
United States Department of Energy

Savannah River Site

**Interim Action Statement of Basis/Proposed Plan for the
H-Area Tank Farm, Waste Tank 16**

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December 2015

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LIST OF ACRONYMS

Acronym	Meaning
ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DOE	United States Department of Energy
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference
FFA	Federal Facility Agreement
GCP	General Closure Plan
GSA	General Separations Area
HTF	H-Area Tank Farm
IASB/PP	Interim Action Statement of Basis/Proposed Plan
ICMI/RAIP	Interim Corrective Measures Implementation/Remedial Action Implementation Plan
IROD	Interim Record of Decision
LUC	Land Use Control
NCP	National Oil and Hazardous Substances Pollution Contingency Plan, commonly referred to as National Contingency Plan
NDAA	National Defense Authorization Act
OU	Operable Unit
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SCHWMR	South Carolina Hazardous Waste Management Regulations
SRNS	Savannah River Nuclear Solutions, LLC
SRR	Savannah River Remediation LLC
SRS	Savannah River Site

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I. INTRODUCTION AND BACKGROUND

Introduction

This Interim Action Statement of Basis/Proposed Plan (IASB/PP) is being issued by the United States Department of Energy (DOE), which functions as the lead agency for Savannah River Site (SRS) remedial activities, with concurrence by the United States Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC). The purpose of this IASB/PP is to describe the preferred interim remedial alternative for the H-Area Tank Farm (HTF) Waste Tank 16 that has been removed from service, and to provide for public involvement in the decision-making process.

SRS occupies approximately 310 square miles of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located approximately 25 miles southeast of Augusta, Georgia, and 20 miles south of Aiken, South Carolina.

SRS is owned by the DOE. The Liquid Waste Facilities at SRS are managed and operated by Savannah River Remediation LLC (SRR). Management and operating services for the remainder of the site are provided by Savannah River Nuclear Solutions, LLC (SRNS). SRS has historically produced tritium, plutonium, and other special nuclear materials for national defense. Chemical and radioactive wastes are byproducts of nuclear material production processes. Hazardous substances, as defined by the Comprehensive Environmental Response,

Compensation and Liability Act (CERCLA), are currently present in the environment at SRS.

The HTF is located at the SRS in Aiken County and Barnwell County, South Carolina (see Figures 1 and 2) and was constructed to receive waste generated by various SRS production, processing, and laboratory facilities. The HTF consists of twenty-nine (29) liquid waste storage tanks (i.e., waste tanks) and ancillary structures and are governed by an Industrial Wastewater Construction Permit No. 17,424-IW issued by SCDHEC on January 25, 1993 (DHEC_01-25-1993). The DOE intends to remove from service the waste tanks that do not meet the standards established in Appendix B of the SRS Federal Facility Agreement (FFA) (FFA, 1993), entered into pursuant to Section 120 of CERCLA and Sections 3008(h) and 6001 of the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984 (hereinafter jointly referred to as RCRA) and the Atomic Energy Act of 1954. Removal of these tanks from service reduces the risk of a leak to the environment and provides a stable form that is protective of human health and the environment. In May 2002, DOE issued an Environmental Impact Statement (EIS) on waste tank cleaning and stabilization alternatives. [DOE-EIS-0303] The DOE studied five alternatives: 1) empty, clean, and fill waste tank with grout, 2) empty, clean, and fill waste tank with sand, 3) empty, clean, and fill waste tank with saltstone, 4) clean and remove waste tanks, and 5) no action. Evaluations described in the EIS showed the “Empty, clean and fill waste tank with grout”

alternative to be the best approach to minimize human health and safety risks associated with closure of the waste tank. [DOE-EIS-0303 ROD]

Waste tanks and ancillary structures are removed from the Wastewater Construction Permit when they are stabilized and removed from service. The parties to the FFA determined that an interim remedial action was needed for the waste tanks and ancillary facilities removed from service to address the period between removal from the Wastewater Construction Permit until final closure of the Operable Unit (OU). The interim action would ensure that the integrity of stabilization actions implemented under the SCDHEC-approved *Industrial Wastewater General Closure Plan for H-Area Waste Tank Systems*, SRR-CWDA-2011-00022, (hereinafter referred to as the HTF General Closure Plan [GCP]) and waste tank system-specific Industrial Wastewater Closure Modules for Liquid Waste Tanks (hereinafter referred to as Closure Modules) were protected from significant damage or deterioration during the interim period.

The preferred interim remedial action for HTF waste tanks and ancillary structures is annual visible engineered barriers inspections and any maintenance necessary as a result of inspections. This IASB/PP documents the preferred interim remedial action specifically for Waste Tank 16 which was removed from service in 2015. No ancillary structures are associated with Waste Tank 16. The IASB/PP also supports the development of an Interim Record of Decision (IROD). The IASB/PP will become applicable

to each HTF waste tank, group of waste tanks, and associated ancillary structures, via an Explanation of Significant Difference (ESD) modification to the IROD upon satisfactory removal from service in accordance with a SCDHEC approved Closure Module.

History

SRS manages certain waste materials that are regulated under RCRA, a comprehensive law requiring responsible management of hazardous waste. The HTF waste tanks and ancillary structures are solid waste management units under RCRA Section 3004(u). SRS received a RCRA hazardous waste permit from SCDHEC, which was most recently renewed on February 11, 2014 (SC1 890 008 989). Module VIII of the Hazardous and Solid Waste Amendments portion of the RCRA permit mandates corrective action requirements for non-regulated solid waste management units subject to RCRA 3004(u).

On December 21, 1989, SRS was included on the National Priorities List. The inclusion created a need to integrate the established RCRA Facility Investigation (RFI) program with CERCLA requirements to provide for a focused environmental program. In accordance with Section 120 of CERCLA 42 U.S.C. § 9620, DOE negotiated a FFA (FFA, 1993) with the EPA and SCDHEC to coordinate remedial activities at SRS into one comprehensive strategy which fulfills these dual regulatory requirements. The FFA lists the HTF OU as a RCRA/CERCLA unit requiring further evaluation using an investigation/assessment process that integrates

and combines the RFI process with the CERCLA Remedial Investigation process to determine the actual or potential impact to human health and the environment of releases of hazardous substances to the environment.

Both RCRA and CERCLA require the public to be given an opportunity to review and comment on the draft permit modification and proposed remedial alternatives. Public participation requirements are listed in South Carolina Hazardous Waste Management Regulations (SCHWMR) R.61-79.124 and Sections 113 and 117 of CERCLA 42 U.S.C. § 9613 and 9617. These requirements include establishment of an Administrative Record File that documents the investigation and selection of remedial alternatives and allows for review and comment by the public regarding those alternatives (See Section II). The Administrative Record File must be established at or near the facility at issue. The SRS FFA Community Involvement Plan (WSRC-RP-96-120) is designed to facilitate public involvement in the decision-making process for permitting, closure, and the selection of remedial alternatives. SCHWMR R.61-79.124 and Section 117(a) of CERCLA, as amended, require the advertisement of the draft permit modification and notice of any proposed remedial action and provide the public an opportunity to participate in the selection of the remedial action.

