Scoping Summary for the Lower Three Runs Integrator Operable Unit

(Proposed Plan Scoping)

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DISCLAIMER

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1.0 PROJECT PHASE AND STATUS OF THE LOWER THREE RUNS INTEGRATOR OPERABLE UNIT

This scoping summary supports the development of a Proposed Plan (PP) for the Lower Three Runs (LTR) Integrator Operable Unit (IOU) (Figure 1). The Revision 0 PP is due for submittal on April 24, 2020.

The LTR IOU consists of an Upper subunit, Middle subunit, and Lower subunit. This scoping summary supports a scoping meeting scheduled for January 31, 2019, to reach Core Team agreement on the preferred remedial alternative for the Upper subunit, which includes PAR Pond, pre-cooler ponds, R-Reactor Discharge canal, and the canal system upgradient of PAR Pond dam (Figure 2). A remedial action was previously implemented at the Middle and Lower subunits of the LTR IOU.

A Remedial Investigation/Baseline Risk Assessment (RI/BRA) for the LTR IOU Upper subunit was approved by the South Carolina Department of Health and Environmental Control (SCDHEC) and the United States Environmental Protection Agency (USEPA) in July 2017. A Feasibility Study (FS) was developed by the United States Department of Energy (USDOE) and submitted to SCDHEC and the USEPA in August 2018. Regulator comments on the Revision 0 FS have been addressed, and the Revision 1 redline document was submitted to SCDHEC and USEPA on January 30, 2019. SCDHEC approved the Revision 1 redline FS on February 28, 2019. USEPA provided comments on April 3, 2019. The Revision 1.1 FS was submitted on February 26, 2020. The USEPA and SCDHEC approved the document on February 28, 2020, and March 24, 2020; respectively.

A remedial action is needed in the Upper subunit of the LTR because radionuclides in sediments and radionuclides and metals in fish tissue may pose a threat to human health and the environment. For the Middle and Lower subunits, a 2012 Explanation of Significant Difference (ESD) documented the incorporation of land use controls (LUCs) following completion of a non-time critical removal action for contaminated soil/sediment. An Early Action Land Use Control Implementation Plan (EALUCIP) is in place for the Middle and Lower subunits that describes the LUCs selected in the ESD and how the controls are implemented and maintained. The Core Team

agrees that the remedial action implemented for the Middle and Lower subunits is protective of human health and the environment, and LUCs will be documented in the LTR IOU Record of Decision (ROD) as the final remedial action for the Middle and Lower subunits.

2.0 BACKGROUND

LTR Watershed

The LTR IOU and its associated watershed are in the southeastern portion of the Savannah River Site (SRS) (Figure 1). LTR is a large blackwater stream that originates in the northeast portion of SRS and follows a southerly direction for approximately (~) 40 kilometers (km [24.5 miles {mi}]). LTR has an annual average discharge of 1.8 cubic meter (m^3)/sec (64 cubic feet [ft^3]/sec). The watershed drains about 460 square kilometers (km^2 [180 square miles {mi^2}]) and includes two SRS Operable Units: P-Area Operable Unit (PAOU) including P Reactor (105-P), and R-Area Operable Unit (RAOU) including R Reactor (105-R).

Potential sources of contamination to LTR from its watershed have been evaluated and mitigated. Remedial actions for source units at RAOU and PAOU have been completed. Two units originally identified in the LTR IOU workplan, Dunbarton Railroad Yard and P-Area Groundwater, have subsequently been re-evaluated and administratively transferred to the Steel Creek watershed. There are no known potential sources of contamination to the LTR IOU.

LTR IOU

The LTR IOU is defined as the LTR stream and its tributaries and impoundments, including surface water, sediment, floodplain soils (sediment/soil), and related biota in these water bodies and associated floodplains. The LTR IOU is divided into three subunits (Upper, Middle, and Lower) (Figure 1). The Upper portion of the LTR IOU contains a 1,068-hectare (ha [2,640-acre {ac}]) mainstream impoundment (PAR Pond), several smaller ponds (pre-cooler ponds), and canal systems including P-Area Discharge Canal, R-Area

Discharge Canal and the Old R-Area Discharge Canal (Joyce Branch) (Figure 2). The Middle and Lower subunits of the LTR IOU are located below the PAR Pond dam. A LUC remedy for these subunits was selected in a 2012 ESD and will be documented in the final LTR IOU ROD. The entire length of LTR IOU, but not the entirety of its watershed, is bounded by SRS.

Previous Actions

During an inspection of the PAR Pond Dam in March 1991, a small surface depression was noted on the downstream face which necessitated a detailed structural investigation and initiated a precautionary drawdown of the reservoir. From June through September 1991, the level of PAR Pond was lowered from 60 to 54.3-meters (m [200- to 181-feet {ft}]) mean sea level (msl) to reduce the risk and consequences of an unlikely event of dam failure. A Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Interim Record of Decision (IROD) for PAR Pond was issued in January 1995, to address potential exposure to contaminated sediments that were exposed following water level drawdown of the PAR Pond reservoir during repair of the PAR Pond dam. The objective of the interim remedy was to prevent exposure of contaminated shoreline sediments until a National Environmental Policy Act (NEPA) evaluation could be conducted. The resulting NEPA ROD from that evaluation noted that natural fluctuation of PAR Pond water elevations would remain between 59.4-m and 61.0-m (195-ft and 200-ft) msl without operation of the River Water System (RWS), although it also noted the RWS availability in critical drought conditions. A 2009 revised Finding of No Significant Impact (FONSI) reduced the base flow requirements below PAR Pond dam (5 cubic feet per second {ft^3/sec} [0.14 cubic meter per second {m^3/sec}]) which supports a balanced biological community in the downstream reaches of LTR. As a follow-up to the 1995 CERCLA IROD for PAR Pond that addressed potential exposure to contaminated sediments without the benefit of risk information, the final CERCLA remedial action recommended in this PP is based on the findings of the 2017 RI/BRA and 2018 FS for the LTR IOU which evaluated human and ecological risk to exposed sediment (i.e., no water coverage) in the Upper subunit.

A Time Critical Removal Action (TCRA) was conducted in 2012 for the Lower and Middle LTR subunits downgradient of the PAR Pond dam. The action included excavation of Cs-137 sediment hot spots and LUCs (i.e., fencing and signage). An ESD to the

1995 PAR Pond IROD was issued in 2012 that selected LUCs for the LTR IOU Lower and Middle subunits. The TCRA was designed to achieve an acceptable level of risk to the adolescent trespasser. The implemented remedy left hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the sediment are at levels that allow for unrestricted use. An EALUCIP was prepared for the LTR IOU Middle and Lower subunits to implement the LUCs selected as the remedial decision. The LUCs shall be maintained until the LTR IOU Lower subunit is suitable for unlimited exposure and unrestricted use. No additional data collection, risk assessment, or response evaluation is necessary to support the approved early action remedial decision for both the Lower and Middle subunits. Therefore, the remedial action for the Lower and Middle subunits, documented in the ESD, will be documented as the final action in the LTR IOU final ROD.

The effectiveness of the 1995 IROD and 2012 ESD remedy was evaluated in the Sixth Five-Year Remedy Review Report for SRS OUs with Native Soil Covers and/or LUCs (December 2018). The review concluded that the remedy at PAR Pond, including the LTR IOU Middle and Lower subunits, is protective of human health and the environment.

