

Achieving Accelerated Cleanup of Cesium Contaminated Stream at the Savannah River Site; Collaboration between Stakeholders, Regulators, and the Federal Government - 13182

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ABSTRACT

The Savannah River Site (SRS) is a 310-square-mile United States Department of Energy (USDOE) nuclear facility located along the Savannah River near Aiken, South Carolina that contains six primary stream/river systems.

The Lower Three Runs Stream (LTR) is one of the primary streams within the site that is located in the southeast portion of the Savannah River Site and is a large black water stream system that originates in the northeast portion of SRS and follows a southerly direction before it enters the Savannah River. During reactor operations, secondary reactor cooling water, storm sewer discharges, and miscellaneous wastewater was discharged and contaminated a 36 kilometer stretch of Lower Three Runs Stream that narrows providing a limited buffer of USDOE property along the stream and floodplain. Based on data collected during 2009 and 2010 under Recover Act Funding, the stream was determined to be contaminated with cesium-137 at levels that exceeded acceptable risk based limits.

As efficiencies were realized within the SRS Recovery Act Program, funding was made available to design, permit and execute remediation of the LTR. This accelerated Project allowed for the remediation of 36 kilometers of LTR in only nine months from inception to completion, contributing significantly to the Foot Print Reduction of SRS. The scope consisted of excavation and disposal of more than 2064 cubic meters of contaminated soil, and installing 11 kilometers of fence and 2,000 signs at 1000 locations. Confirmatory sampling and analysis, and radiological surveying were performed demonstrating that soil concentrations met the cleanup goals. The project completed with a very good safety record considering the harsh conditions including, excessive rain in the early stages of the project, high summer temperatures, swampy terrain, snakes, wild boar, insects and dense vegetation. The regulatory approval process was compressed by over 75% and required significant efforts from SRS's stakeholders including the regulators, U. S. Environmental Protection Agency (US EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC), and the public including

local property owners and the SRS Citizens Advisory Board. Stakeholder buy-in was critical in the upfront planning in order to achieve this challenging cleanup

INTRODUCTION

The Savannah River Site (SRS) is a 802 square-kilometer United States Department of Energy (DOE) nuclear facility located along the Savannah River near Aiken, South Carolina. Due to the complexity and size of multiple waste units located in different areas of the SRS, the site is divided into six watersheds for the purpose of managing a comprehensive cleanup strategy. In addition, the SRS identifies six Integrator Operable Units (IOUs) which are defined as surface water bodies (e.g., streams, floodplains, lakes) and associated wetlands, including the sediment, floodplain soil, and related biota (animal and plant life) that correspond to the six watersheds.

The LTR IOU is one of six SRS IOUs and is located in the southeast portion of SRS. LTR is a large blackwater stream that originates in the northeast portion of SRS and follows a southerly direction for approximately 36 km (23 mi) before it enters the Savannah River. The watershed includes two SRS facility areas: P Area Operable unit (PAOU) including P-Reactor (105-P) and R Area Operable Unit (RAOU) including R-Reactor (105-R). In addition, the upper portion of the watershed contains a 1,011 hectare man-made impoundment (PAR Pond), several smaller pre-cooler ponds and canal systems. From the PAR Pond Dam, LTR flows approximately 36 km (23 mi) before it enters the Savannah River. During reactor operations, secondary reactor cooling water, storm sewer discharges, sheet flow from the facility areas, disassembly basin water purges and miscellaneous wastewater was discharged into LTR IOU.

Approximately 8 km downstream from the PAR Pond dam, the SRS boundary narrows providing a limited buffer of USDOE property along the LTR stream and floodplain. This area is referred to as the “LTR Tail” section and is bordered on both sides of the property with private land owners.

CHARACTERIZATION RESULTS

Extensive soil, sediment and water sampling was conducted in 2009 and 2010 under the American Recovery and Reinvestment Act to evaluate contaminant conditions within the LTR IOU. Three sampling transects within the middle and lower tail section (Figure 1) were found to have sediment/soils contaminated with Cesium-137 (Cs-137) exhibiting a risk greater than 1×10^{-4} (23.7 pCi/g) for the adolescent trespasser receptor. The contamination at these locations is entirely within United States Department of Energy (USDOE) property. The Cs-137 contaminated sediment/soil would remain at concentrations that could pose an unacceptable future risk to adolescent trespassers if action was not taken to remove the contamination. Previous actions have been initiated to post warning and no trespassing signs plus construction of fencing to prevent public access, fishing, and hunting on USDOE-owned property. Prior to May 2012 fencing along the LTR tail section was limited.

