for 30 years.

The clean closure alternative would remove all components and contaminated sludge or soil from the site to levels below the Model Toxics Control Act Method B and confirm that radioactivity levels meet the Waste Acceptance Criteria for the disposal facility. Confirmation soil sampling would be conducted to verify that the soil left in place meets these levels and then warning signs and barriers would be removed. Onsite treatment of waste residues or soil would be performed if necessary to meet land disposal restrictions (LDR) or waste acceptance criteria of the receiving disposal facility.

5.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

This section evaluates the removal alternatives against the following criteria:

- Effectiveness
- Implementability
- Cost.

5.1 EFFECTIVENESS

5.1.1 Overall Protection

The overall protection criterion will be used to determine whether an alternative adequately protects human health and the environment. The criterion are minimization of risk levels (either from contaminant concentrations or exposure pathways) and minimization of exposure threats introduced by cleanup actions. This first criterion is a threshold requirement and the primary objective of the remedial program.

The no action alternative is not considered protective of human health and the environment because contaminants could be left in soils and migrate through the soil column, or be absorbed by plants causing exposure to wildlife. The landfill closure alternative would be protective because it isolates contaminants and monitors for their release from the unit. Landfill closure, however, still maintains a risk of future exposure through release of contaminants. The clean closure alternative is the most protective because it removes all potential contaminants from the site, eliminating risk from concentrations and exposure pathways.

5.1.2 Compliance with Applicable or Relevant and Appropriate Requirements

Applicable or relevant and appropriate requirements in federal and state law must be met or waived for CERCLA response actions. The WAC 173-303 requirements for a RCRA storage and treatment unit (40 CFR 265, Subpart Q), including the closure performance standard, are considered applicable to the closure of PSTF. For waste generated by the removal action, the generator requirements of WAC 173-303-170 for waste accumulation, waste designation, and waste packaging and handling will apply. In addition, the LDRs of WAC 173-303-140 will apply for waste intended for land disposal.

Actions taken to close PSTF could result in the potential for emissions of radionuclides. Activities that have the potential to generate radioactive emissions are regulated under 40 CFR 61, Subpart H and WAC 246-247. Radionuclide airborne emissions from all combined operations at the Hanford Site may not exceed 10 mrem/yr effective dose equivalent to the offsite maximally exposed individual. WAC 246-247 requires an evaluation of potential emissions, emissions controls, and monitoring. These items will be addressed for the selected alternative in an air monitoring plan after the Action Memorandum has been issued.

The no action alternative would not remove any of the unit components, waste residues, or potentially contaminated soil, and thus would not comply with the closure performance, the closure requirements for the unit, or the LDRs if the components or waste residues are dangerous waste. The landfill closure requirement would meet the closure performance standard but would not meet the specific closure requirements for the unit or the LDRs if the components and waste residues are dangerous waste.

The clean closure alternative would meet the closure performance standard, the unit-specific closure requirements for clean closure, the generator requirements by designating and properly packaging waste for disposal, and the LDRs for waste generated by the removal action, either automatically or via treatment prior to disposal.

5.1.3 Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence criterion is used to determine whether a risk remains after the conclusion of response actions. Because no potential contaminants would be removed, the no action alternative would not provide long-term protection of human health and the environment. The landfill closure alternative would provide some measure of long-term protection by isolating potential contaminants. However, a landfill closure alternative requires inspection and repair to ensure permanence. The clean closure alternative provides the greatest long-term protection and permanence by removing all potential contaminants.

5.1.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

None of the alternatives include treatment technology for contaminants, unless the contaminants exceed LDR or waste acceptance criteria. If treatment is required under those circumstances, waste residues or soil will be treated by stabilization to significantly reduce the mobility of contaminants.

5.1.5 Short-Term Effectiveness

The short-term effectiveness criterion is used to evaluate whether an alternative provides adequate protection to human health and the environment during the response action, and the length of time necessary for an action to achieve the established objectives. Because the no action alternative does not involve a response, there is no short-term impact from this alternative, and thus no short-term effectiveness. Because wastewater will not be present during the response action, both the landfill closure and the clean closure alternatives provide equivalent protection during the respective response actions. In addition, both alternatives could be fully implemented and thus achieve the protection within the 12-month non-time-critical removal action statutory time frame.

5.2 IMPLEMENTABILITY

The implementability criterion is used to evaluate whether the alternatives are technically and administratively feasible.

5.2.1 Technical Feasibility

All three alternatives are technically feasible.

5.2.2 Administrative Feasibility

Because the no action alternative does not meet the closure performance standard of controlling the escape of dangerous waste constituents or of returning the land and use of the surrounding areas, it is not considered administratively feasible. All of the alternatives will meet the statutory time limits of 12 months to implement. Any permits or approvals needed for onsite treatment of waste residues or contaminated soil can be obtained within the same time frame. No other approvals or waivers are expected to be needed.