3.0 LAND USE

Current land use in the LTR IOU is mixed. Industrial areas cover less than 10% of the SRS portion of the LTR watershed including PAOU and RAOU. The remainder of the watershed primarily consists of managed forests, wetlands/floodplain habitats, and surface water impoundments, and is no longer used for industrial purposes. No part of the LTR IOU is anticipated to have residential or unrestricted use in the future. The Upper subunit (including ponds and canals) and Middle subunit of the LTR (below PAR Pond dam) are well within the SRS property boundary. The Lower subunit includes a strip of USDOE property on both sides of the stream, which is bounded on both sides by private property, some of which includes residential parcels. The USDOE-owned property is ~0.20- to 0.40-km (0.125- to 0.25-mi) wide; the USDOE boundary is posted, and trespassing is not allowed. There are four public road crossings, two power line crossings, and a railroad crossing along this portion of LTR.

Exposure Scenarios

Previous decisions for the Middle and Lower subunits of the LTR IOU were based on an adolescent trespasser exposure scenario. An "IOU onsite worker" scenario was determined to be the appropriate scenario for the Upper subunit of the LTR IOU BRA. The IOU onsite worker is based on the most likely human receptor for the Upper subunit: an SRS worker/researcher (20 years, 150 days/year, 8 hours/day). The IOU onsite worker is also protective of an adolescent trespasser (10 years, 90 days/year, 18 hours/day), since it assumes ~50 percent greater total exposure than the adolescent trespasser.

Because it is known that some contaminants could bio-accumulate in fish, and fish are a mobile media, the evaluation of human exposure also included a hypothetical recreational fisherman scenario for the ingestion of fish (26 years, 350 days/year, 54 g/day). The recreational fisherman scenario was determined to only be viable for EAs that can sustain populations of consumable fish specifically EA3, EA6, and EA9.

4.0 SUBUNITS AND EXPOSURE AREAS

The LTR IOU is divided into three major subunits based on sub-watershed boundaries: Upper, Middle, and Lower (Figure 1). The Middle and Lower subunits are located below PAR Pond dam. For purposes of data evaluation, risk assessment, and response selection, the Upper subunit has been further segregated into nine Exposure EAs (Figure 2). The nine EAs are identified in Section 4.2. The human health and ecological risk assessments, the principle threat source material (PTSM) evaluation, and evaluation of contaminant migration have been completed per SRS protocols. The FS Summary of Comparative Analysis is provided in Section 4.3.

4.1 Lower and Middle Subunits (below PAR Pond Dam)

The early remedial action for the Lower and Middle subunits, documented in the 2012 ESD, is complete. The clean-up level achieved is considered protective of human health and the environment and will be documented as the final action in the LTR IOU ROD.

4.2 Upper Subunit (above PAR Pond Dam)

The Upper subunit has been divided into nine Exposure Areas (EAs) as indicated on Figure 2. The individual EAs represent the following portions of the LTR IOU.

1. Exposure Area 1: Pond A – Including R Discharge Canal
2. Exposure Area 2: Canal from Pond A to Pond B
3. Exposure Area 3: Pond B – Including canal to Pond C
4. Exposure Area 4: Canal from Pond B to North Arm of PAR Pond
5. Exposure Area 5: Joyce Branch (Old Discharge Canal)
6. Exposure Area 6: PAR Pond
7. Exposure Area 7: Canal from P-Area to Ponds 4 and 5 – Including Pond 2
8. Exposure Area 8: Ponds 4 and 5 – Including canal from Ponds 4 and 5 to Pond C
9. Exposure Area 9: Pond C

Likely Response Actions

The No Action alternative does not involve any remedial action response. The No Action response does not involve any monitoring or reporting. No Five-Year Remedy Reviews would be performed.

LUCs with Monitored Natural Recovery (MNR) is a remedial action that allows contaminated media to remain in place. LUCs are used so human receptors are protected by signs, administrative procedures, and/or fencing. LUCs require site inspections and long-term reporting. MNR is a potential remedial action for contaminated sediment that uses ongoing, naturally-occurring processes (i.e., biodegradation, sorption, sedimentation, radioactive decay) to contain, destroy, or reduce the bioavailability or toxicity of contaminants in sediment and fish tissue. MNR usually requires assessment, modeling, and long-term monitoring and reporting. MNR monitoring is anticipated to continue for all nine EAs until Cs-137 concentrations have decayed below the PTSM threshold (~50 years). Consideration for continued MNR will be reassessed at that time.

In Situ Capping on PTSM Sediments (including consideration of a hybrid cap) is an in-situ remedial action that includes the addition of some type of barrier cap to contaminated media. The application of a cap readily limits exposure pathways by reducing the mobility and the bioavailability of the known contaminants. A hybrid cap would include placement of amendments in addition to the capping material. Amendments or capping generally require sampling to define construction boundaries, post installation verification/surveying, and long-term monitoring and reporting. Application of this likely response action is considered for the areas within each EA that have concentrations above PTSM threshold.

The Maintain Water in Ponds action consists of maintaining dam structures to maintain water in Pond B, Pond C and PAR Pond which ensures that contaminated sediment is not exposed to human receptors. Current water levels within the pond systems are naturally fluctuating but sustainable. Maintaining water in the ponds, much like the MNR alternative, uses natural processes to allow for the decay of contamination in the sediment, but also shields receptors from the radioactive contaminated sediments. It also limits contaminated sediments from migrating off-SRS; mobility of contaminated media in the Upper subunit is restricted by the dam structures at Pond B (EA3), Pond C (EA9) and ultimately PAR Pond (EA6). This infrastructure serves as sedimentation barriers that retain and slow the movement of water and sediment within the system, controlling flow into PAR Pond. Similarly, the PAR Pond dam acts as a sedimentation barrier for the entire Upper subunit and limits contaminated sediments from migrating to the Middle and Lower subunits

and potentially off SRS. This response requires site inspections, maintenance, and long-term monitoring and reporting only for the duration of which sediment in the IOU exceeds PTSM threshold (~50 years). Consideration for continuing the Maintain Water in Ponds alternative will be reassessed at that time.

Excavation/Treatment/Disposal scenarios include the removal, treatment and disposal of contaminated media, generally to a specified clean-up level, from the EA. This process involves extracting the contaminated media with specialized equipment and unique construction methods. The unit where the media was removed is often backfilled with clean fill. Excavation/Treatment/Disposal requires assessment, modeling, confirmation sampling, long-term monitoring, and reporting. Application of this likely response action is considered for the areas within each EA that have concentrations above the PTSM threshold and is also evaluated for all contaminated sediments in the Upper subunit as a bounding case.

4.2.1 Exposure Area 1: Pond A – Including R Discharge Canal

Subunit Background

EA1 includes Pond A and the R-Area Discharge Canal. Pond A is ~2.6 ha (6.4 ac) and received water from the R-Area Discharge Canal and subsequently discharged to Pond B. Prior to construction of PAR Pond, the Discharge Canal effluent flowed into LTRs via Joyce Branch. Water levels in Pond A fluctuate from year to year. The canal from R-Reactor to Pond A is ~645-m (2,116.1-ft) long. The canal from the R-Discharge Canal to Joyce Branch is 233-m (764.4-ft) long. The canal flow area (i.e., where contaminants most likely have been deposited) is ~3.0-m (9.8-ft) across the base of the canal. EA1 contains one sample location where Cs-137 levels are above the PTSM threshold for the onsite worker. This location lies within the R Discharge Canal along a Diversion Control Structure. Although not the intended function, the infrastructure currently serves as a sedimentation barrier for contaminated sediment transport into Pond A. EA1 is an active research location for basic and applied ecological research. This area is a training ground for current and

future ecologists, biologists and radioecologists. Any land-altering response actions would impact the highly unique short and long-term research that takes place in this EA.