Based on the realization that the characterization had shown discreet locations of contaminants and since efficiencies were realized within the SRS Recovery Act Program,

funding was made available to design, permit and execute remediation of the LTR under a very compressed schedule. As a result, a significant effort was required and subsequently achieved in completing the required work within the required timeframe.

ACCELERATED REMEDIAL PROCESS

Once the problem along LTR was identified, the next step was to determine the necessary clean-up while working within the schedule framework. The compressed regulatory approval process required significant efforts from SRS's stakeholders including the appropriate regulators, namely the U. S. Environmental Protection Agency (US EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC). Additional stakeholders included the public, specifically local property owners and the SRS Citizens Advisory Board (CAB). Stakeholder buy-in was critical in the upfront planning in order to achieve this challenging cleanup.

CLEAN-UP ACTION CHALLENGES

The LTR clean-up actions presented a major shift in SRS's normal remediation process, including:

- Reduced the clean-up schedule from the traditional 24 months to just 9 months
- Reduced the procurement award cycle by approximately 40%.
- Accelerated document development and reviews.
- Performed frequent public involvement meetings and briefings

REGULATOR COLLABORATION

Much of the early remediation decision making required advanced planning and agreement from the regulators and the DOE. This group, called the core team, utilized a decision making process that allowed the SRS to proceed with an accelerated remediation. The decision process included scoping meetings where recently acquired data were presented, impacts and risks were analyzed. Finally, endstate decisions were subsequently made and actions to codify the decisions determined.

These actions started in late Calendar Year 2011 with the initial scoping meetings and agreement in principle on an action. The outcome of the meetings yielded the following:

- Removal strategy for the identified "hot spots" of contamination including decision criteria for the area of removal
- Protection of surrounding wetlands and considerations for re-establishment of excavation areas
- Placement of fencing and signage within "high impact areas"
- Appropriate documentation necessary for the tri-party agreement including approval of a Sampling Analysis Plan, Waste Management Plan, Stormwater Management Plan, Site Evaluation Report/Action Memorandum and an Explanation to Significant Differences Report

All decisions and documents were finalized on schedule and clean-up initiated in May 2012 and completed 90 days later.

PUBLIC INVOLVEMENT AND COLLABORATION

Two public involvement approaches were used. The first included information releases to the public by way of newspaper ads and other media where public notices were used to inform and educate the public on the pending early action. Additionally, presentations were made to the SRS Citizens Advisory Board (CAB) that addressed the characterization data, risks and recommended remediation. The SRS CAB strongly supported the accelerated cleanup.

Documents provided to the public were used to solicit comments or questions from citizens. All comments received from the public were incorporated into the final decision documents; there were no unresolved public comments.

The second public involvement process (less common for most remediation) was face-to-face contact with land owners adjacent to the LTR boundary. SRS let the landowners know why and when activities would be taking place. Some property owners made their own property available to allow more efficient entry into the cleanup areas. The involvement of private property owners negated the need to build over four miles of access roads that would have had to be built through wetlands. In the final analysis, the public involvement turned out to be a win – win for the DOE and the private landowners who both benefited by the improvements to existing roads leading to the remediation areas.

REMEDIAL ACTION SCOPE

When the scope of the early action was defined and executed the results were extraordinary. The removal action excavated over 2064 cubic meters of Cs-137 contaminated sediment/soil while minimizing wetland impacts. Confirmatory sampling and analysis, and radiological surveying demonstrated that cleanup goals had been achieved.

More than 11 kilometers of additional fence was added to the “high impact areas” where trespassing might be a future potential and over 1,050 sign locations (2,000 signs) installed warning of trespassing and residual contamination concerns.

More importantly than the amount of work performed, was how safe project was at the end. The project completed with a near perfect safety record considering the harsh conditions including, excessive rain in the early stages of the project, high summer temperatures, swampy terrain, snakes, feral pigs, insects and dense vegetation.

SUMMARY OF LTR CLEAN-UP

The SRS teams, including its stakeholders, achieved an unprecedented cleanup of a 36 kilometer long stream system that included a “tail section” that was bordered on either side by publically owned land.