SCHWMR R.61-79.124 requires that a brief description and response to all significant comments be made available to the public as part of the RCRA Administrative Record. Community involvement in consideration of this evaluation of alternatives for the HTF waste

tanks and ancillary structures is strongly encouraged. All submitted comments will be reviewed and considered. Following the public comment period, a Responsiveness Summary will be prepared to address issues raised during the public comment period. The Responsiveness Summary will be made available with the final IROD.

The interim decision will be made only after the public comment period has ended and all the comments have been received and considered. The interim decision under RCRA will be in the form of a permit modification, which is made by SCDHEC. Selection of the remedial alternative that will satisfy the FFA requirements will be made by DOE, in consultation with EPA and SCDHEC. It is important to note that the final action(s) may be different from the preferred alternative discussed in this plan depending on new information or public comments. The alternative chosen will be protective of human health and the environment and will comply with applicable federal and state laws.

II. COMMUNITY PARTICIPATION

The FFA Administrative Record File, which contains the information pertaining to the selection of the response action, is available at the following locations:

US Department of Energy
Public Reading Room
Gregg-Graniteville Library
University of South Carolina – Aiken
471 University Parkway
Aiken, South Carolina 29801
(803) 641-3320

Thomas Cooper Library
Government Documents Department
University of South Carolina
1322 Greene Street
Columbia, South Carolina 29208
(803) 777-4866

Hard copies of the IASB/PP are available at the following locations:

Reese Library
Government Information Section
Augusta University
2500 Walton Way
Augusta, Georgia 30906
(706) 737-1744

Asa H. Gordon Library
Savannah State University
2200 N. Tompkins Road
Savannah, Georgia 31404
(912) 356-2183

The RCRA Administrative Record File for SCDHEC is available for review by the public at the following locations:

The South Carolina Department of Health and Environmental Control
Attn: David Scaturo, Director
Division of Waste Management
Bureau of Land and Waste Management
2600 Bull Street
Columbia, South Carolina 29201
(803) 898-2000

The South Carolina Department of Health and Environmental Control
Midlands EQC Region - Aiken
206 Beaufort Street, NE
Aiken, South Carolina 29801
(803) 642-1637

The public will be notified of the public comment period through mailings of the SRS Environmental Bulletin, a newsletter sent to citizens in South Carolina and Georgia, and through notices in the *Aiken Standard*, the *Allendale Citizen Leader*, the *Augusta Chronicle*, the *Barnwell People-Sentinel*, and *The State*

newspapers. The public comment period will also be announced on local radio stations.

DOE will provide an opportunity for a public meeting during the public comment period if significant interest is expressed. The public will be notified of the date, time, and location. At the meetings, the proposed action will be discussed, and questions about the action will be answered.

To request a public meeting during the public comment period, to obtain more information concerning this document, or to submit written comments, contact one of the following:

Amy Joslin
Savannah River Remediation, LLC
Dir. of Public Affairs & Project Communications
Savannah River Site
Building 766-H
Aiken, South Carolina 29808
(803) 208-1956
amy.joslin@srs.gov

The South Carolina Department of Health and Environmental Control
Attn: David Scaturo, Director
Division of Waste Management
Bureau of Land and Waste Management
2600 Bull Street
Columbia, South Carolina 29201
(803) 898-2000

Following the public comment period, an IROD will be signed, and a final decision for the SRS RCRA permit will be issued. The IROD and RCRA permit will detail the alternative chosen for HTF, annual visible engineered barriers inspection and maintenance, and include responses to oral and written comments received during the public comment period in the Responsiveness Summary.

III. HTF OPERABLE UNIT BACKGROUND

The HTF occupies a 45-acre site within an area of the SRS commonly referred to as the General Separations Area (GSA), which encompasses E, F, H, J, S, and Z Areas (Figure 1), consisting of 29 liquid waste tanks, three evaporator systems, over 74,800 linear feet of transfer pipelines, eight diversion boxes, one catch tank, two concentrate transfer systems and ten pump pits. Figure 2 shows the general layout of HTF and Figure 3 provides an aerial view of the HTF. There are four major waste tank types in HTF: Type I tanks with a nominal capacity of 750,000 gallons, Type II tanks with a nominal capacity of 1,070,000 gallons, and Type III/IIIA and Type IV tanks with nominal capacities of 1,300,000 gallons. The differing waste tank types have varying degrees of secondary containment and intra-tank obstructions, such as cooling coils and columns. HTF was constructed to receive waste generated by various SRS production, processing and laboratory facilities and has treated and stored wastes that were contaminated with heavy metals and high levels of radioactivity. Further information can be found in the Tank 16 Closure Module (SRR-CWDA-2013-00091). The use of HTF isolated these wastes from the environment, SRS workers, and the public. Facilities are in place to pretreat the accumulated sludge and salt solutions (supernate) to enable the management and treatment of these wastes within other SRS facilities (i.e., Defense Waste Processing Facility and Saltstone Production Facility). These treatment facilities convert the sludge and supernate to more stable forms suitable for permanent disposal in a federal repository or the

Saltstone Disposal Facility, as appropriate. [SRR-CWDA-2010-00128]

Waste Tank 16 is a Type II tank constructed in the mid-1950s. The primary tank is made of carbon steel with varying thicknesses. The walls are joined to the roof and floor of the primary tank by curved knuckle plates made of the same material and are welded in place. The secondary liner is also made of 0.5-inch thick carbon steel. Transfer line penetrations allow three-inch diameter inlet waste transfer lines to enter the primary waste tank near the top through the top knuckle. Each transfer line is enclosed in a four-inch diameter carbon steel jacket pipe where it bridges the waste tank annulus. [SRR-CWDA-2010-00128]

The waste tank vault is constructed of 33-inch thick reinforced concrete walls and 45-inch thick reinforced concrete roof with an outer diameter of 95 feet 8.5 inches. [SRR-CWDA-2010-00128]

Each Type II tank has one central filled steel column to support the roof. This column has an inner diameter of 6 feet 8 inches of 0.5-inch thick carbon steel that was welded to the bottom of the primary tank and filled with concrete. Figure 4 provides a cross-sectional sketch of a typical Type II tank.