EA1 (Pond A – Including R Discharge Canal)			
Problem(s) Warranting Action	**Remedial Action Objectives**	**Scope of Problem(s)**	**Likely Response Actions**
• Cs-137 and Co-60 in sediments pose a Total Cumulative Risk (TCR) of $8.24x10^{-4}$ to the onsite worker (decay corrected to $6.4x10^{-4}$) - Cs-137: (EPC = 148 pCi/g; risk to the onsite worker = $8.2x10^{-4}$; decay corrected to $6.4x10^{-4}$). - Co-60: (EPC = 0.144 pCi/g; risk to the onsite worker = $1.7x10^{-6}$; decay corrected to $<1x10^{-6}$)	• Protect onsite workers from exposure to Cs-137 and Co-60 in sediment that exceed $1x10^{-6}$ risk threshold or background levels.	• Assuming 0.3-m (1.0-ft) depth of contaminated sediment and 3.0-m (9.8-ft) canal flow area, the maximum volume of contaminated sediment/soil in the canal system would be 658 m^3 (1,034.5 yd^3). • Contaminated sediment below the water surface in Pond A covers an area of ~25,900 square meters (m^2 [30,976.1 squire yards {yd^2}]). Assuming a 0.3-m (1.0-ft) depth of contaminated sediment, the maximum volume of contaminated sediment in Pond A would be 7,770 m^3 (10,162.8 yd^3). • There is one location (R-1), with five separate samples, where Cs-137 levels are above the PTSM threshold for the onsite worker. • Approximately 10 m^3 (13.1 yd^3) greater than PTSM threshold.	• No Action • LUCs with MNR* • In Situ Capping of PTSM sediments (including consideration of a hybrid cap) • Excavation, Treatment and Disposal of PTSM*
Uncertainties			
• None.			

* Core Team Preferred Remedy

4.2.2 Exposure Area 2: Canal from Pond A to Pond B

Subunit Background

EA2 includes the canal from Pond A to Pond B and is ~2,837-m (9,307.7-ft) long. Water levels fluctuate from year to year. The canal flow area (i.e., where contaminants most likely have been deposited) is ~3.0-m (9.8-ft) across the base of the canal.

EA2 (Canal from Pond A to Pond B)			
Problem(s) Warranting Action	**Remedial Action Objectives**	**Scope of Problem(s)**	**Likely Response Actions**
• Cs-137 in sediments (EPC = 48.8 pCi/g) poses a $2.7x10^{-4}$ risk to the onsite worker (decay corrected to $2.3x10^{-4}$).	• Protect onsite workers from exposure to Cs-137 in sediments that exceed $1x10^{-6}$ risk threshold or background levels.	• Assuming 0.3-m (1.0-ft) depth of contaminated sediment and 3.0 m (9.8-ft) canal flow area, the maximum volume of contaminated sediment in the canal system would be 2,553 m^3 (3,339.2 yd^3).	• No Action • LUCs with MNR*
Uncertainties			
• None.			

* Core Team Preferred Remedy

4.2.3 Exposure Area 3: Pond B – Including Canal to Pond C

Subunit Background

EA3 includes Pond B and the overflow canal connecting Pond B to Pond C. Pond B is ~82.1 ha (202.8 ac) and received water from the R-Area and subsequently discharged to Pond C. Pond B generally maintains its water level from year to year. The canal from Pond B to Pond C is ~547-m (1,794.6-ft) long. The canal flow area (i.e., where contaminants most likely have been deposited) is ~3.0-m

(9.8-ft) across the base of the canal. EA3 (Pond B – Including Canal to Pond C) contains two locations where Cs-137 levels are above the PTSM threshold for the onsite worker. The two sample locations are in Pond B, submerged below several feet of water. EA3 is also an active research location for basic and applied ecological research. This area is a training ground for current and future ecologists, biologists and radioecologists. Any land-altering response actions would impact short and long-term research that takes place in this EA.

EA3 (Pond B – Including Canal to Pond C)			
Problem(s) Warranting Action	**Remedial Action Objectives**	**Scope of Problem(s)**	**Likely Response Actions**
• Cs-137 in sediments (EPC = 98.3 pCi/g) poses a $5.5x10^{-4}$ risk to the onsite worker (decay corrected to $3.3x10^{-4}$).	• Protect onsite workers from exposure to Cs-137 in sediments that exceed $1x10^{-6}$ risk threshold or background levels.	• Assuming 0.3-m (1.0-ft) depth of contaminated sediment and 3.0-m (9.8-ft) canal flow area, the maximum volume of contaminated sediment in the canal system would be 492 m^3 (643.5 yd^3). • Contaminated sediment below the water surface in Pond B covers an area of ~820,703 m^2 (981,533 yd^2). Assuming a 0.3-m (1.0-ft) depth of contaminated sediment, the maximum volume of contaminated sediment in Pond B would be 246,211 m^3(322,031.8 yd^3). • There are two locations in EA3 (SCB-29 and SCB-34) where measured concentrations of Cs-137 (circa 1994) exceeded PTSM threshold for the onsite worker. • Approximately 200 m^3 (260.2 yd^3) greater than PTSM threshold.	• No Action • LUCs with MNR* • In Situ Capping of PTSM sediments (including consideration of a hybrid cap) • Excavation, Treatment and Disposal of PTSM • Maintain Water in Pond*
• Cs-137 in fish tissue (Max = 113 pCi/g; PRG = 0.054 pCi/g) and Hg (Max = 1.83 mg/kg; RSL = 0.154 mg/kg) exceeds risk based screening levels for the recreational fisherman.	• Protect recreational fisherman from exposure to contaminated fish.	• Contaminated fish have been detected in Pond B.	• No Action • LUCs with MNR*
Uncertainties			
• None.			

* Core Team Preferred Remedy

Hg = mercury Max. = maximum PRG = preliminary regional goal RSL = regional screening level

4.2.4 Exposure Area 4: Canal from Pond B to North Arm of PAR Pond

Subunit Background

EA4 includes the canal from Pond B to the North Arm of PAR Pond and is ~2,305-m (7,562.3-ft) long. The canal flow area (i.e., where contaminants most likely have been deposited) is ~3.0-m (9.8-ft) across the base of the canal.

EA4 (Canal from Pond B to North Arm of PAR Pond)			
Problem(s) Warranting Action	**Remedial Action Objectives**	**Scope of Problem(s)**	**Likely Response Actions**
• Cs-137 in sediments (EPC = 18.3 pCi/g) poses a $1.0x10^{-4}$ risk to the onsite worker (decay corrected to $8.8x10^{-5}$).	• Protect onsite workers from exposure to Cs-137 in sediments that exceed $1x10^{-6}$ risk threshold or background levels.	• Assuming 0.3-m (1.0-ft) depth of contaminated sediment and 3.0-m (9.8-ft) canal flow area, the maximum volume of contaminated sediment in the canal system would be 2,075 m^3 (2,714.0 yd^3).	• No Action • LUCs with MNR*
Uncertainties			
• None.			

* Core Team Preferred Remedy

4.2.5 Exposure Area 5: Joyce Branch (Old Discharge Canal)

Subunit Background

EA5 is Joyce Branch (Old Discharge Canal). Joyce Branch is ~2,533-m (8,310.3-ft) long. The flow area is ~3.0-m (9.8-ft) across the base of the stream bed. EA5 contains two locations where Cs-137 levels are above the PTSM threshold for the onsite worker. The topography of the sample area would present difficulties in implementation for capping or excavation remedial alternatives.

