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United States Department of Energy

Savannah River Site

Explanation of Significant Difference (ESD) for the Plug-In ROD for In Situ Stabilization with a Low Permeability Soil Cover System for Radiological Contaminants in Soil - K-Area Reactor Seepage Basin (U)

WSRC-RP-99-4200

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Introduction

This Explanation of Significant Difference (ESD) is being issued by the U.S. Department of Energy (US DOE), the lead agency for the Savannah River Site (SRS) remedial activities, with concurrence by the U.S. Environmental Protection Agency (US EPA) – Region IV and the South Carolina Department of Health and Environmental Control (SCDHEC). The purpose of this ESD is to announce that the K-Area Reactor Seepage Basin (KRSB) Operable Unit (OU) will use the remedy described in the *Plug-In Record of Decision for In Situ Stabilization with a Low Permeability Soil Cover System for Radiological Contaminants in Soil (U)* (WSRC-RP-98-4099). The plug-in record of decision (ROD) was issued on November 29, 1999.

The plug-in ROD selected a common remedy, in situ stabilization with a low-permeability soil cover system, for high-risk, radioactively contaminated OUs at SRS with similarities in history of use, contaminants, and location. Although the ROD did not identify a specific waste unit for the remedial action, it did identify KRSB as a candidate for the plug-in remedy. A *Unit-Specific Plug-in Technical Evaluation Report for the K-Area Reactor Seepage Basin Operable Unit (U)* (WSRC-RP-98-4165) was prepared to demonstrate that the KRSB meets the criteria specified in the plug-in ROD and to show how the remedy will be applied.

Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 117 (c), SRS is required to publish an ESD whenever there is a significant change to a component of a remedy specified in a ROD. Sections 300.435 (c) (2) (i) and 300.825 (a) (2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires the lead agency to provide an explanation of the difference and to make this information available to the public in the Administrative Record File and information repositories.

The ESD and technical evaluation report are part of the Administrative Record File, and are 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 Aiken
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

Reese Library
Augusta State University
2100 Walton Way
Augusta, GA 30910
(706) 737-1744

Asa H. Gordon Library
Savannah State University
Thompkins Road
Savannah, GA 31404
(912) 356-2183

Summary of Site History, Contamination Problems, and Selected Remedy

The KRSB is located in the south-central portion

of the SRS in K-Reactor Area (Figure 1). The KRSB is approximately 400 feet (ft) west of K-Reactor.

The KRSB was used from 1957 to 1960 to receive low-level radioactive wastewater from K-Area disassembly basin purges via a 600 ft long, 3-inch diameter, polyethylene pipe buried approximately 2 to 4 ft below land surface (bls). The basin dimensions are approximately 135 x 70 ft with an average depth of 7 ft.

In 1995, characterization activities were begun and the results are documented in the *Remedial Investigation Report and Baseline Risk Assessment for the K-Reactor Seepage Basin (904-65G) (U)* (WSRC-RP-96-871). These studies indicate that the seepage basin soils and process sewer line present a potential hazard from radionuclides to future industrial workers and residents and that remediation of the KRSB is warranted.

Basis for the Explanation of Significant Difference

The purpose of this document is to demonstrate that the KRSB OU meets the criteria specified in the plug-in ROD; thus the remedy selected in the plug-in ROD should be applied to the KRSB.

The detailed determination of how this unit meets the criteria is in the *Unit-Specific Plug-in Technical Evaluation Report for the K-Area Reactor Seepage Basin Operable Unit (U)* (WSRC-RP-98-4165) available in the Administrative Record File.

