EXPLANATION OF SIGNIFICANT DIFFERENCES TO THE REVISION.1.1 RECORD OF DECISION FOR THE OLD F-AREA SEEPAGE BASIN

Introduction

This Explanation of Significant Differences (ESD) is being issued by the Department of Energy (DOE), the lead agency for the Savannah River Site, with concurrence by the Environmental Protection Agency-Region IV (EPA) and South Carolina Department of Health and Environmental Control (SCDHEC) to announce changes in the remedial decision selected for the Old F-Area Seepage Basin (OFASB) waste unit. The waste unit is located northwest of the center of the Savannah River Site (SRS), in Aiken, South Carolina. The original remedy includes removal of contaminated vegetation from the basin and overflow ditchline, chipping the vegetation, and transporting the chipped vegetation off-unit for disposal. This ESD provides the rationale for disposing of the chipped vegetation on-unit. The result of this remedy change would: (1) reduce the overall cost of the remedial action by eliminating the costs for additional vegetation handling, transportation and disposal off-unit; (2) eliminate the unnecessary exposure risk to the workers handling, transporting, and unloading the vegetation for disposal at the off-unit facility, and; (3) preserve all remedial action objectives and remedial actions identified in the originally selected remedy.

The SRS is required by CERCLA Section 117 (c) to publish an ESD whenever there is a significant change to a component of the remedy identified in the Record of Decision (ROD). Section 300.435 (c)(2)(I) of the National Oil and Hazardous Substances Pollution Contingency Plan requires the lead agency to provide an explanation of the differences and to make the information available to the public in the Administrative Record and information repository. This ESD is available for public review during normal business hours at the following information repositories:

U.S. Department of Energy
Public Reading Room
Gregg-Graniteville Library
University of South Carolina
171 University Parkway
Aiken, SC 29801
(803) 641-3465

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

Summary of Site History, Contamination Problems, and Selected Remedy

The OFASB, which served as an unlined seepage basin, received 9 to 14 million gallons of low radioactive activity wastewater between November 1954 and mid-May 1955. Wastewater included overhead condensates from evaporates, laundry wastewater, non-reactor cooling water from F and H Areas, and possibly other chemicals.

Since 1955, the OFASB received occasional discharges of cooling waters and rainfall runoff. During a three-month period in 1969, spent nitric acid solutions used to etch depleted uranium (M Area operations) were discharged (via tanker truck) to the basin. Wastewater disposal was discontinued after the 1969 discharge. An estimated 1.8 curies (Ci) of radioactive activity was released to the basin during its use. Due to natural radioactive decay an estimated inventory of less than 0.8 curies remains. Releases to the basin of various non-radioactive chemicals also occurred during basin use. The inactive basin is currently fenced and open. Standing water is present during wet seasons. The trees and vegetation from the basin and overflow ditchline have been removed and chipped. The chipped vegetation is being stored on-unit at the OFASB in accordance with established SRS requirements.

Analytical data pertaining to OFASB indicates that radionuclide contaminated soils associated with OFASB are the principal threat wastes which pose risk to both the future resident and industrial worker.

These radionuclide risks are primarily associated with external radiation from the top two feet of the OFASB soils. Major contaminants include Cesium-137 and Mercury. Fifty-three percent (53%) of the Cesium –137 is found in the top two feet of soils and 97% of the Mercury is found in the top two feet of soil.

The groundwater monitoring data has also revealed that Iodine-129, Nitrate, Strontium-90, and Tritium are present in the groundwater above maximum contaminant levels (MCLs). Uranium has been detected above proposed MCLs. Although radium has been decreasing over time, it has also exceeded MCLs. The groundwater plume has been detected in eight local wells associated with the OFASB. The groundwater plume in the water table aquifer has migrated beyond the surface boundaries of the OFASB by more than 200 feet toward the Upper Three Runs Creek which is more than 2500 feet to the north of the OFASB.

Based on the risk analysis, the OFASB soils pose a significant risk to human health. Significant carcinogenic risk to the potential future resident and worker are driven by exposure from direct radiation from the basin soils contaminated with Cesium-137 to a depth of 0 to 2 feet (4,500 cubic yards) and overflow ditchline soils to a depth of 0 to 2 feet (167 cubic yards). Significant carcinogenic risks to the potential future resident are also driven by exposure from ingestion of groundwater contaminated with Iodine-129, Tritium, Strontium-90 and Radium-228 in the water table aquifer.

The approved remedy as stated in the Revision 1.1 ROD (March 1997) consists of: (1) off-unit disposal of vegetation removed and chipped from the basin and overflow ditchline; (2) in-situ grouting of basin and overflow ditchline soils and installation of a low permeability engineered soil cap; (3) groundwater controls using alternate concentration limits/mixing zone for remediation of the OFASB groundwater, and; (4) institutional control for the OFASB influent pipeline and pipeline soils.

The primary remedial action objectives (RAOs) for the OFASB operable unit that have a potential to be influenced by the disposition of chipped vegetation on-unit are as follows:

- Prevent external exposure to radiological constituents,
- Prevent inhalation of radiological constituents, and to
- Prevent or mitigate the release of constituents of concern to the groundwater.

