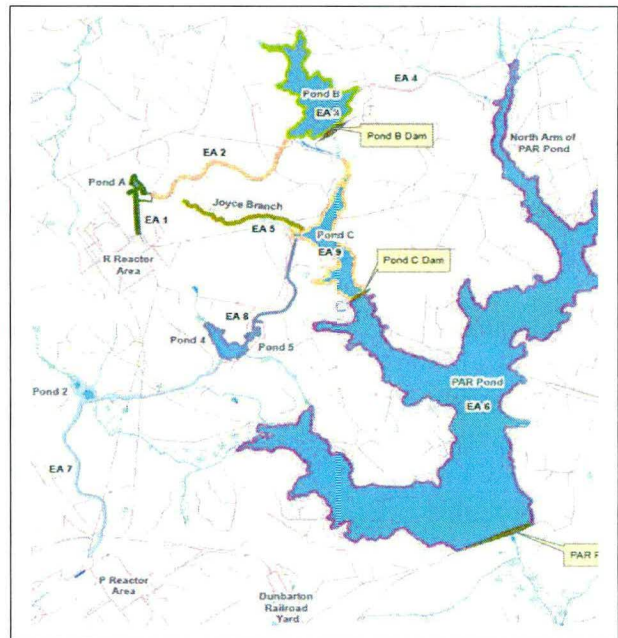




The Upper subunit is segregated into the following nine individual Exposure Areas (EAs):

- EA1: Pond A – Including R-Area Discharge Canal
- EA2: Canal from Pond A to Pond B
- EA3: Pond B – Including canal to Pond C
- EA4: Canal from Pond B to North Arm of PAR Pond
- EA5: Joyce Branch (Old Discharge Canal)
- EA6: PAR Pond
- EA7: Canal from P-Area to Ponds 4 and 5 – Including Pond 2
- EA8: Ponds 4 and 5 – Including canal from Ponds 4 and 5 to Pond C
- EA9: Pond C



Residual sediment/soil contamination, primarily cesium-137, is present in the LTR IOU stream corridor due to historical reactor operations. R-Reactor began operations in 1953 and was followed by P-Reactor in 1954. Both reactors received cooling water from the Savannah River via the river water distribution system. R-Reactor initially discharged reactor effluent directly into Joyce Branch, while P-Reactor discharged reactor effluent directly into Steel Creek. In 1958, PAR Pond, along with a series of pre-cooler ponds and a connecting canal system, were constructed to address the cooling water requirements of both P- and R-Reactor. Effluent from R-Reactor was routed to the R-Area Discharge Canal and pre-cooler Pond B where it discharged into the north arm of PAR Pond. This effluent pathway was used for R-Reactor discharge from 1961 until the reactor was shut down in 1964. Since the shutdown of R-Reactor, R-Area Discharge Canal and Pond B have remained essentially undisturbed.

PAR Pond also served as a heat exchange/cooling reservoir for P-Reactor until 1988. Heated water was released through a series of man-made canals and smaller impoundments into the pre-cooler Pond C and released into PAR Pond. Effluent discharges from P-Reactor ceased in 1987 with the shutdown of the reactor. As with the R-Area Discharge Canal, the associated canal system and pre-cooler ponds have remained essentially undisturbed. Releases from P-Reactor and R-Reactor operations included process leaks, reactor disassembly basin purges, and thermal discharges that contained primarily Cs-137.

The LTR IOU is currently designated for industrial use. No current or projected future development is planned, nor is the current land use expected to change. To support the risk management decision-making, an IOU onsite worker (wetland researcher) land use scenario was evaluated. A recreational fisherman scenario was also evaluated for EAs that can sustain populations of consumable fish, i.e., EA3 (Pond B), EA6 (PAR Pond), and EA9 (Pond C).

A risk evaluation determined that for EA1 through EA9, cesium-137 and cobalt-60 activity in sediment/soil exceeded a risk of 1E-06 for the onsite worker. A risk greater than or equal to 1E-06 indicates a probability of 1 chance in 1,000,000 of an individual developing cancer. Surface water was determined to not be a media of concern and did not pose an unacceptable risk to the IOU onsite worker.

Principal threat source materials (PTSM) are described as highly toxic materials that would present a significant risk to human health or the environment should exposure occur. Results of the PTSM screening determined that the maximum activity of cesium-137 exceeded the PTSM threshold (i.e., risk  $\geq$  1E-03) for the IOU onsite worker in one submerged location at EA1 in the R-Area Discharge Canal. EA3 (Pond B) had two sample locations with cesium-137 levels above the PTSM threshold, and EA5 (Joyce Branch) had two locations with cesium-137 above the PTSM threshold.