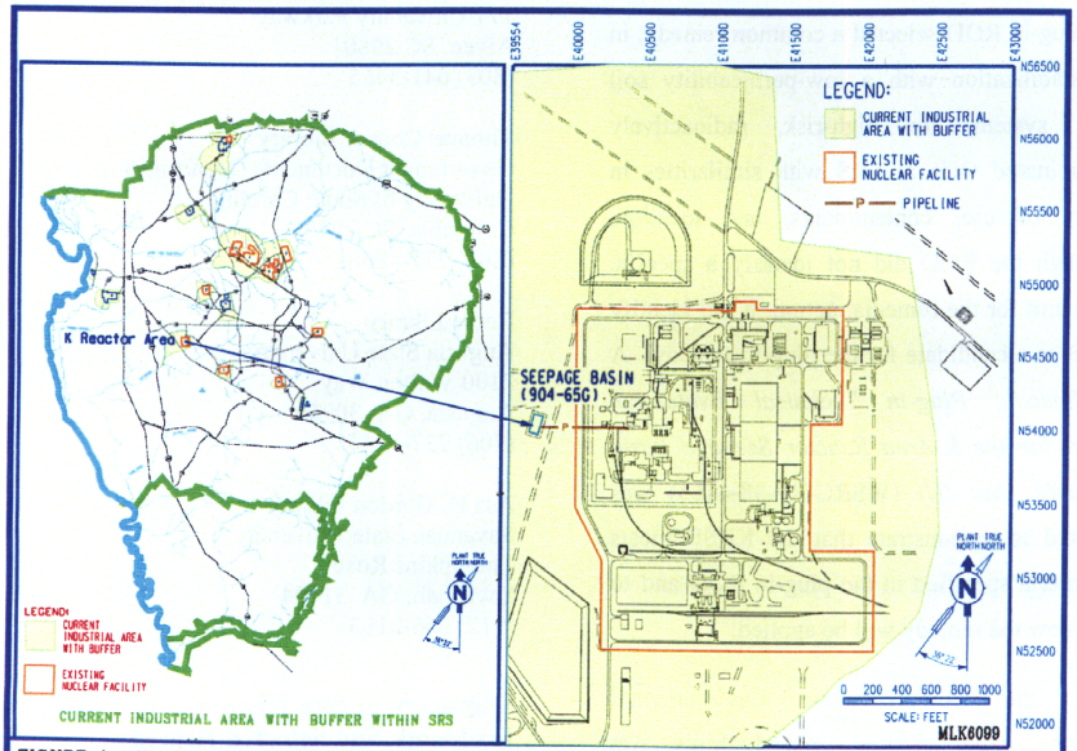

FIGURE 1. K-AREA REACTOR SEEPAGE BASIN (904-65G) WITH CURRENT INDUSTRIAL AREA AND BUFFER

Description of Significant Differences and the Basis for those Differences

This ESD is unique in that it does not describe a change to the remedy selected in the ROD, but rather documents that the remedy will be implemented at a specific OU (KRSB). US EPA, SCDHEC and US DOE have determined that using an ESD format is a key component in communicating remedial decisions for the plug-in ROD.

In order to show that the plug-in remedy is the appropriate response action for KRSB, plug-in criteria are used to evaluate whether the waste unit matches the conditions that the plug-in remedy has been designed to address. The plug-in criteria have been formulated as four key questions that follow. If the answer to any of the four questions is "NO", then the plug-in ROD is not appropriate, and an alternate administrative pathway will be used.

1) Is the Unit Radiologically Contaminated?

Yes. Data previously collected for the KRSB OU indicate that soil in the seepage basin and in the vicinity of pipeline leaks is contaminated by radionuclides. Five radionuclides, cesium-137, strontium-90, plutonium-239/240, americium-241, and cobalt-60 are present in the basin at levels that pose unacceptable cancer risks to future industrial workers. The distribution of cesium-137, the most significant contaminant, in the basin is shown in Figure 2. Carbon-14 and strontium-90 are contaminants in the basin that may leach to groundwater.