EA5: Joyce Branch (Old Discharge Canal)			
Problem(s) Warranting Action	**Remedial Action Objectives**	**Scope of Problem(s)**	**Likely Response Actions**
• Cs-137 and Co-60 in sediments pose a TCR of $1.3x10^{-3}$ to the onsite worker (decay corrected to $9.4x10^{-4}$) - Cs-137: (EPC = 228 pCi/g; risk to onsite worker = $1.3x10^{-3;}$ decay corrected to $9.4x10^{-4}$). - Co-60: (EPC = 0.76 pCi/g; risk to onsite worker = $9.1x10^{-6}$; decay corrected to $1.7x10^{-6}$)	• Protect onsite workers from exposure to Cs-137 and Co-60 in sediments that exceed $1x10^{-6}$ risk threshold or background levels.	• Assuming 0.3-m (1.0-ft) depth of contaminated sediment and 3.0-m (9.8-ft) canal flow area, the maximum volume of contaminated sediment in the canal system would be 2,280 m^3 (2,982.1 yd^3). • There are four samples total (two each) at two specific locations (LTR-02 and LTR-04) with measured levels (circa 2003-2004) above the PTSM threshold for Cs-137 for the onsite worker. • Approximately 20 m^3 (26.2 yd^3) greater than PTSM threshold.	• No Action • LUCs with MNR* • In Situ Capping of PTSM sediments (including consideration of a hybrid cap) • Excavation, Treatment and Disposal of PTSM
Uncertainties			
• None			

* Core Team Preferred Remedy

4.2.6 Exposure Area 6: PAR Pond

Subunit Background

EA6 is PAR Pond. PAR Pond is ~1,068.3 ha (2,640 ac) and received water from the R-Area and P-Area discharges via Pond B and Pond C. In 1995 an Interim Record of Decision established a minimum water elevation (61 +/- 0.3-m [200 +/- 1-ft msl]) and LUCs to manage exposure to contaminated sediments. The subsequent NEPA document (ROD, Shutdown of the River Water System at the SRS, FR Vol. 63, No.18, 1/29/98) acknowledged PAR can naturally fluctuate between 59.4- and 61.0-m (195- and 200-ft) msl and established a minimum water elevation of 59.4-m (195-ft) msl. Additionally, minimum outflow of 0.14-m^3 (5 ft^3/sec) from PAR Pond

has been established (per 2009 FONSI) to maintain downstream environments. As with other areas, EA6 is an active research location for basic and applied ecological research. This area is a training ground for current and future ecologists, biologists and radioecologists. Any land-altering response actions would impact short and long-term research that takes place in this EA.

EA6 (PAR Pond)			
Problem(s) Warranting Action	**Remedial Action Objectives**	**Scope of Problem(s)**	**Likely Response Actions**
• Cs-137 and Co-60 in sediments pose a TCR of $5.0x10^{-5}$ to the onsite worker (decay corrected to $2.9x10^{-5}$) - Cs-137: (EPC = 8.82 pCi/g; risk to onsite worker = $4.9x10^{-5}$; decay corrected to $2.9x10^{-5}$). - Co-60: in sediment (EPC = 0.097 pCi/g; risk to onsite worker = $1.2x10^{-6}$; decay corrected to $<1x10^{-6}$).	• Protect onsite workers from exposure to Cs-137 and Co-60 in sediments that exceed $1x10^{-6}$ risk threshold or background levels.	• Contaminated sediment below the water surface in PAR Pond covers an area of ~ 10,680,000 m^2 (10.68 km^2). Assuming 0.3-m (1.0-ft) depth of contaminated sediment the maximum volume of contaminated sediment under water in PAR Pond could be 3,257,400 m^3 (4,261,000 yd^3).	• No Action • LUCs with MNR* • Maintain Water in Pond*
• Cs-137 (max.18.4 pCi/g; PRG = 0.054 pCi/g) and Hg (max= 3.18 mg/kg; RSL = 0.154 mg/kg) in fish tissue exceeds risk based screening levels for the recreational fisherman.	• Protect recreational fisherman from exposure to contaminated fish.	• Contaminated fish have been detected in PAR Pond.	• No Action • LUCs with MNR*
Uncertainties			
• None.			

* Core Team Preferred Remedy

4.2.7 Exposure Area 7: Canal from P-Area to Ponds 4 and 5 – Including Pond 2

Subunit Background

EA7 includes Pond 2 and the canal from P-Area to Ponds 4/5. Pond 2 is ~7.9 ha (19.6) ac and received water from the P-Area and subsequently discharged to Ponds 4/5. The canal from P-Area to Pond 2 is ~3,582-m (11,751.9-ft) long. The canal from the Pond 2 to Ponds 4/5 is ~2,081-m (6,827.4-ft) long. The canal flow area (i.e., where contaminants most likely have been deposited) is ~3.0-m (9.8-ft) across the base of the canal.

EA7 (Canal from P-Area to Ponds 4 and 5 - Including Pond 2)			
Problem(s) Warranting Action	**Remedial Action Objectives**	**Scope of Problem(s)**	**Likely Response Actions**
• Cs-137 and Co-60 in sediments pose a TCR of $7.8x10^{-4}$ to the onsite worker (decay corrected = $4.5x10^{-4}$) - Cs-137: (EPC = 139 pCi/g; risk to onsite worker = $7.7x10^{-4;}$ decay corrected to $4.5x10^{-4}$). - Co-60: (EPC = 0.802 pCi/g; risk to onsite worker = $9.6 x10^{-6}$; decay corrected to $1.0 x10^{-6}$).	• Protect onsite workers from exposure to Cs-137 and Co-60 in sediments that exceed $1x10^{-6}$ risk threshold or background levels.	• Assuming 0.3-m (1.0-ft) depth of contaminated sediment and 3.0-m (9.8-ft) canal flow area, the maximum volume of contaminated sediment in the canal system would be 5,097 m^3 (6,666.6 yd^3). • Contaminated sediment below the water surface in Pond 2 covers an area of ~79,318 m^2 (94,863.54 yd^2). Assuming a 0.3-m (1.0-ft) depth of contaminated sediment, the maximum volume of contaminated sediment in Pond 2 would be 23,796 m^3 (31,123.9 yd^3).	• No Action • LUCs with MNR*
Uncertainties			
• None.			

* Core Team Preferred Remedy

4.2.8 Exposure Area 8: Ponds 4 and 5 – Including Canal from Ponds 4 and 5 to Pond C

EA8 includes Ponds 4 and 5 and the canal to Pond C. Pond 4 is ~14.3 ha (35.3 ac) and received water from the P-Area and subsequently discharged to Pond 5. Pond 5 is ~4.0 ha (9.9 ac) and received water from Pond 4 and subsequently discharged to Pond C via an 1,887-m (6,190.9-ft) long canal. The canal flow area (i.e., where contaminants most likely have been deposited) is ~3.0-m (9.8-ft) across the base of the canal.