For EA3 (Pond B), EA6 (PAR Pond), and EA9 (Pond C), Cs-137 and mercury in fish tissue exceed a risk of 1E-06 for the recreational fisherman.

## CLEANUP GOALS

Cleanup goals for the LTR IOU include the following:

- Protect IOU onsite workers from exposure to cesium-137 and cobalt-60 in sediment/soil that exceed 1E-06 risk threshold or background levels. The primary exposure route of concern is the external radiation pathway.
- Protect the recreational fisherman from exposure to cesium-137 and mercury in fish tissue. The primary route of exposure is the ingestion of fish pathway.

## PROPOSED REMEDY

Due to the complexity of the Upper subunit, multiple remedial strategies are needed to address the nature and extent of contamination within the LTR IOU system. The preferred remedial alternative for the entire Upper Subunit (EA1 through EA9) is LUCs with Monitored Natural Recovery (MNR). In addition, the Excavation of PTSM Sediment/Soil alternative is the preferred alternative to address the one location in EA1 in the R-Area Discharge Canal that exceeded the PTSM



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threshold, and the Maintain Water in Ponds alternative is the preferred alternative to provide additional exposure protection for EA3 (Pond B) and EA6 (PAR Pond).

LUCs include engineering controls such as signs and gates at access points and administrative measures (i.e., deed restrictions, and worker protection programs) to effectively reduce exposure of contaminated media to human receptors. MNR is a remedy that uses the ongoing, naturally-occurring process to contain, destroy, or reduce the bioavailability or toxicity of contaminants in sediment/soil. The MNR remedy component will assess the natural decay of Cs-137 in the Upper subunit over time. Cs-137 levels are expected to decay below the PTSM threshold in the Upper subunit in approximately 50 years, and the need to continue with the MNR component of the remedy will be reevaluated at that time.

For EA1, the Excavation and Disposal of PTSM sediment/soil remedial alternative will be implemented to remove the single PTSM location in the R-Area Discharge Canal. The PTSM location is in relatively shallow water and is accessible for standard excavation practices. The excavated sediment/soil will be treated with a drying agent to reduce contaminant mobility during transportation and on site disposal.

EA5 (Joyce Branch) contains two PTSM locations in shallow water. EA5 (Joyce Branch) is located interior to the site approximately 4.5 miles from the SRS boundary, is remotely located from site operations, and is not accessible to the public (i.e., trespassers). Because PTSM is present in EA5 (Joyce Branch) in two locations, LUCs will be augmented in the form of additional signage at access roads and utility corridors in addition to gates within the access roads leading toward the two PTSM locations. Also, additional signs will be installed along the banks near the PTSM locations.

The Maintain Water in Ponds remedial alternative is the preferred action for EA3 (Pond B) and EA6 (PAR Pond) to minimize access and limit exposure to submerged, contaminated sediment/soil within the ponds. This alternative consists of maintaining dam structures for water retention, allows for natural fluctuation of water levels, and controls sediment movement downstream of the PAR Pond Dam. Annual inspections and periodic maintenance of the physical attributes (i.e., dams, weirs, control gates, etc.) that make water retention viable are already in place per SRS procedures and the Federal Energy Regulatory Commission guidelines.

The proposed remedy for the LTR IOU Upper subunit includes LUCs with MNR, Excavation and Disposal of PTSM, and Maintain Water in Ponds remedial alternatives. The proposed remedy requires five-year remedy reviews. The United States Environmental Protection Agency and South Carolina Department of Health and Environmental Control concur with the proposed remedy.



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### FOR MORE INFORMATION

The 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 Campus  
471 University Parkway  
Aiken, South Carolina 29803  
(803) 641-3504

Thomas Cooper Library  
Government Information and Maps  
Department  
University of South Carolina  
1322 Green Street  
Columbia, South Carolina 29208  
(803) 777-4841

Hard copies of the Proposed Plan for the LTR IOU are available at the following locations:

Reese Library  
Government Information Department  
Augusta University  
2500 Walton Way  
Augusta, Georgia 30904  
(706) 737-1744

Asa H. Gordon Library  
Savannah State University  
2200 Tompkins Road  
Savannah, Georgia 31404  
(912) 358-4324

### HOW TO SUBMIT COMMENTS

The public comment period for the Proposed Plan for LTR IOU begins August 13, 2019 and ends September 26, 2019. 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:

Angie Benfield  
Savannah River Nuclear Solutions, LLC  
Savannah River Site  
Building 730-1B  
Aiken, South Carolina 29808  
(803) 952-9830  
[Angela.Benefield@srs.gov](mailto:Angela.Benefield@srs.gov)