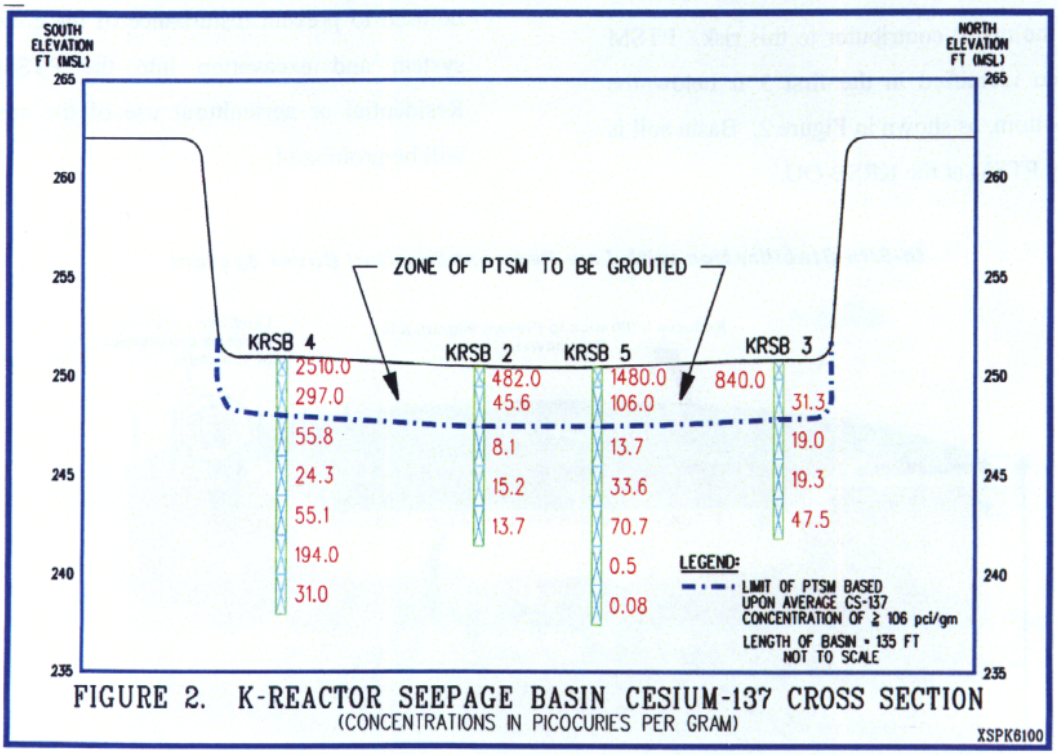

FIGURE 2. K-REACTOR SEEPAGE BASIN CESIUM-137 CROSS SECTION
(CONCENTRATIONS IN PICOCURIES PER GRAM)

2) Is the Unit Located in a Current Industrial Use Area (With Buffer) Adjacent to a Nuclear Facility?

Yes. The KRSB is approximately 400 ft west of the K-Reactor Area (Figure 1). This area is located in an industrial zone identified in the proposed SRS future land use map of the SRS Federal Facility Agreement Implementation Plan, is adjacent to a nuclear facility, and has been selected to remain as an industrial use area.

3) Does the Unit Contain Principal Threat Source Material (PTSM)?

Yes. For the plug-in remedy, PTSM has been defined as soil that poses a radiological (or cancer) risk to the future industrial worker equal to or greater than 1×10^{-3} (1 additional predicted cancer in 1000 people). The KRSB OU characterization data indicate that a maximum risk of 1.3×10^{-2} may result from exposure of a future industrial worker to basin soils. Cesium-137 is the major contributor to this risk. PTSM has been identified in the first 3 ft below the basin bottom, as shown in Figure 2. Basin soil is the only PTSM at the KRSB OU.

4) Is PTSM Not in Direct Contact with Groundwater or Immediately Adjacent to Surface Water?

Yes. The PTSM at KRSB is not in direct contact with groundwater or surface water. The groundwater table at KRSB is approximately 65 ft bls at the waste unit (Figure 3). Rainwater is temporarily impounded and stays within the basin. Surface water features are not affected by the KRSB OU. The nearest stream, Indian Grave Branch, is located approximately 2,750 ft west of the KRSB.