EA8 (Ponds 4 and 5 - Including Canal from Ponds 4 and 5 to Pond C)			
Problem(s) Warranting Action	**Remedial Action Objectives**	**Scope of Problem(s)**	**Likely Response Actions**
• Cs-137 in sediments (EPC = 50.3 pCi/g) poses a $2.8x10^{-4}$ risk to the onsite worker (decay corrected to $1.9x10^{-4}$).	• Protect onsite workers from exposure to Cs-137 in sediments that exceed $1x10^{-6}$ risk threshold or background levels.	• Assuming 0.3-m (1.0-ft) depth of contaminated surface soil/sediment and 3.0-m (9.8-ft) canal flow area, the maximum volume of contaminated sediment in the canal system would be 1,698 m^3 (2,220.9 yd^3). • Contaminated sediment below the water surface in Pond 4 and 5 covers a combined area of ~182,918 m^2 (218,768.1 yd^2). Assuming 0.3-m (1.0-ft) depth of contaminated sediment the maximum volume of contaminated sediment under water in Ponds 4 and 5 combined could be 54,875 m^3 (71,773.8 yd^3).	• No Action • LUCs with MNR*
Uncertainties			
• None.			

* Core Team Preferred Remedy

4.2.9 Exposure Area 9: Pond C

Subunit Background

EA9 includes Pond C. Pond C is ~53.5 ha (132.4 ac) and received water from the R-Area and P-Area discharged via Joyce Branch, Pond B, and Ponds 4/5. Pond C maintains its water level from year to year and is hydraulically connected to PAR Pond through the Bubble Up Pipe at the dam between PAR and Pond C.

EA9 (Pond C)			
Problem(s) Warranting Action	**Remedial Action Objectives**	**Scope of Problem(s)**	**Likely Response Actions**
• Cs-137 and Co-60 in sediments pose a TCR of $1.2x10^{-4}$ to the onsite worker (decay corrected = $6.7x10^{-5}$) - Cs-137: (EPC = 20.9 pCi/g; risk to onsite worker = $1.2x10^{-4}$; decay corrected to $6.7x10^{-5}$). - Co-60: (EPC = 0.114 pCi/g; risk to onsite worker =$1.4x10^{-6}$; decay corrected to <$1x10^{-6}$).	• Protect onsite workers from exposure to Cs-137 and Co-60 in sediments that exceed $1x10^{-6}$ risk threshold or background levels.	• Contaminated sediment below the water surface in Pond C covers a combined area of ~535,800 m^2 (640,800 yd^2). Assuming 0.3-m (1.0-ft) depth of contaminated sediment the maximum volume of contaminated sediment under water in Pond C could be 163,419 m^3 (213,700 yd^3).	• No Action • LUCs with MNR* • Maintain Water in Pond
• Cs-137 (max 42.5 pCi/g; PRG = 0.054 pCi/g) and Hg (max 0.214 mg/kg; RSL = 0.154 mg/kg) in fish tissue exceeds risk based screening levels for the recreational fisherman.	• Protect recreational fisherman from exposure to contaminated fish.	• Contaminated fish have been detected in Pond C.	• No Action • LUCs with MNR*
Uncertainties			
• None.			

* Core Team Preferred Remedy

4.3 Summary of Comparative Analyses of the Alternatives

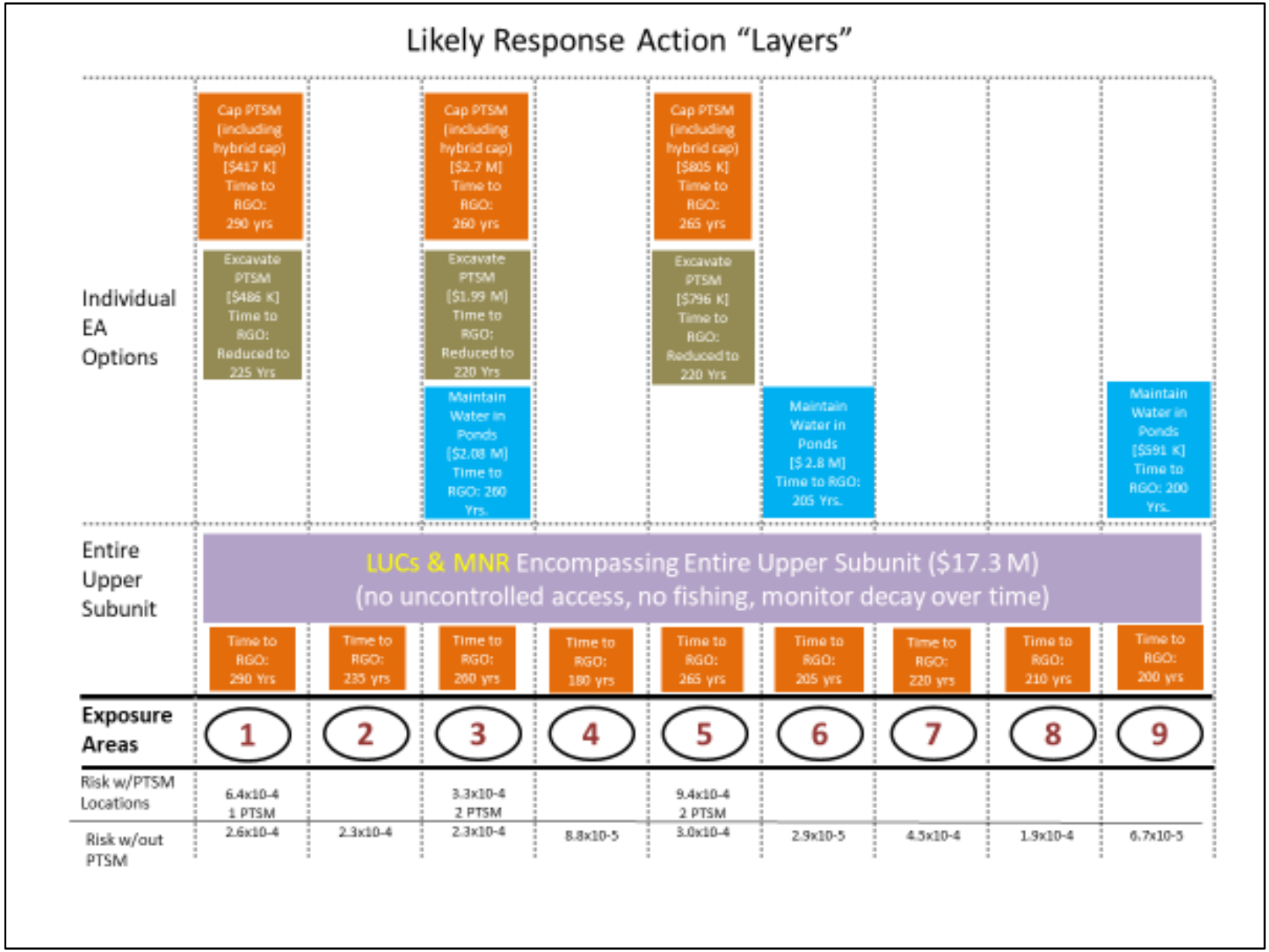
Summary of the Comparative Analyses of the Alternatives							
LTR IOU Alternatives	**Overall Protection of Human Health and the Environment**	**Compliance with ARARs**	**Long-term Effectiveness**	**Reduction of Toxicity, Mobility, and Volume through Treatment**	**Short-term Effectiveness**	**Implementability**	**Cost**
Alternatives That Apply to Entire Upper Subunit of the LTR IOU (EA1 thru EA9)							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	$17,321,141 ($696K cap - $16.6 M O&M)
EA by EA Evaluation							
EA1: Pond A – Including R-Area Discharge Canal							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	*see Upper subunit
A-3: Capping of PTSM Sediment/Soil[1]	High	Yes	High	Yes	High	Moderate Level of Effort	$416,566
A-5: Excavation/Treatment/Disposal of PTSM Sediment/Soil[1]	High	Yes	High	Yes	Medium	High Level of Effort	$485,986
EA2: Canal from Pond A to Pond B							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	*see Upper subunit
EA3: Pond B – Including Canal to Pond C							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	*see Upper subunit