5.2.3 Availability of Services and Materials

All construction, sampling, waste handling and shipping, disposal, and recycle services are readily available at the Hanford Site. Offsite disposal service agreements are already in place.

5.3 COST

The cost criterion is used to evaluate the cost effectiveness of an alternative. The no action alternative would have a no direct response cost, only annual monitoring and maintenance costs. The landfill closure alternative includes the following cost components:

1. Removal and disposal or recycle of the clean steel and plastic components of the inactive ModuTank

2. Construction of a RCRA equivalent landfill cover over the previously active ModuTank

3. Postclosure maintenance, inspection and monitoring for the previously active ModuTank.

The clean closure alternative includes the following cost components:

1. Removal and disposal (or recycle) of the clean steel and plastic components of the inactive ModuTank

2. Waste analysis for characterization

3. Removal, possible treatment, and disposal of the waste residues, steel and plastic components, and potentially contaminated soil of the previous active ModuTank

4. Verification soil sampling.

The estimated costs are shown in Table 5-1.

Table 5-1. PSTF Removal Alternatives Comparative Cost Summary.

Description of Alternative	Total Cost
No action	$2,000[a]
Landfill closure (modified RCRA cap)	$1,718,000[b]
Closure by removal (clean closure)	$196,000

[a] Annual cost of monitoring and maintenance.
[b] Includes monitoring and maintenance for 30 years.

6.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

Based on overall protection, compliance with regulations, and long-term effectiveness, the clean closure alternative is determined to be the preferred response alternative for the PSTF site. Clean closure will provide a higher degree of protectiveness to human health and the environment than the other two alternatives by eliminating potential risk from exposure to contaminants. In addition, clean closure will comply with all of the identified regulations, whereas the other two alternatives will not. Finally, clean closure provides greater long-term effectiveness and permanence by eliminating potential contaminants. Appendix A is the Closure Plan for clean closure of the PSTF site.

7.0 REFERENCES

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq.

DOE/RL, 1998, *600 Area Purgewater Storage Treatment Facility - Dangerous Waste Permit Application,* DOE/RL-88-21, Rev. 3, U. S. Department of Energy, Richland Operations Office, Richland, Washington.

Resource Conservation and Recovery Act of 1976, 46 U.S.C. 6901, et seq., as amended.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

WAC 246-247, "Radiation Protection--Air Emissions," *Washington Administrative Code*, as amended.

APPENDIX A

600 AREA PURGEWATER STORAGE AND TREATMENT FACILITY CLOSURE PLAN

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600 Area Purgewater Storage and Treatment Facility Closure Plan

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600 Area Purgewater Storage and Treatment Facility Closure Plan

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Draft A

CONTENTS

DOE/RL-99-43
Draft A

1.0 INTRODUCTION

This document provides a closure plan for the 600 Area Purgewater Storage and Treatment Facility (PSTF). This plan describes the requirements and activities that will be conducted for closure by removal of this *Resource Conservation and Recovery Act of 1976* (RCRA) interim status chemical, physical, and biological treatment unit. All waste residues, protective liners, leachate system components, and structural walls of the PSTF will be removed and either recycled or disposed in accordance with solid and dangerous waste regulations. At closure, the security fencing will be removed, the site graded, and inspections discontinued. There is currently no groundwater monitoring at the PSTF site and because there will be no waste or waste constituents left in place, there will be no post-closure care or monitoring.

2.0 SITE DESCRIPTION

The PSTF consists of two aboveground open containment vessels (ModuTanks™ [1]) located near the 216-B-3 Pond in the 600 Area at the Hanford Site. The ModuTanks were designed and built to store purgewater from groundwater monitoring activities at the Hanford Site. Groundwater monitoring is required by the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA); the RCRA compliance monitoring program; the Hanford Site monitoring program; and the Operational Groundwater Monitoring Program.

The two ModuTanks are constructed of steel components and have a capacity of approximately 3,790,000 L (1,000,000 gal) each. Each tank has a primary and a secondary liner of 80-mil high-density polyethylene separated by a geotextile drainage layer. A leachate detection system consisting of a standpipe with measurable depth and sampling capability is connected between the two liners. Only one of the ModuTanks installed has been operational. The other unit has never been used and is assumed to be a clean unit.

Purgewater was transferred to the PSTF by tanker truck and gravity-drained into the unit for storage and solar evaporation. The PSTF received approximately 1,137,000 L of purgewater per year that had the potential to be designated D019, F001, or state-only F003 dangerous waste.

3.0 CLOSURE STRATEGY

The closure of the PSTF will be a closure by removal (clean closure) of the unit. All potentially contaminated waste residues, plastic liners, metal sidewalls, leachate collection system components, and loading facility components will be removed and recycled or disposed as described in the following sections. Upon final closure, the site will be "down posted," security

[1] ModuTank is a tradename of ModuTank, Inc., Long Island City, New York.

fences will be removed, and inspections discontinued. The clean closure will be certified upon completion and no post-closure activity will be required.