The planning and execution of this action commenced in late 2011 and was completed in August 2012. This safety executed, accelerated project completed 9 months from initial planning with the regulators. The clean-up of LTR contributed a reduction of the SRS

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footprint by 10% (total footprint reduction under Recovery Act at SRS was 85%). The economic stimulus of the local economy was also spurred by the rental of equipment, purchasing of local materials and additional labor needed to finish the job.

The project has been hailed as a major milestone in the footprint reduction of the site and was cited by the Agency of Toxic Substances and Disease Registry as a significant accomplishment in the protection of the public at SRS.

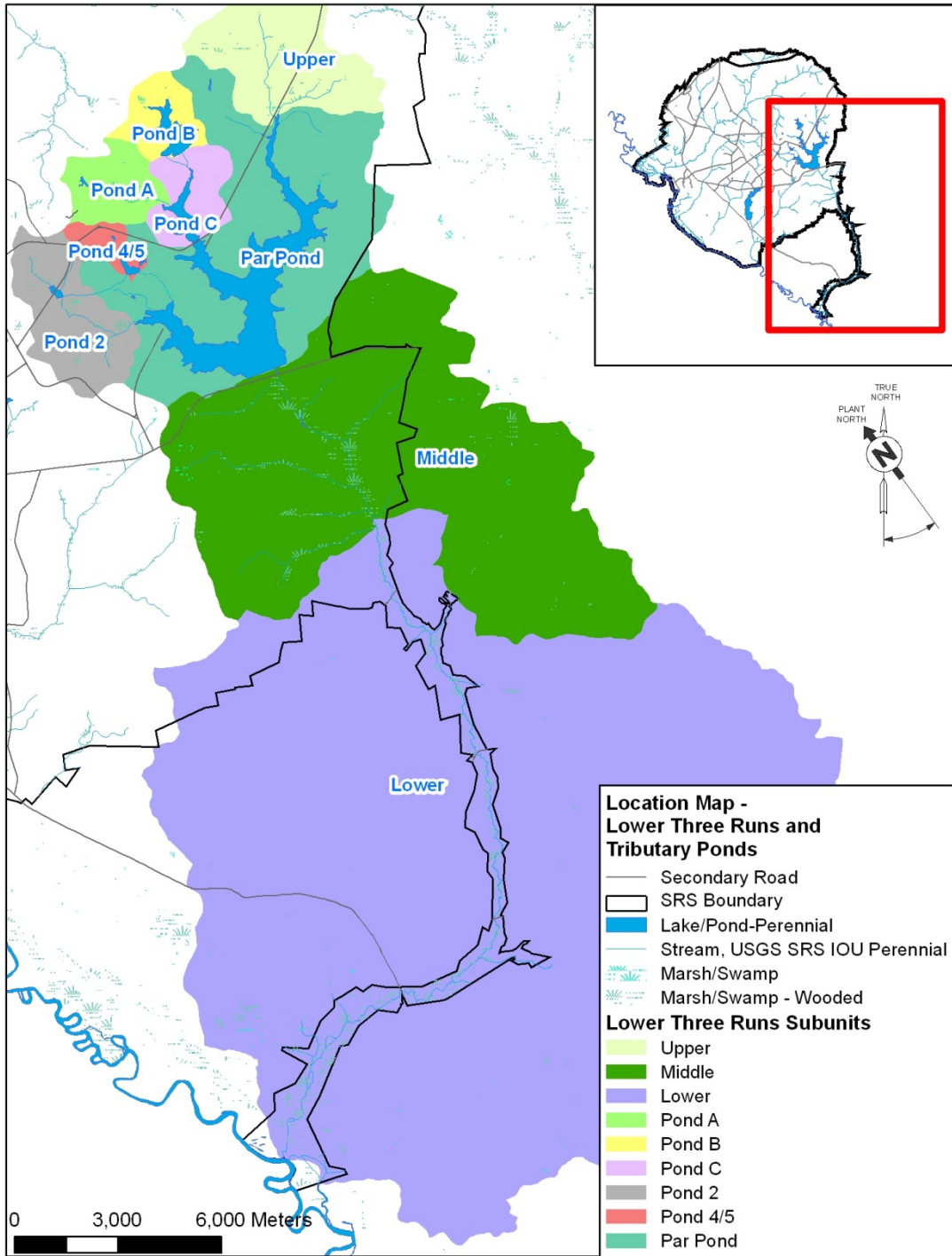


Figure 1 - Lower Three Runs Location