Description of Significant Differences and the Basis for those Differences

Remedial Strategy:

The change in the originally approved remedy is to dispose of the vegetation from the basin and overflow ditchline on-unit in lieu of off-unit. All other remedial action remedies remain unchanged. The chipped vegetation is currently stored on-unit. Prior to and during production grouting of the basin soils the chipped vegetation will be handled and stored in accordance with established SRS requirements. After completion of grouting, the chipped vegetation will be placed on top of the first clean, compacted, soil fill layer placed over the in-situ grouted soils. The chipped vegetation (approximately 285 cubic yards) will be blended into the second lift of grading fill. The volume of the chips will be limited to approximately 15% of soil volume and will be uniformly spread over the compacted lift of grading fill. The blended material will be compacted prior to placement of additional fill material. Clean fill material will continue to be compacted in-place until the proper grade for a low permeability cap has been obtained. A low permeability engineered soil cap would then be constructed over the basin area to minimize surface infiltration and reduce the potential for contamination migration. This method of chip disposal will minimize potential of settlement especially uneven settlement that could result in cracking of the soil cover system. Attachment A shows a typical cross section of the disposed chips and associated constructed layers required to complete the basin closure.

Cost Effectiveness:

The following estimates have been made for the chipped vegetation disposal methods:

Original Remedy	Modified Remedy
Off-unit disposition of chipped vegetation at SRS E-Area Low Level Disposal Facility $ 123,000.	On-unit disposition of chipped vegetation $ 23,000.

The proposed remedy for disposition of chipped vegetation on-unit is cost effective. The original remedy considered several off-unit disposal options. All of the options for off-unit disposal require packaging, transportation, and off-loading of the chips at a SRS disposal facility. The review of these options has been on going since the vegetation has been chipped. Additionally, on-unit storage and handling costs have been expended during the investigation of viable off-unit disposal options. The extended period of time (approximately 12 months) involved in this determination negated any savings previously forecast for reducing handling and storage costs planned by immediate off-unit disposal. Regardless, the on-unit disposal method described in the Remedial Strategy section costs significantly less than the proposed off-unit option.

Prevention to Exposure or Inhalation of Radiological Constituents:

The on-unit disposal of chipped vegetation will be constructed to have approximately four (4) feet of clean soil over the top of the blended vegetation\soil compacted mixture. An analysis was performed to calculate the shielding effect of soil cover against Cesium -137, a source for gamma radiation, for H-Retention Basin (ECSD-SGS-95-0317, dated July 13, 1995). The calculations show that a 2 to 3 ft soil cover provides adequate safeguard against any external exposure from the gamma radiation source. For the OFASB, the major contaminants include Cesium- 137 and Mercury. Cesium concentrations in the soil at OFASB are considerably less than the value analyzed for H-Retention Basin (1,345 pCi/g vs. 33,000 pCi/g). The radiological contamination identified in the chipped vegetation (e.g. Cesium 2.89 pCi/g) is much lower than the contamination levels detected in the OFASB soils. Hence, the proposed remedy for the disposition of chipped vegetation placed over the grouted matrix in a soil mixture will be effective in eliminating the direct radiation exposure hazards associated with the on-unit worker.

Prevent or Mitigate the Release of Constituents of Concern to Groundwater:

A low permeability engineered soil cap with a minimum thickness of 2 feet of compacted low-hydraulic conductivity soil (in-place saturated hydraulic conductivity of 1×10^{-5} cm/sec or less) is installed over the vegetation/soil mixture and compacted clean fill material. The cap will also have an upper surface with a slope to promote surface runoff and minimize surface erosion. A vegetative soil layer will be placed over the low permeability layer to support grass growth and will have the ability to survive and function with little or no maintenance. The surface slope will also promote runoff and minimize surface erosion. The design of this cap both reduces the risks associated with direct radiation exposure and minimizes future potential migration of contaminants to the groundwater.

To further analyze the potential impact of adding the chipped vegetation under the engineered cap, transport and risk modeling was performed using a computer-based program called RESRAD. The program calculated groundwater concentrations for specified times in the future based on various hydrogeologic properties of the unsaturated and saturated zones. The estimated groundwater concentrations were compared to appropriate maximum contaminant levels (MCLs). Only three constituents were estimated to appear in groundwater within 1,000 years: Carbon-14, Iodine-129, and Technetium -99. None of these constituents had estimated groundwater concentrations exceeding their MCLs, or if MCLs were not available, their risk-based activities (RBAs). Therefore the addition of the chipped vegetation in the proposed configuration meets the RAO to prevent or mitigate the release of constituents of concern to the groundwater.

Conclusion:

Disposing of the chipped vegetation on-unit will not reduce the overall effectiveness of the selected remedy. Rather, the selected change in the ROD to dispose of contaminated vegetation on-unit will: (1) reduce the overall cost of the remedial action; (2) eliminate the unnecessary exposure risk to the workers handling, transporting, and unloading the vegetation for disposal at the off-unit facility, and; (3) preserve all applicable RAO and remedial actions identified in the original ROD.