The PSTF is subject to the requirements of WAC 173-303-400 and 40 CFR 265, Subpart Q as a chemical, physical, and biological treatment unit. As such, 40 CFR 265.404 requires that at closure "all hazardous waste and hazardous waste residues must be removed from treatment processes or equipment." The closure is also subject to the closure performance standards of WAC 173-303-610(2)(a) that requires closure in a manner that achieves the following:

1. Minimizes the need for further maintenance

2. Controls, minimizes, or eliminates post closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground surface water, groundwater, or the atmosphere

3. Returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity.

3.1 MODUTANK REMOVAL

The clean ModuTank will be closed first and used as a prototype for closure conditions. Because no wastes were placed in this unit, there are no residues to remove and no decontamination that will be needed for the construction equipment. The liners will be removed and disposed as solid waste either onsite at an inert demolition landfill, or offsite at a municipal landfill. The components of the leachate collection system will be dismantled and either disposed as solid waste or reused. The structural steel sidewalls will be disassembled and either recycled or disposed.

At the start of the removal action, free-standing water remaining in the operational ModuTank will be removed and taken to the Effluent Treatment Facility. After the water has been removed, there may be residual solids remaining in the unit that will undergo waste profile sampling prior to disposal. Purgewater designated D019, F001, and state-only F003 were placed in the unit. Samples of the residues will be analyzed for total concentrations of RCRA toxicity characteristic contaminants. Based on the results of the totals analysis, extract samples may also need to be taken and analyzed for some contaminants. If the residual solids are designated characteristic dangerous waste, they will be treated prior to disposal to meet both the land disposal restrictions for the exceeding contaminant and the Universal Treatment Standards (40 CFR 268.48) for the underlying hazardous constituents. If treatment is necessary, the treatment method utilized is expected to be stabilization. Because the residuals are assumed to contain low-level radioactivity from the purgewater, they will be disposed onsite at the Environmental Restoration Disposal Facility (ERDF).

Prior to removal of any of the ModuTank components, an inspection of the structure will be conducted to identify sites of potential breach of structural integrity where leaks could have occurred. If evidence of leaks is found, limited sampling for hazardous waste constituents will be conducted to determine the extent of chemical contamination. Samples will be analyzed for

the hazardous constituents indicated by the results of the analysis on the waste residuals. The liners are assumed to have radioactive contamination due to contact with the purgewater. Based on the inspection, a limited radiological survey of the liners may be conducted to identify any hot spots. The liners will then be removed and disposed of as debris at ERDF. The components of the leachate collection system are assumed to be have radioactive contamination and will be disposed of at ERDF.

The structural-steel sidewalls were not in contact with the purgewater and thus are not expected to be contaminated. If inspection indicates a potential for the waste to have contacted the sidewall, a limited radiological survey and limited chemical sampling will be conducted. The sidewalls will be disassembled and either recycled or disposed of as debris elsewhere onsite.

Limited sampling of the unloading ramp will be conducted prior to its removal. It is not expected to be contaminated and thus will be disposed of as debris elsewhere onsite.

Decontamination of construction and sampling equipment will be conducted at the PSTF site and the decontamination fluids will be collected and disposed of accordingly.

3.2 CONFIRMATION SAMPLING

After the ModuTanks have been completely removed, confirmation soil sampling will be conducted to confirm there is no residual dangerous waste contamination. A Confirmation Sampling Plan will be developed prior to closure and pursuant to a data quality objectives analysis. Any soil found to contain hazardous waste constituents above cleanup levels (no soil is expected to be designated dangerous waste) may be excavated and disposed of elsewhere onsite.

3.3 SITE RESTORATION

After all removals have been completed, the site will be graded to an even surface, and sloped slightly to prevent ponding of precipitation. The fencing surrounding the site will be taken down and all postings will be removed. At this point, previously required RCRA inspections will cease.

3.4 CLOSURE CERTIFICATION

In accordance with WAC 173-303-610(6), within 60 days of completion of closure of the PSTF, the U.S. Department of Energy, Richland Operations Office (RL) will submit to the Washington State Department of Ecology a certification of closure signed by both RL and an independent registered professional engineer. The certification will specify that the PSTF has been closed in accordance with specifications contained within the approved closure plan.

4.0 CLOSURE SCHEDULE

Closure activities will begin in the third quarter of 2000 and will require approximately 6 weeks to complete.

5.0 CLOSURE COST ESTIMATE

The cost for closure by removal of the PSTF is estimated to be approximately $196,000. This cost includes the following activities:

- Dismantling and disposing or recycling the components of the clean tank
- Sampling, treating (if found to be contaminated), and disposing of the residual solids remaining in the active tank
- Dismantling and disposing of the components of the active tank
- Verification sampling of underlying soil and excavation of soil found to be contaminated
- Removal of perimeter fence.

6.0 REFERENCES

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 268, "Land Disposal Restrictions," *Code of Federal Regulations*, as amended.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq.

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq., as amended.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.