Each Type II tank contains 40 vertical cooling coils (20 operating, 20 auxiliary) that are supported from the primary tank roof by hanger and guide rods. The vertical coils consist of approximately 20 foot-long vertical sections connected with 24-inch radius half circle loops. Four horizontal cooling coils (two upper

operating, two lower auxiliary) extend across the bottom of the waste tanks and are supported by guide rods welded to the primary tank floor. The horizontal coils consist of 40 horizontal sections and 36 loops (half circle with a 24-inch radius) that connect the horizontal sections. In addition, there are supply pipes that connect the tank top cooling water system to the cooling coils. There are approximately 29,400 linear feet of two-inch carbon steel pipe cooling coils in a Type II tank. [SRR-CWDA-2010-00128]

HTF Closure Activities

Waste Tank 16 was operationally closed and removed from service in 2015 in accordance with an approved HTF GCP (SRR-CWDA-2011-00022) and waste tank system-specific Closure Module (SRR-CWDA-2013-00091). No ancillary structures were included in the removal of Waste Tank 16 from service. The waste tank was isolated from the remaining operating facility and filled with grout. Some equipment installed in the waste tank or used in the closure activities (i.e., transfer pump, transfer jet, rotary spray wash downcomers, thermowells) was entombed in the grout as part of the closure process. Figure 5 shows the visible surface of Waste Tank 16.

DOE is in the process of removing the remaining HTF waste tanks and ancillary structures from service in accordance with the HTF GCP (SRR-CWDA-2011-00022) and waste tank system-specific Closure Modules. HTF waste storage and removal operations are governed by Industrial Wastewater Construction Permit #17,424-IW issued by SCDHEC on January 25,

1993 and the FFA. The State of South Carolina has authority for approval of wastewater treatment facility operational closure under Chapter 61, Article 82 of the SCDHEC Regulations. The *Ronald Reagan National Defense Authorization Act (NDAA) for Fiscal Year 2005*, Section 3116 (a) specifies the criteria for DOE to use to determine whether residuals remaining in the waste tanks systems can be managed as non-high level waste at a DOE site in a “covered state” (e.g., South Carolina) where activities are regulated by the state’s approved closure plan or permit, authority for the approval or issuance of which is conferred on the State outside of Section 3116. The *Basis for Section 3116 Determination for Closure of H-Tank Farm at the Savannah River Site* (DOE/SRS-WD-2014-001) has been prepared for HTF, based in part on the environmental protection information provided in the HTF Performance Assessment (SRR-CWDA-2010-00128). Based on the information in the *Basis for Section 3116 Determination for Closure of H-Tank Farm at the Savannah River Site* and the HTF Performance Assessment, the Secretary of Energy, in consultation with the United States Nuclear Regulatory Commission, has determined that the residual material in the waste tank systems can be managed as non-high level waste.

In accordance with the FFA, when all HTF waste tanks and ancillary structures have been removed from service, an appropriate response action will be developed for the HTF OU which includes the stabilized waste tanks and ancillary structures as well as the surrounding environmental media and groundwater directly below the HTF.

The HTF GCP requires monitoring of the groundwater under an approved HTF Groundwater Monitoring Plan (SRNS-RP-2012-00146), which describes the monitoring of the groundwater exiting the HTF. The HTF Groundwater Monitoring Plan supports both the operation and removal from service of the HTF waste tanks and includes requirements for reporting the monitoring results. The HTF Groundwater Monitoring Plan remains in effect until all waste tanks have been removed from service, at which time a remedial decision, if any is needed, will be made for the HTF OU which includes the stabilized tanks, the surrounding soils, and the groundwater below the HTF. Because these requirements are already in place, groundwater monitoring is not being considered as an interim action in this proposed plan.

Site Characteristics

The HTF is in H Area which is located in the north-central region of SRS. Figure 6 presents the area known as the GSA. The GSA is located atop a ridge running southwest-northeast that forms the drainage divide between Upper Three Runs Creek to the north, Fourmile Branch to the south, and McQueen Branch to the east.

Much of SRS lies within the Aiken Plateau, which slopes to the southeast approximately 5 feet per mile. The Plateau is bounded by the Savannah and Congaree Rivers and extends from the fall line to the Orangeburg Escarpment. The highly dissected surface of the Aiken Plateau is characterized by broad interfluvial areas with narrow, steep-sided valleys.

IV. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

The scope of the interim response action is limited to the interim controls that the individual HTF waste tanks and ancillary structures will be subject to from the time of removal from the Industrial Wastewater Construction Permit until the final response action for the closure of the entire HTF OU. The interim remedial action in this IASB/PP is specific for Waste Tank 16, which has been operationally closed and removed from service under an approved HTF GCP (SRR-CWDA-2011-00022) and waste tank system-specific Closure Module (SRR-CWDA-2013-00091). This IASB/PP does not include the groundwater beneath the HTF or the soils surrounding the tanks. An HTF Groundwater Monitoring Plan (SRNS-RP-2012-00146), which describes the monitoring of the groundwater exiting the HTF in accordance with the HTF GCP, supports both the operations and closure of the HTF waste tanks and includes requirements for reporting the monitoring results. However, groundwater will be addressed in the final Record of Decision (ROD) for the HTF OU.

The interim inspection requirements will be the same for all waste tanks and ancillary structures. This IASB/PP will become applicable to each tank, group of tanks, and associated ancillary structures, via an ESD modification to the IROD upon satisfactory removal from service in accordance with a SCDHEC approved Closure Module.

V. SUMMARY OF SITE RISKS

The HTF is located in an area designated exclusively for industrial use. The HTF is currently in an operational phase. Because of ongoing operations, a CERCLA risk assessment has not been conducted and is not required to support this interim action. However, a performance assessment has been prepared and has determined that exposure to stabilized residual material in the tanks is unlikely during the interim period (SRR-CWDA-2010-00128). The potential risk lies in the premature degradation of the engineered barriers which could increase the likelihood of exposure. More specific findings from a baseline risk assessment and exposure levels for the HTF will be included for all media in the subsequent final action ROD.

VI. REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are media- or OU-specific objectives for protecting human health and the environment. RAOs describe what the remediation must accomplish and are used as a framework for developing remedial alternatives. The RAOs are based on the nature and extent of contamination, threatened resources, and the potential for human and environmental exposure.

The interim RAO is to prevent premature degradation of the engineered barriers associated with stabilization of Waste Tank 16 that has been operationally closed and removed from service. If evidence of premature degradation is noted, appropriate action will be taken based on the evidence. Following removal from service of all HTF waste tanks and ancillary structures, an

evaluation will be conducted for all media (e.g., soils, structures, equipment) in the HTF OU and additional RAOs will be established at that time. The future land use of the HTF OU is assumed to be industrial land use with DOE maintaining control of the land. No current or projected future development of the HTF is planned. Access is currently restricted by administrative controls, and additional land use controls (LUCs) are not required with the interim remedial action. LUCs will be part of the final remedial action for the HTF OU to ensure protection against unrestricted use. LUCs may be included in the final remedial action (or Final ROD) for the HTF OU in order to prevent inadvertent exposure to remaining contaminated media and to ensure the integrity of the closed tanks by restricting land and groundwater uses within the HTF OU. That determination will be made at the time of a Final ROD.