Conclusion

Because the KRSB OU meets all plug-in criteria, the plug-in remedy will be used at KRSB. A schematic drawing (Figure 3) shows how the remedy will be applied at KRSB. The remedy consists of four components:

- Land use controls (institutional control) will be used to prevent disturbance of the cover system and excavation into the PTSM. Residential or agricultural use of the area will be prohibited.

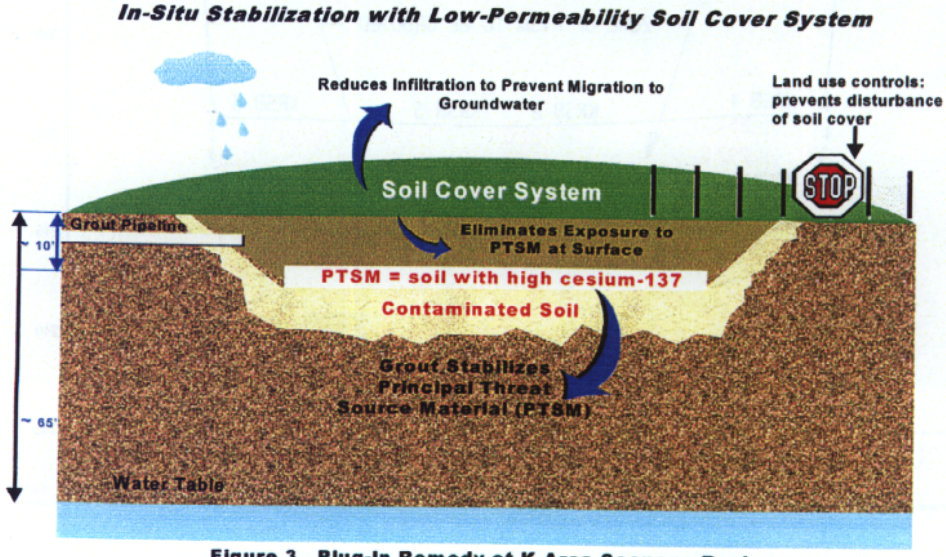

Figure 3. Plug-In Remedy at K-Area Seepage Basin

- PTSM soils in the first 3 ft below the basin bottom will be stabilized in place using a cement-based grout mixture. This treatment will convert the waste into a form less likely to result in human exposure to radionuclides.

- A low permeability soil cover will be placed over the stabilized soil. This will reduce infiltration through the stabilized soil to prevent leaching of strontium-90 and carbon-14 to groundwater above maximum contaminant levels. The cover will also prevent exposure of humans or animals to radionuclides in the stabilized soil.

- The pipeline will be grouted to prevent exposure to burrowing animals.

This remedy will be the final remedy for this OU, since the groundwater contamination associated with this basin is being addressed as a separate OU.

Statutory Determinations

The plug-in remedy meets the requirements specified in CERCLA Section 121 to:

- Protect human health and the environment
- Comply with applicable or relevant and appropriate requirements
- Be cost-effective
- Utilize permanent solutions and alternative treatment technologies to the maximum extent practicable
- Satisfy the preference for treatment as a principal element

Public Participation Activities

The public has been notified of a 30-day public comment period on this ESD through mailing of the *SRS Environmental Bulletin*, a newsletter sent to approximately 3,500 citizens in South Carolina and Georgia, and through the *Aiken Standard*, the *Allendale Citizen Leader*, the *Barnwell People Sentinel*, *The State*, and the *Augusta Chronicle* newspapers. The public comment period began February 18, 2000 and ended March 18, 2000. No public comments were received. A presentation on this ESD was made to the SRS Citizens Advisory Board Environmental Remediation committee on March 7, 2000.

The public will be informed of regulator concurrence with this ESD through public notices in the *Barnwell people Sentinel/Allendale Citizen Leader*, *Aiken Standard*, *Augusta Chronicle* and *The State*.

3/22/00
Date

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