Summary of the Comparative Analyses of the Alternatives *(Continued)*							
LTR IOU Alternatives	**Overall Protection of Human Health and the Environment**	**Compliance with ARARs**	**Long-term Effectiveness**	**Reduction of Toxicity, Mobility, and Volume through Treatment**	**Short-term Effectiveness**	**Implementability**	**Cost**
EA by EA Evaluation *(cont'd)*							
EA3: Pond B – Including Canal to Pond C *(cont'd)*							
A-3: Capping of PTSM Sediment/Soil[1]	High	Yes	High	Yes	High	High Level of Effort	$2,678,707
A-5: Excavation/Treatment/Disposal of PTSM Sediment/Soil[1]	High	Yes	High	Yes	Medium	High Level of Effort	$1,990,626
A-6: Maintain Water in Ponds[1]	High	Yes	High	None	High	Low Level of Effort	2,082,616
EA4: Canal from Pond B to North Arm of PAR Pond							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	*see Upper subunit
EA5: Joyce Branch (Old Discharge Canal)							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	*see Upper subunit
A-3: Capping of PTSM Sediment/Soil[1]	High	Yes	High	Yes	High	Moderate Level of Effort	$805,190
A-5: Excavation/Treatment/Disposal of PTSM Sediment/Soil[1]	High	Yes	High	Yes	Medium	High Level of Effort	$795,537
EA6: PAR Pond							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	*see Upper subunit
A-6: Maintain Water in Ponds[1]	High	Yes	High	None	High	Low Level of Effort	$2,835,922

Summary of the Comparative Analyses of the Alternatives *(Continued/End)*

LTR IOU Alternatives	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-term Effectiveness	Reduction of Toxicity, Mobility, and Volume through Treatment	Short-term Effectiveness	Implementability	Cost
EA by EA Evaluation *(cont'd)*							
EA7: Canal from P-Area to Ponds 4 and 5 – Including Pond 2							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	*see Upper subunit
EA8: Ponds 4 and 5 – Including Canal from Ponds 4 and 5 to Pond C							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	*see Upper subunit
EA9: Pond C							
A-1: No Action	None	No	None	None	None	None	$0
A-2: LUCs with MNR	High	Yes	High	None	High	Low Level of Effort	*see Upper subunit
A-6: Maintain Water in Ponds[1]	High	Yes	High	None	High	Low Level of Effort	$591,176

[1] Alternative is evaluated under the condition that LUCs with MNR is also applied.
Note: Range is Low to High, where Low = worst and High = best.
ARAR = applicable or relevant and appropriate requirement.
K = thousands
M = million
O&M = Operations and Maintenance


Likely Response Action "Layers"
Individual EA Options
Cap PTSM (including hybrid cap) [$417 K] Time to RGO: 290 yrs
Excavate PTSM [$486 K] Time to RGO: Reduced to 225 Yrs
Cap PTSM (including hybrid cap) [$2.7 M] Time to RGO: 260 yrs
Excavate PTSM [$1.99 M] Time to RGO: Reduced to 220 Yrs
Maintain Water in Ponds [$2.08 M] Time to RGO: 260 Yrs.
Cap PTSM (including hybrid cap) [$805 K] Time to RGO: 265 yrs
Excavate PTSM [$796 K] Time to RGO: Reduced to 220 Yrs
Maintain Water in Ponds [$ 2.8 M] Time to RGO: 205 Yrs.
Maintain Water in Ponds [$591 K] Time to RGO: 200 Yrs.
Entire Upper Subunit
LUCs & MNR Encompassing Entire Upper Subunit ($17.3 M)
(no uncontrolled access, no fishing, monitor decay over time)
Time to RGO: 290 Yrs
Time to RGO: 235 yrs
Time to RGO: 260 yrs
Time to RGO: 180 yrs
Time to RGO: 265 yrs
Time to RGO: 205 yrs
Time to RGO: 220 yrs
Time to RGO: 210 yrs
Time to RGO: 200 yrs
Exposure Areas
1
2
3
4
5
6
7
8
9
Risk w/PTSM Locations
6.4x10-4
1 PTSM
2.6x10-4
2.3x10-4
3.3x10-4
2 PTSM
2.3x10-4
8.8x10-5
9.4x10-4
2 PTSM
3.0x10-4
2.9x10-5
4.5x10-4
1.9x10-4
6.7x10-5
Risk w/out PTSM

5.0 IOU STRATEGY

The project team will develop a PP for the LTR IOU that summarizes the remedial alternatives evaluated in the FS document. The Core Team reached agreement on the following preferred remedial actions for each EA:

Exposure Area	A-2: LUCs with MNR	A-5: Excavation, Treatment and Disposal of PTSM Sediment/Soil	A-6: Maintain Water in Ponds
EA1: Pond A – Including R 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 to Pond C	√		
EA9: Pond C	√		

In addition, the Core Team agrees that the early remedial action (i.e., LUCs) documented in the 2012 ESD for the Middle and Lower subunits is protective of human health and the environment, and LUCs will be documented in the LTR IOU ROD as the final remedial action for the Middle and Lower subunits.

Alternative A-2 LUCs with MNR is recommended as a preferred action for the entire Upper subunit (EA1 thru EA9) because the remedy is effective in reducing exposure of contaminated media to human receptors in all EAs and will achieve the RAOs. Although EA5

contains two PTSM locations in a shallow water/wetland area of Joyce Branch, the Core Team agreed that the multiple layers of LUCs (e.g. site boundary access controls, site use/site clearance restrictions, radiological protection escort requirements for remote worker access), LUC signs and enhanced access warnings (additional signage and gates along access roads and utility corridors), along with MNR, were sufficient to manage the risks associated with PTSM. For EA5 (Joyce Branch), the Core Team agreed that a remedial action to remove or cover the two remote PTSM locations in addition to LUCs with MNR is not warranted because EA5 is located interior to the site (7.4 km [4.5 mi] 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 in two locations, more robust LUCs will be applied at EA5 in the form of additional signage at access roads and utility corridors in addition to gates leading toward the two PTSM locations and signs along the bank near the PTSM locations.

For EA1, the Core Team identified Alternative A-5 Excavation, Treatment and Disposal of PTSM sediment/soil to remove the single PTSM location in addition to Alternative A-2 LUCs with MNR as the preferred remedy. Excavation, treatment with a drying agent, and disposal of the single PTSM exceedance location was preferred because the identified area is located in relatively shallow water and is accessible for standard excavation practices.

Alternative A-6 Maintain Water in Ponds was evaluated for EA3, EA6, and EA9 through the timeframe that allows Cs-137 concentrations to decay below PTSM action levels (~50 yrs). This remedy includes maintenance of the dam structures for water retention to allow for natural fluctuations of water levels and control of 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. Although the risk assessment evaluation assumed no surface water was present and therefore did not account for shielding as the baseline condition, water is currently present and provides shielding for the sediment contamination. In addition, PAR Pond serves as a catch basin for sediments within the Upper subunit restricting downstream transport. The Core Team agreed that Alternative A-6 Maintain Water in Ponds in addition to

Alternative A-2 LUCs with MNR was appropriate for EA3 and EA6 to provide shielding and prevent migration of contaminated sediments below the PAR Pond dam. Including A-6 Maintain Water in Ponds in addition to LUCs and MNR for EA9 is not needed because EA9 and EA6 are hydraulically connected.