Remedial Goal Options

Remedial goal options are typically identified along with the RAOs and represent the cleanup goals that are either concentration levels that correspond to a risk or hazard or are based on Applicable or Relevant and Appropriate Requirements (ARARs). Since this is an interim action, quantitative remediation goals are not specified.

VII. SUMMARY OF REMEDIAL ALTERNATIVES

This section summarizes the interim remedial alternatives to be evaluated. Three interim remedial alternatives were developed for Waste Tank 16. These alternatives are based on site

conditions that remain following stabilization (i.e., grouting) of Waste Tank 16 as implemented under the HTF GCP and waste tank system-specific Closure Module.

Alternative A-1: No Action

Total Present Worth Cost \$0

The No Action alternative is required by the National Contingency Plan (NCP) to serve as a baseline for comparison with other remedial alternatives. This alternative would leave Waste Tank 16 in the current condition with no additional controls or monitoring.

Alternative A-2: Triennial Visible Engineered Barriers Inspection and Maintenance

Total Present Worth Cost \$88,579

Visible engineered barriers (i.e., visible grout) will be inspected triennially (i.e., every three years) for physical integrity. In addition, the area will be inspected for excessive water accumulation that may cause premature degradation associated with stabilization of the waste tank.

Alternative A-3: Annual Visible Engineered Barriers Inspection and Maintenance

Total Present Worth Cost \$265,737

Alternative A-3 includes the maintenance activities described for Alternative A-2, but increases the frequency of the inspections to

every year for consistency with the requirements of the HTF GCP.

The detailed cost estimates for the interim remedial alternatives are provided in Appendix A.

VIII. EVALUATION OF ALTERNATIVES

The NCP [40 CFR 300.430(e)(9)] sets forth nine evaluation criteria to provide the basis for evaluation of alternatives and selection of a remedy. The nine criteria were derived from the statutory requirements of CERCLA Section 121 and fall into categories of threshold criteria, primary balancing criteria, and modifying criteria. Modifying criteria (i.e., state or support agency acceptance and community acceptance) will be evaluated after the public comment period for the IASB/PP. The nine evaluation criteria are detailed in Table 1.

Comparative Analysis of HTF Waste Tank 16 Alternatives

A comparative analysis of the interim remedial alternatives is provided in Table 2. Below is a summary of the comparison of alternatives.

Overall Protection of Human Health and the Environment

The remedial alternatives are assessed to determine the degree to which each alternative eliminates, reduces, or controls threats to human health and the environment through treatment, engineering methods, or institutional controls. Alternative A-1 is protective of human health and the environment because of the engineering controls (i.e., closure and grouting of tanks)

implemented under the HTF GCP and waste tank system-specific Closure Module. Alternative A-2 provides additional protection with visual inspections to prevent premature degradation associated with stabilization actions. The frequency of every three years for the visual inspections is sufficient because the remainder of the HTF waste tanks will be operational and other inspection activities will be taking place in the general area of the stabilized waste tanks. Alternative A-3 increases the frequency of the inspections to annually.

Compliance with ARARs

ARARs are cleanup standards, standards of control and other substantive requirements, criteria or limitations promulgated under federal, state, or local environmental laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Section 121(d) of CERCLA, as amended by the Superfund Amendments Reauthorization Act requires that remedial actions comply with requirements and standards set forth under federal and state environmental laws.

There are no ARARs for the preferred interim remedial alternative, which is annual inspection and maintenance for stabilized Waste Tank 16. DOE will continue to implement requirements for appropriate inspections, as described in DOE Order 435.1 and its associated manual and guide for the operation of the HTF. DOE Order 435.1 is a To Be Considered criterion for inspections.

Short-Term Effectiveness

The remedial alternatives are assessed considering factors relevant to implementation of the remedial action, including risks to the community during implementation, impacts to workers, potential environmental impacts (e.g., air emissions), and the time until protection is achieved. Alternative A-1 is effective for the interim period because of the engineering controls (i.e., closure and grouting of tanks) implemented under the HTF GCP and waste tank system-specific Closure Module. Alternative A-1 poses no short-term risk to human receptors or the environment as a result of tank stabilization and this alternative requires no time to implement. Alternative A-2 and Alternative A-3 pose no additional risk to human health or the environment and will be protected by health and safety plans and procedures. Both Alternatives A-2 and A-3 are readily implemented following waste tank stabilization. Inspections required by Alternatives A-2 and A-3 will assure protection of workers and identify potential environmental impacts during the interim period until such time as all tanks are closed and a final ROD is implemented.

Long-Term Effectiveness and Permanence

The remedial alternatives are assessed based on their ability to maintain reliable protection of human health and the environment after implementation. Because this is an interim measure, long-term effectiveness and permanence do not apply to any of the three alternatives.

Reduction of Toxicity, Mobility, or Volume through Treatment

The remedial alternatives are assessed based on the degree to which they employ treatment that reduces toxicity (the harmful nature of the contaminants), mobility (the ability of the contaminants to move through the environment), or volume of contaminants associated with the unit. This interim measure does not involve treatment so the reduction of toxicity, mobility or volume through treatment does not apply to any of the three alternatives. Stabilization of the tank and residual waste, which did reduce the volume and mobility of the waste (i.e., tank cleaning and grouting in accordance with the HTF GCP and waste tank system-specific Closure Module), is not part of this interim response action.

Implementability

The remedial alternatives are assessed by considering the difficulty of implementing the alternative, including technical feasibility, constructability, reliability of technology, ease of undertaking additional remedial actions (if required), monitoring considerations, administrative feasibility (regulatory requirements), and availability of services and materials. No implementation is associated with Alternative A-1. Alternatives A-2 and A-3 are readily implemented following waste tank stabilization.

Cost

The evaluation of remedial alternatives must include capital and operations and maintenance costs. Present value costs are estimated within +50/-30% according to EPA guidance, with a

graduated discount factor for increasing operations and maintenance time. There is no interim action cost for Alternative A-1 because no additional action is taken. The cost estimates for Alternatives A-2 and A-3 were prepared from information available at the time of the estimate and the final costs may vary from the estimates presented in Table 2 and Appendix A. Currently, the assumed time frame for Alternatives A-2 and A-3 is 26 years, at which time a final ROD will be issued for the HTF OU.

IX. PREFERRED ALTERNATIVE

The interim preferred alternative for Waste Tank 16 is Alternative A-3 to conduct annual visible engineered barriers inspections and any maintenance necessary as a result of inspections in the interim period until final remedial actions for the HTF OU are determined. Although Alternative A-3 is more expensive, this alternative is preferred over A-2 because the requirement for annual inspections is consistent with the maintenance and monitoring requirements of the HTF General Closure Plan and the Waste Tank 16 Closure Module.