Support Agency Comments

Comments were received from USEPA, Letter to Mr. Brian Hennessey, FFA Project Manager, from Julie L. Corkran, RPM, USEPA, dated August 13, 1998. The primary comments from USEPA were to provide additional information to clarify the basis for the remedy change and the cost and implementability differences, establish that the change does not impact the protectiveness of the remedy, and respond to any contradictory positions previously taken by DOE.

The comments were reviewed and incorporated as appropriate in this Explanation of Significant Differences to the Revision 1.1 Record of Decision.

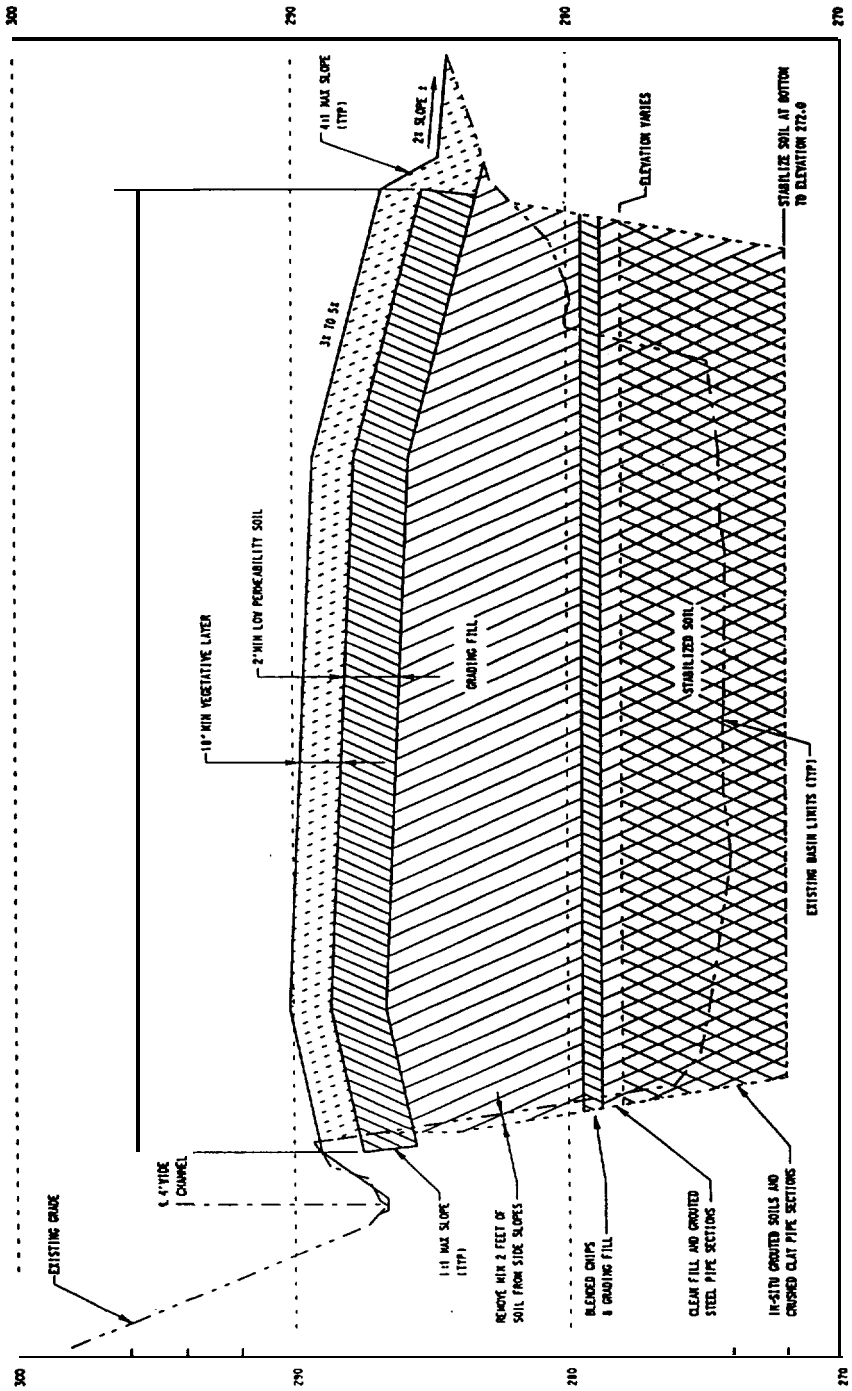
Affirmation of the Statutory Determinations:

Considering the information that has been provided, DOE believes the changes that have been made to the selected remedy remains protective of human health and the environment, complies with federal and state requirements that were identified in the Revision 1.1 ROD and this ESD as applicable or relevant and appropriate to this remedial action, and is cost effective.

Public Participation Activities

The public will be informed of the changes in the selected remedy as specified in this document through public notices in the *Barnwell People Sentinel/Allendale Citizen Leader, Aiken Standard, Augusta Chronicle, and The State.*

ATTACHMENT A
SKETCH SHOWING THE CROSS-SECTION OF THE COVER SYSTEM OVER OFASB



TYPICAL SECTION