The remedial alternatives selected for each EA in the final ROD will be evaluated in five-year remedy reviews, and EPA and SCDHEC will be notified should conditions change that would call into question the protectiveness of the remedy. Cs-137 concentrations in the Upper subunit are expected to decay below the PTSM threshold in ~50 years. The Core Team agreed to reevaluate the need to continue the MNR component of Alternative A-2 and the need to continue Alternative A-6 Maintain Water in Ponds when Cs-137 decays below the PTSM threshold.

The Revision 0 PP is scheduled for submittal on April 24, 2020. The LTR IOU ROD is scheduled for issuance in August 2021.

The key milestones leading up to the ROD issuance include the following:

April 24, 2020	Submit Rev. 0 PP
December 7, 2020	Submit Rev. 0 ROD
August 20, 2021	Issue ROD

Table 1. Record of Core Team Agreements

Record of Key Agreements[1]	
Date	**Description of Agreement**
6/10/2015	The Core Team agreed that the on-site worker was the appropriate human health receptor for the Upper subunit of the LTR IOU.
10/29/2015	The Core Team agreed that the EAs presented are appropriate for the risk assessment, with the exception of EA6 (PAR Pond and Pond C). Based on the January 2016 data review, the Core Team will evaluate whether EA6 should include both PAR Pond and Pond C or if two separate EAs are needed.
10/29/2015	With the exception of PAR Pond, the 2009/2010 data will be used for the exposure point concentration assessment. All other data will be used as lines of evidence as part of the uncertainty evaluation.
1/28/2016	For EA6 (PAR Pond and Pond C), the Core Team agreed that the sediment data identified as high and medium pedigree is sufficient for the risk assessment. However, there needs to be a solid discussion in the RI/BRA of why the older 1995 and 2001 data (i.e., high pedigree rating) is adequate for the risk assessment. Project Team will acknowledge availability of low pedigree data in the RI/BRA report and explain why low pedigree data will not be used.
1/28/2016	The Core Team agreed that radionuclide concentrations (as reported) would be used in the risk assessment and radionuclide decay will generally be applied as part of the weight of evidence (i.e., uncertainty discussion).
1/28/2016	The Core Team agreed that high and medium pedigree data will be used for the Principal Threat Source Material evaluation for the onsite worker and decay corrected for the weight-of-evidence discussion.
1/28/2016	The Core Team agreed that high and medium pedigree data for surface water was adequate for Pond C but not PAR pond. Additional surface water samples (both filtered and unfiltered) are needed in PAR Pond in approximately 14 locations. An additional three (3) sediment samples will be considered. The Core Team agreed that an Addendum to the 2009/2010 would be adequate for formal approval of the additional surface water and sediment samples.
1/28/2016	The Core Team agreed that the high and medium pedigree fish data for Pond C and PAR pond are sufficient for the risk assessment. Because high pedigree data is limited, the medium data needs to be leveraged in the RI/BRA to establish that it is in the representative range with the high pedigree data. Data summary information should communicate the range and mean for each medium quality data set as well as the range and mean for the entire medium quality data set.

[1] Core team agreements will be documented at each scoping phase and should be retained for each successive phase to maintain a comprehensive list for the life of the project.

Record of Key Agreements (*Continued*)

Date	Description of Agreement
7/20/2016	1. The Core Team agrees to integrate the medium with the high pedigree data for calculation of risk. Accounting for radiological physical/ecological half- life will be addressed on the COCs (risk drivers) in the RI/BRA uncertainty discussion. 2. The Core Team agrees to combine sediment and sediment/soil as a single media (to be called "sediment/soil" and defined in the RI/BRA) for all evaluations (ecological, human health, and PTSM). A qualitative discussion of contaminant migration will support development of the conceptual site model. 3. The risk screening will be based on conservative thresholds representing the lower of sediment and "soil" benchmarks for the ecological assessment. 4. The uncertainty discussion will discuss the medium (sediment or sediment/soil) data associated with constituents that fail screening and require further assessment/evaluation. 5. The human health assessment for sediment/soil will be based on USEPA soil RSLs (for non- radionuclides) and PRGs (for radionuclides) to calculate risk. Exposure media will be based on 0- to 0.15-m (0- to 0.5-ft) sediment, 0- to 0.3-m (0- to 1-ft) sediment and 0- to 0.3-m (0- to 1-ft) sediment/soil data combined for each EA. 6. The surface water human health assessment will be based on MCLs or the lowest of the RSL/PRG or promulgated AWQCs (Federal/State) if MCLs are not available. 7. The human health assessment for ingestion of fish will be based on the recreational fisherman scenario. Results of fish tissue analyses will be compared to RSLs/PRGs. 8. The ecological assessment will be based on: (a) the primary screening will be based on EPA Region IV NOAELs for soil, as available, otherwise use levels derived from the ECORISK tool from LANL. The secondary soil screening will be based on LANL LOAELs; (b) use LANL for sediment values for wildlife receptors and aquatic community receptors; (c) the SW threshold will be based on the lowest of the community or wildlife receptors based on LANL, SCDHEC Water Classifications and Standards (chronic values), or EPA Region IV values; (d) use LANL for radionuclides for all media; (e) the COPCs will be further evaluated by biological data, trophic modeling (using LANL TRVs), and other biological data, to determine ecological COCs. 9. The Core Team agreed to address Pond C and PAR Pond as separate EAs. 10. The Core Team agreed the existing data are sufficient to proceed with the RI/BRA with the inclusion of the additional data collected in 2016 for PAR Pond (sediment and surface water) for initial screening.

Record of Key Agreements (*Continued*)

Date	Description of Agreement
2/8/2017	1. The Core Team agreed that Fish Tissue Data collected in the four EAs (EA 3, 6, 8, and 9) would be representative of the fish in each EA where no fish data were collected (EA 1, 2, 4, 5 and 7). As part of that agreement, a problem statement was added for EA 1, 2, 4, 5 and 7 stating that Hg and Cs-137 are problems warranting action for the recreational fisherman based on the adjoining EAs. 2. The Core Team agreed that the most recent PRG calculator information from the USEPA website would be used in the Uncertainty discussions for those constituents that have changed since the October 2016 tables were developed (emphasis on the Cs-137 PRG). 3. The Core Team agreed that tritium is not a surface water RCOC for the onsite worker in EA1. 4. The Core Team agreed that DDT and mercury are not ecological RCOPCs in surface water for any EA. 5. The Core Team agreed that Bismuth-214 is a common natural decay product in surface water and is not an RCOC in any EA. 6. The Core Team agreed that Pb-212, Tl, and Th-234 are natural constituents and are not RCOCs for surface water within EA6. 7. The Core Team agreed that Cr, Fe, Mn, and Pb-212 are natural constituents in surface water in EA7 and are not RCOCs for the onsite worker. 8. The Core Team agreed that Al is not an ecological RCOPC for surface water in EA7. 9. The Core Team agreed that Cr, K-40, and Th-232 are not RCOCs in sediment for the onsite worker in EA8.
2/14/2018 & 3/5/2018	1. Core Team agreed that the remedial alternative selected for the Lower and Middle subunits, documented in the ESD, is complete. The cleanup level achieved is considered protective of human health and the environment and will be documented in the final ROD. 2. The updated Cs-137 PRG (0.144 pCi/g) will be used to establish the PTSM threshold of 144 pCi/g; this activity will be applied as the RGO to determine PTSM extent (including an excavation scenario) in the FS. 3. Core Team agreed that overflight data to monitor Cs-137 in areas not inundated with water could be incorporated into the monitoring plan along with ground truth sampling at a determined frequency. 4. Core Team agreed that LUCs for any EA was not acceptable as a stand-alone remedy. 5. Core Team agreed that MNR to address characterization uncertainties and LUCs would be applied to the Upper subunit as a whole (inclusive of all EAs). The MNR threshold is achieved when contaminant levels decay below PTSM levels, throughout the Upper subunit. 6. Core Team agreed that remedial actions for the Recreational Fisherman scenario are only applicable to the credible fishing areas of Pond B, Pond C, and PAR Pond. 7. Core Team agreed that broadcasting of amendments for the Recreational Fisherman scenario would be considered in the screening of remedial alternatives but not carried forward as a viable remedy for the detailed analysis. 8. Core Team agreed that maintaining water levels addresses the general exposure to contaminated media, not just PTSM. 9. Core Team agreed that excavation of all contamination in all EAs would be considered in the screening of remedial alternatives as a bounding point of comparison in the FS but not carried forward as a viable remedy for the detailed analysis. Excavation of PTSM will be carried forward for detailed analysis.