The current land use for the HTF is industrial with DOE maintaining control of the land. The HTF is currently in the operation phase and access is restricted by administrative controls. Additional LUCs are not part of this interim action. A final remedial action will be evaluated and conducted in the future for the HTF OU according to the requirements of the FFA. A LUC Implementation Plan will be deferred until final closure of the entire HTF OU.

Based on information currently available, the lead agency believes the Preferred Alternative provides the best balance of tradeoffs among the other alternatives with respect to the evaluation criteria. The DOE expects the Preferred Alternative to satisfy the statutory requirements in CERCLA Section 121(b) to: (1) be protective of human health and the environment and (2) be cost-effective.

X. POST-ROD SCHEDULE

The interim remedial action schedule is provided in Figure 7. An IROD will be developed after receipt of, and response to, public and regulatory comments on the IASB/PP. The IROD is anticipated to be submitted to the regulatory agencies by May 2016. An Interim Corrective Measures Implementation/Remedial Action Implementation Plan (ICMI/RAIP) is scheduled to be submitted in November 2016 followed by an Interim Remedial Action start date upon approval of the ICMI/RAIP.

XI. REFERENCES

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and Analysis Plan, Rev. 1, Savannah River Site, Aiken, SC, November 2012.

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SRR-CWDA-2011-00022, *Industrial Wastewater General Closure Plan for H-Area Waste Tank Systems*, Savannah River Site, Aiken, SC, Rev. 0, May 2012.

SRR-CWDA-2013-00091, *Industrial Wastewater Closure Module for Liquid Waste Tank 16H H-Area Tank Farm*, Savannah River Site, Savannah River Site, Aiken, SC, Rev. 1, April 2015.

WSRC-RP-96-120, *Savannah River Site Federal Facility Agreement Community Involvement Plan (U)*, Rev. 7, Savannah River Site, Aiken, SC, February 2011.

XII. GLOSSARY

Administrative Record File: A file that is maintained and contains all information used to make a decision on the selection of a response action under the Comprehensive Environmental Response, Compensation and Liability Act. This file is to be available for public review, and a copy is to be established at or near the Site, usually at one of the information repositories. Also a duplicate file is held in a central location, such as a regional or state office.

ARARs: Applicable, or Relevant and Appropriate Requirements. Refers to the federal and state requirements that a selected remedy will attain. These requirements may vary from site to site.

Baseline Risk Assessment: Analysis of the potential adverse health effects (current or future) caused by hazardous substance release from a site in the absence of any actions to control or mitigate these releases.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 1980: A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act.

Corrective Action: A EPA requirement to conduct remedial procedures under RCRA 3998(h) at a facility when there has been a release of hazardous waste or constituents into the environment. Corrective action may be required beyond the facility boundary and can be required regardless of when the waste was placed at the facility.

Closure Module: Waste tank system-specific documentation that demonstrates that closure has been conducted in accordance with an approved General Closure Plan. A waste tank system-specific Closure Module details the inventory and removal from service configuration of individual waste tanks or group of tanks and associated ancillary structures.

Federal Facility Agreement (FFA): The legally binding agreement between regulatory agencies (DOE, EPA, and SCDHEC) that sets the standards and schedules for the comprehensive remediation of the SRS.

Land Use Controls: Legal and/or administrative mechanisms as well as physical installations that modify or guide human behavior at operable units where residual contamination remains in place. Institutional controls and engineering controls are types of land use controls.

Media: Pathways through which contaminants are transferred. Five media to which a release of contaminants may occur are groundwater, soil, surface water, sediments, and air.

National Priorities List: EPA's formal list of the nation's most serious uncontrolled or abandoned waste sites, identified for possible long-term remedial response, as established by CERCLA.

Operable Unit (OU): A discrete action taken as one part of an overall site cleanup. The term is also used in EPA guidance documents to refer to distinct geographic areas or media-specific units

within a site. A number of operable units can be used in the course of a cleanup.

Proposed Plan: A legal document that provides a brief analysis of remedial alternatives under consideration for the site/operable unit and proposes the preferred alternative. It actively solicits public review and comment on all alternatives under consideration.

Record of Decision (ROD): A legal document that explains to the public which alternative will be used at a site/operable unit. The record of decision is based on information and technical analysis generated during the remedial investigation/ feasibility study and consideration of public comments and community concerns.

Resource Conservation and Recovery Act (RCRA), 1976: A Federal law that established a regulatory system to track hazardous substances from their generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous substances. RCRA is designed to prevent the creation of new, uncontrolled hazardous waste sites.

Responsiveness Summary: A summary of oral and/or written comments received during the proposed plan comment period and includes responses to those comments. The responsiveness summary is a key part of the IROD, highlighting community concerns.

Statement of Basis: A report describing the corrective measures/remedial actions being

conducted pursuant to South Carolina Hazardous Waste Management Regulations, as amended.

Superfund: The common name used for CERCLA; also referred to as the Trust Fund. The Superfund program was established to help fund cleanup of hazardous waste sites. It also allows for legal action to force those responsible for the sites to clean them up.

Figure 1: Location of Savannah River Site

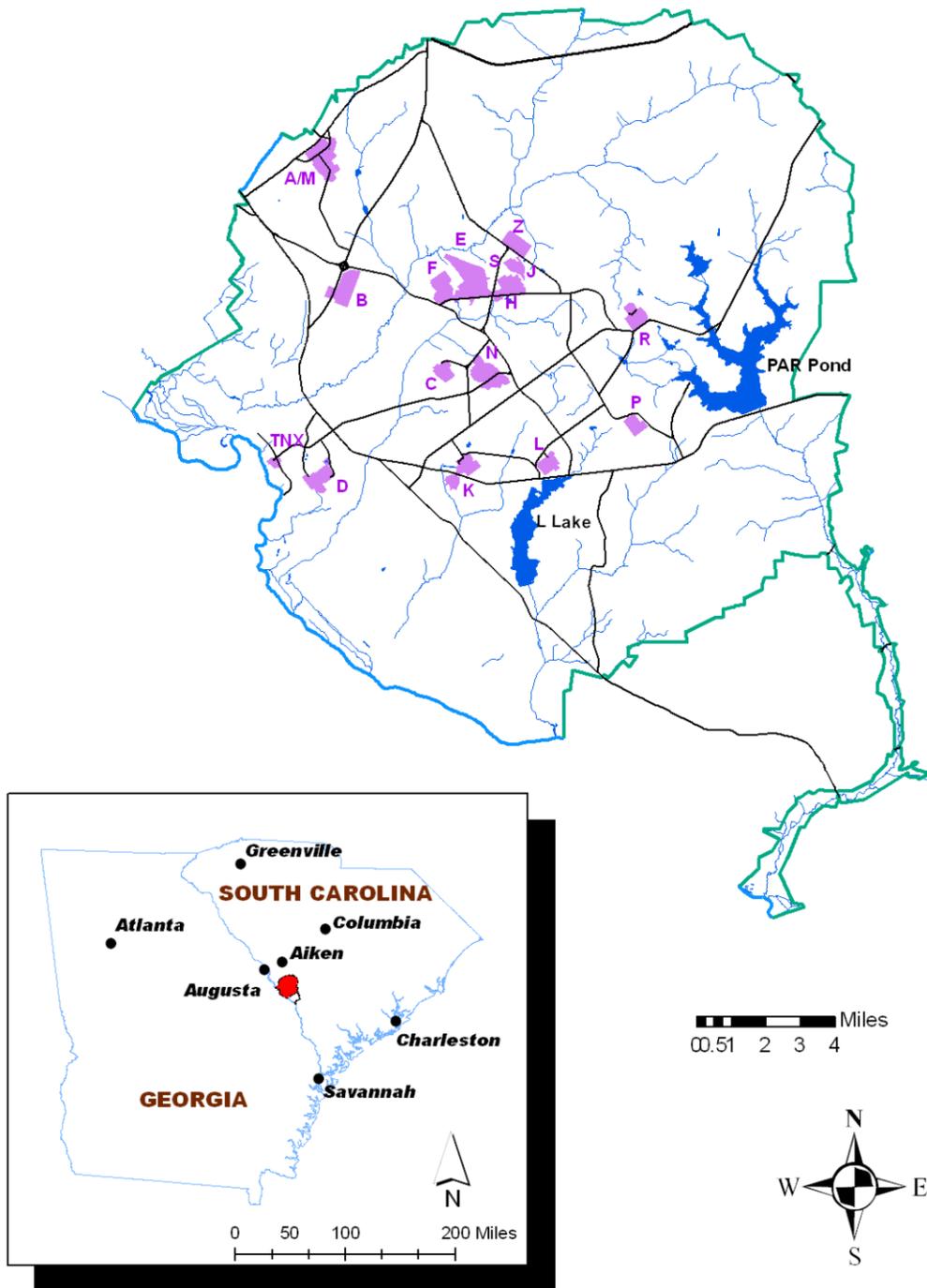


Figure 2: Layout of H-Area Tank Farm

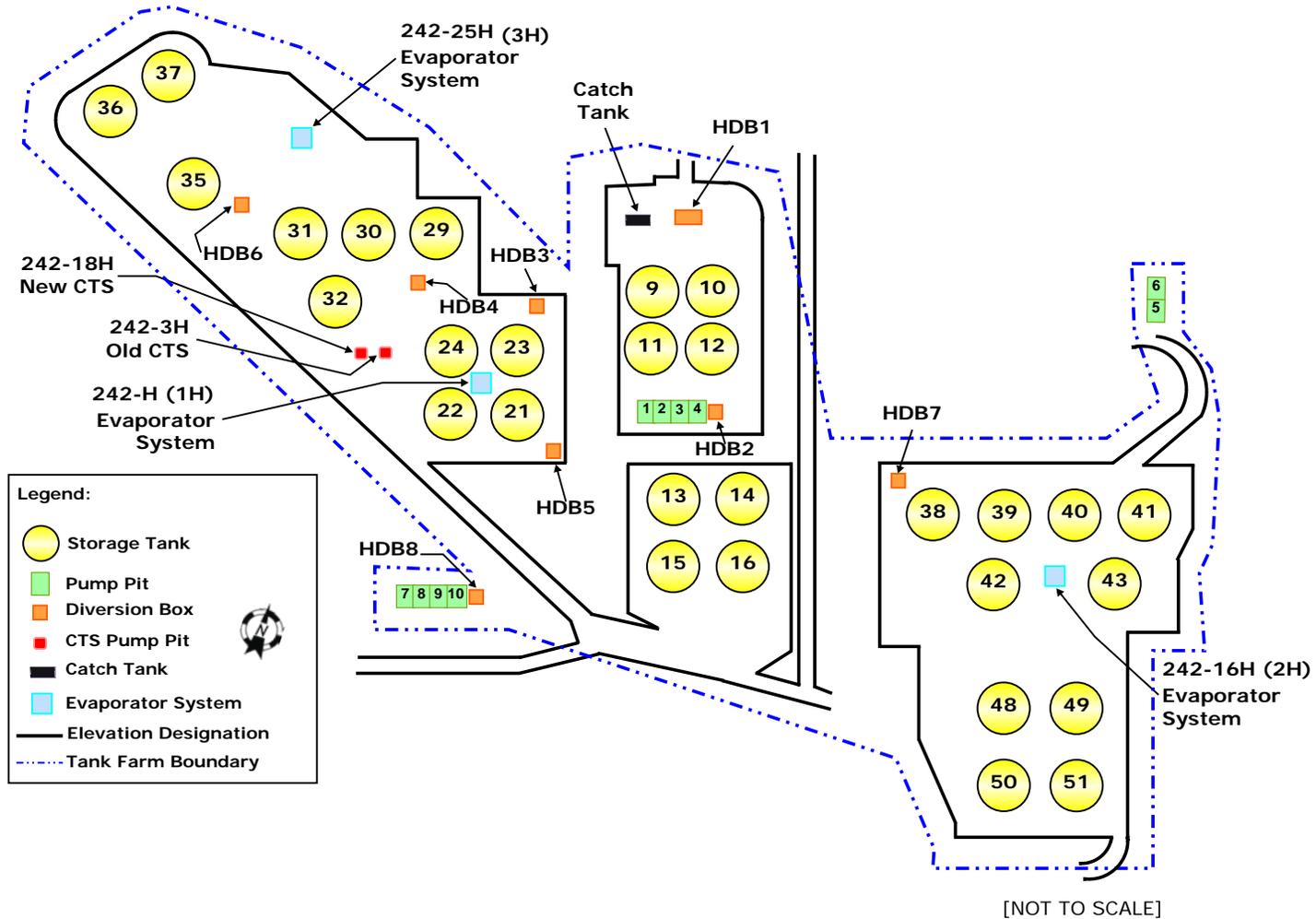


Figure 3: Aerial View of the HTF



Figure 5: Surface View of Waste Tank 16



Figure 6: GSA Topography

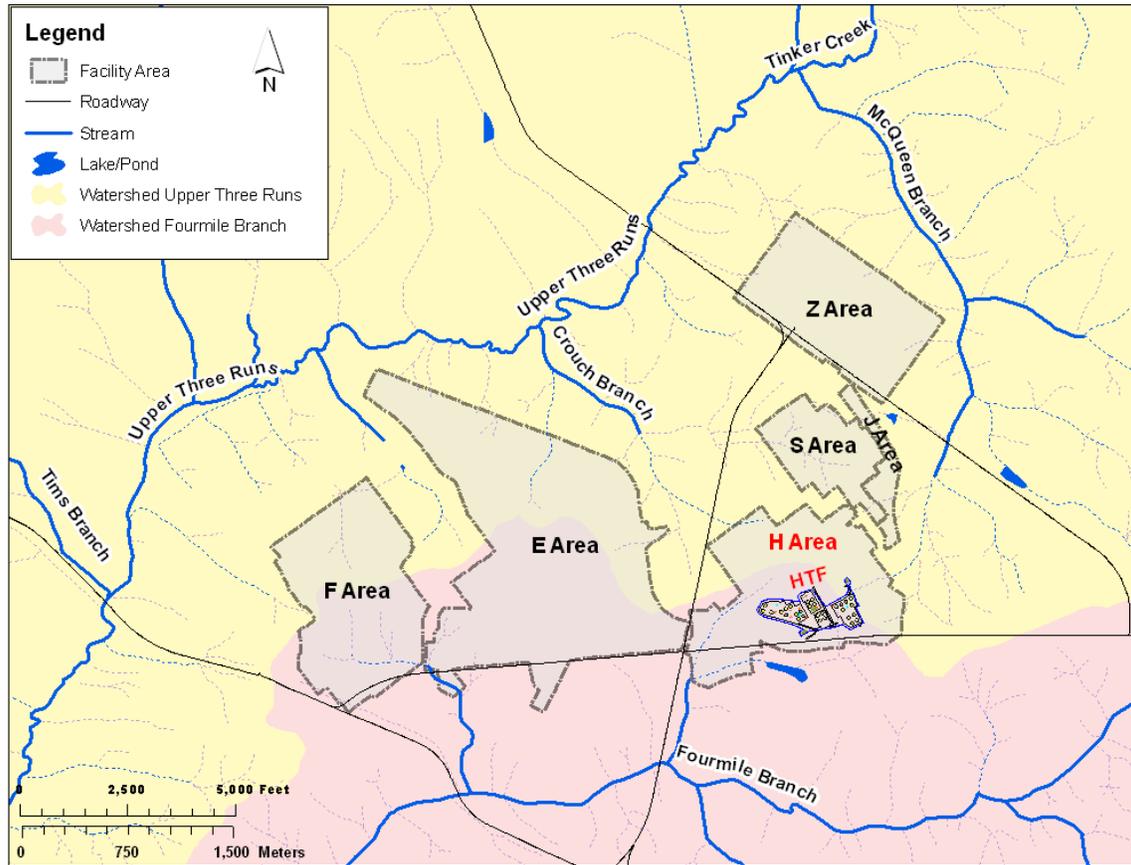


Figure 7: Post-ROD Schedule

Accelerated: HTF IASB/PP IROD IRAIP Schedule Logic	Duration (calendar days)	START DATE (calendar days)	FINISH DATE (calendar days)
Interim Action Statement of Basis/Proposed Plan (IASB/PP)			
Develop Rev. 0 IASB/PP	30	9/21/2015	10/20/2015
Submit Rev. 0 IASB/PP	1	10/21/2015	10/21/2015
EPA/SCDHEC Review Rev. 0 IASB/PP	30	10/22/2015	11/20/2015
Incorporate EPA/SCDHEC Comments into the Rev. 1 IASB/PP	30	11/21/2015	12/20/2015
Submit Rev. 1 IASB/PP	1	12/21/2015	12/21/2015
EPA/SCDHEC Final Review/Approval Rev. 1 IASB/PP	20	12/21/2015	1/19/2016
Receive EPA/SCDHEC Approval of Rev. 1 IASB/PP	1	1/20/2016	1/20/2016
Prepare & Transmit Clean Copy of Rev. 1 IASB/PP	15	1/21/2016	2/2/2016
Notification of Public Comment Period	14	2/4/2016	2/15/2016
Public Comment Period	45	2/16/2016	3/31/2016
Interim Record of Decision (ROD)			
Develop Rev. 0 IROD	30	4/4/2016	5/3/2016
Responsiveness Summary and Approvals (IASB/PP)	14	5/4/2016	5/17/2016
Submit Rev. 0 IROD	1	5/18/2016	5/18/2016
EPA/SCDHEC Review Rev. 0 IROD	30	5/19/2016	6/17/2016
Incorporate EPA/SCDHEC Comments into the Rev. 1 IROD	30	6/18/2016	7/18/2016
Submit Rev. 1 IROD	1	7/19/2016	7/19/2016
EPA/SCDHEC Final Review/Approval Rev. 1 IROD	21	7/20/2016	8/9/2016
Receive EPA/SCDHEC Approval of Rev. 1 IROD	1	8/10/2016	8/10/2016
DOE Obtain Signature on IROD	21	8/11/2016	8/31/2016
EPA Obtain Signature on IROD	21	9/1/2016	9/21/2016
SCDHEC Obtain Signature on IROD	21	9/22/2016	10/12/2016
Prepare for Public Notice	14	10/13/2016	10/26/2016
Issue IROD	1	10/27/2016	10/27/2016
Interim Remedial Action Implementation Plan (IRAIP)			
Develop Rev. 0 IRAIP	30	10/28/2016	11/21/2016
Submit Rev. 0 IRAIP	1	11/22/2016	11/22/2016
EPA/SCDHEC Review Rev. 0 IRAIP	30	11/23/2016	1/6/2017
Incorporate EPA/SCDHEC Comments into the Rev. 1 IRAIP	30	1/9/2017	2/7/2017
Submit Rev. 1 IRAIP	1	2/8/2017	2/8/2017
EPA/SCDHEC Final Review/Approval Rev. 1 IRAIP	21	2/9/2017	3/1/2017
Receive EPA/SCDHEC Approval of Rev. 1 IRAIP	1	3/2/2017	3/2/2017

Table 1: Description of CERCLA Evaluation Criteria

Threshold Criteria:
<ul style="list-style-type: none"> • <i>Overall Protectiveness of Human Health and the Environment</i> determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment. • <i>Compliance with ARARs</i> evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site. ARARs may be waived under certain circumstances. ARARs are divided into chemical-specific, location-specific, and action-specific criteria.
Primary Balancing Criteria:
<ul style="list-style-type: none"> • <i>Long-Term Effectiveness and Permanence</i> considers the ability of an alternative to maintain protection of human health and the environment over time. It evaluates magnitude of residual risk and adequacy of reliability of controls. • <i>Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment</i> evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present. • <i>Short-Term Effectiveness</i> considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation. • <i>Implementability</i> considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services. • <i>Cost</i> includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
Modifying Criteria:
<ul style="list-style-type: none"> • <i>State Support/Agency Acceptance</i> considers whether EPA and SCDHEC agree with the analyses and recommendations by the DOE. • <i>Community Acceptance</i> considers whether the local community agrees with the Preferred Alternative. Comments received on the Proposed Plan during the public comment period are an important indicator of community acceptance.

Table 2: Comparison of Interim Remedial Alternatives against the Nine Criteria

Criteria	Alternative A-1 No Action	Alternative A-2 Triennial Visible Engineered Barriers Inspection and Maintenance	Alternative A-3 Annual Visible Engineered Barriers Inspection and Maintenance
Overall protection of human health and the environment	Controls in place are adequate and protective.	Maintenance of area provides additional protection.	Maintenance of area provides additional protection
Compliance with ARARs	Not applicable	DOE Order 435.1 - To Be Considered	DOE Order 435.1 - To Be Considered
Long-term effectiveness and permanence	Not applicable	This is an interim remedy and long term effectiveness does not apply. Long term remedies will be evaluated following removal from service of all tanks and ancillary structures.	This is an interim remedy and long term effectiveness does not apply. Long term remedies will be evaluated following removal from service of all tanks and ancillary structures
Reduction of toxicity, mobility, or volume through treatment	No treatment	No treatment	No treatment
Short-term effectiveness	Not applicable	Visual inspections meet remedial action objective.	Visual inspections meet remedial action objective.
Implementability	No implementation	Readily implemented	Readily implemented
Cost	\$0	\$88,579	\$265,737
State acceptance	This criterion will be completed following state review.	This criterion will be completed following state review.	This criterion will be completed following state review.
Community acceptance	This criterion will be completed following public review.	This criterion will be completed following public review.	This criterion will be completed following public review.

**APPENDIX A
COST ESTIMATES OF ALTERNATIVES**

Alternative A-1: IASB/PP for the H-Tank Farm, Waste Tank 16
 No Action
 Savannah River Site

<u>Item</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<u>Direct Capital Costs</u>				
No Action				
Subtotal - Direct Capital Cost				\$0 *
Mobilization/Demobilization	20%	of subtotal direct capital		\$0 *
Site Preparation/Site Restoration	20%	of subtotal direct capital		\$0 *
Total Direct Capital Cost		(sum of * items)		\$0
<u>Indirect Capital Costs</u>				
Engineering & Design	18%	of direct capital		\$0
Project/Construction Management	25%	of direct capital		\$0
Health & Safety	5%	of direct capital		\$0
Overhead	30%	of direct capital		\$0
Contingency	20%	of direct capital		\$0
Total Indirect Capital Cost				\$0
Total Estimated Capital Cost				
				\$0
<u>Direct O&M Costs</u>				
Annual Costs				
	1.02%	discount rate for costs > 200 years duration ¹		
	26	years O&M		Years 2016 - 2041
Subtotal - Annual Costs				\$0
Present Worth Annual Costs (2.7% Discount Rate)				\$0
Five Year Costs				
Remedy Review	0			\$0
	0	ea	\$15,000	\$0
Subtotal - Five Year O&M Costs				\$0
Present Worth Five Year Costs				\$0
Total Present Worth Direct O&M Cost				\$0
<u>Indirect O&M Costs</u>				
Project/Admin Management	100%	of direct O&M		\$0
Health & Safety	30%	of direct O&M		\$0
Overhead	30%	of direct O&M		\$0
Contingency	15%	of direct O&M		\$0
Total Present Worth Indirect O&M Cost				\$0
Total Estimated Present Worth O&M Cost				
				\$0
TOTAL ESTIMATED COST				
				\$0

1. Interest rate for costs with duration < 30 years (i.e., before 2045) is based on OMB Circular No. A-94 Appendix C revised Dec 2014

Alternative A-2: IASB/PP for the H-Tank Farm, Waste Tank 16
Triennial Visible Engineered Barriers Inspection and Maintenance
Savannah River Site

<u>Item</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Direct Capital Costs				
No Action				
				\$0 *
				\$0 *
				\$0 *
				\$0
Indirect Capital Costs				
Engineering & Design	18%	of direct capital		\$0
Project/Construction Management	25%	of direct capital		\$0
Health & Safety	5%	of direct capital		\$0
Overhead	30%	of direct capital		\$0
Contingency	20%	of direct capital		\$0
				\$0
				\$0
Direct O&M Costs				
Annual Costs	1.02%	discount rate for costs > 200 years duration ¹		
Tri-annual Inspections / Maintenance	26	years O&M	Years 2016 - 2041	
	26	1	1,417	1,417
				\$1,417
				\$32,211
Five Year Costs	0			
Remedy Review	0	ea	\$15,000	\$0
				\$0
				\$0
				\$32,211
Indirect O&M Costs				
Project/Admin Management	100%	of direct O&M		\$32,211
Health & Safety	30%	of direct O&M		\$9,663
Overhead	30%	of direct O&M		\$9,663
Contingency	15%	of direct O&M		\$4,832
				\$56,369
				\$88,579
TOTAL ESTIMATED COST				\$88,579

1. Interest rate for costs with duration < 30 years (i.e., before 2045) is based on OMB Circular No. A-94 Appenndix C revised Dec 2014

Alternative A-3: IASB/PP for the H-Tank Farm, Waste Tank 16
 Annual Visible Engineered Barriers Inspection and Maintenance
 Savannah River Site

<u>Item</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<u>Direct Capital Costs</u>				
No Action				
Subtotal - Direct Capital Cost				\$0 *
Mobilization/Demobilization	20%	of subtotal direct capital		\$0 *
Site Preparation/Site Restoration	20%	of subtotal direct capital		\$0 *
Total Direct Capital Cost		(sum of * items)		\$0
<u>Indirect Capital Costs</u>				
Engineering & Design	18%	of direct capital		\$0
Project/Construction Management	25%	of direct capital		\$0
Health & Safety	5%	of direct capital		\$0
Overhead	30%	of direct capital		\$0
Contingency	20%	of direct capital		\$0
Total Indirect Capital Cost				\$0
Total Estimated Capital Cost				\$0
<u>Direct O&M Costs</u>				
Annual Costs	1.02% discount rate for costs > 200 years duration ¹			
Annual Inspections / Maintenance	26	years O&M	Years 2016 - 2041	
	26	1	4250	4250
Subtotal - Annual Costs				\$4,250
Present Worth Annual Costs (2.1% Discount Rate)				\$96,632
Five Year Costs	0			
Remedy Review	0	ea	\$15,000	\$0
Subtotal - Five Year O&M Costs				\$0
Present Worth Five Year Costs				\$0
Total Present Worth Direct O&M Cost				\$96,632
<u>Indirect O&M Costs</u>				
Project/Admin Management	100%	of direct O&M		\$96,632
Health & Safety	30%	of direct O&M		\$28,990
Overhead	30%	of direct O&M		\$28,990
Contingency	15%	of direct O&M		\$14,495
Total Present Worth Indirect O&M Cost				\$169,106
Total Estimated Present Worth O&M Cost				\$265,737
TOTAL ESTIMATED COST				\$265,737

1. Interest rate for costs with duration < 30 years (i.e., before 2045) is based on OMB Circular No. A-94 Appendix C revised Dec 2014