Record of Key Agreements (*Continued/End*)

Date	Description of Agreement
4/9/18	Core Team agreed to combine In Situ Capping of PTSM Sediments alternative and In Situ Amendments on PTSM Sediments alternative into a single alternative titled In Situ Capping of PTSM Sediments (Including Consideration of Hybrid Cap). The actual cap material and consideration of amendments would be determined in the design for the applicable EAs.
1/31/2019	Core Team agreed to re-evaluate the need to continue the MNR component of Alternative A-2 and the need to continue Alternative A-6 Maintain Water in Ponds in 50 years when Cs-137 contamination is predicted to decay below PTSM levels.
	Core Team agreed to document the following as the preferred alternatives in the PP: EA1: LUCs with MNR + Excavation of PTSM Sediment/Soil EA2: LUCs with MNR EA3: LUCs with MNR + Maintain Water in Ponds EA4: LUCs with MNR EA5: LUCs with MNR EA6: LUCs with MNR + Maintain Water in Ponds EA7: LUCs with MNR EA8: LUCs with MNR EA9: LUCs with MNR
2/7/2019	Core Team agreed that because PTSM is present in EA5 in two locations, more robust LUCs will be applied at EA5 in the form of additional signage at access roads and utility corridors in addition to gates leading toward the two PTSM locations and signs along the bank near the PTSM locations.
4/15/2020	Core Team agreed that the preferred name for Alternative A-5 is Excavation, Treatment and Disposal of PTSM Sediment/Soil to include the treatment component in the name.

Table 2. Key Changes to the Scoping Summary

CHANGES TO SCOPING SUMMARY			
Date	**Section**	**Description of Change**	**Rationale for Change**
January 2019	1.0	Revised to support development of the PP.	Updated to reflect current project phase.
	4.0 – 4.4	Revised to summarize likely response actions carried forward in the FS detailed analysis and remove uncertainties addressed by the FS document.	Updated to support development of the PP.
	5.0	Revised to identify the preferred remedial alternative recommended by the project team.	Updated to reflect the current IOU strategy for development of the PP.
April 2020	Cover Page and Page Headers	Revised scoping summary date from January 2019 to April 2020.	Updated to support submittal of the Revision 0 PP.
	1.0	Revised to include current PP submittal date. Revised to include submittal and approval history of the FS.	Updated to reflect current project phase.
	5.0	Revised to include current dates for submittal of the Revision 0 PP and Revision 0 ROD and Issue ROD milestones.	Updated to reflect current project phase.

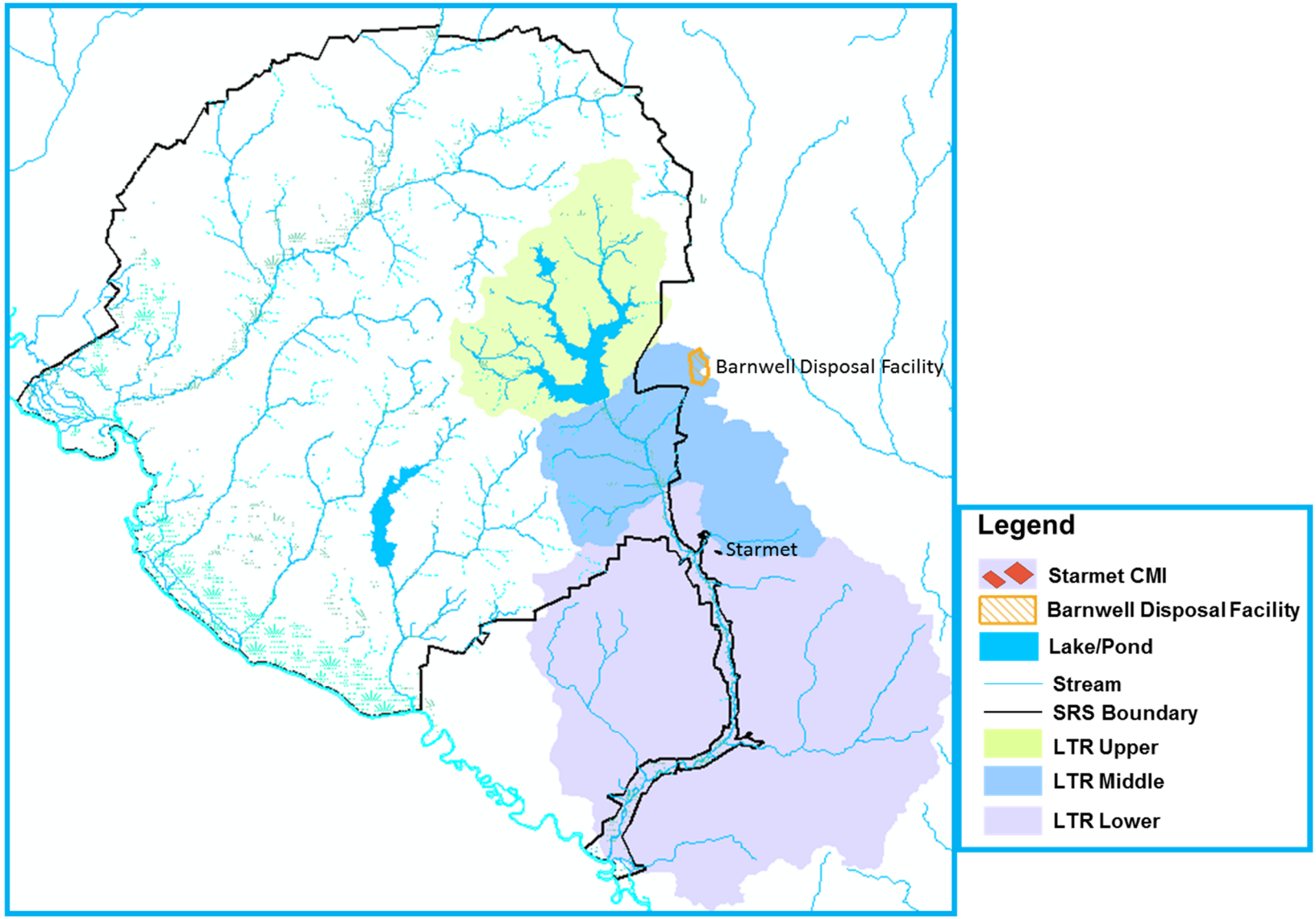


Figure 1. LTR IOU of the SRS.

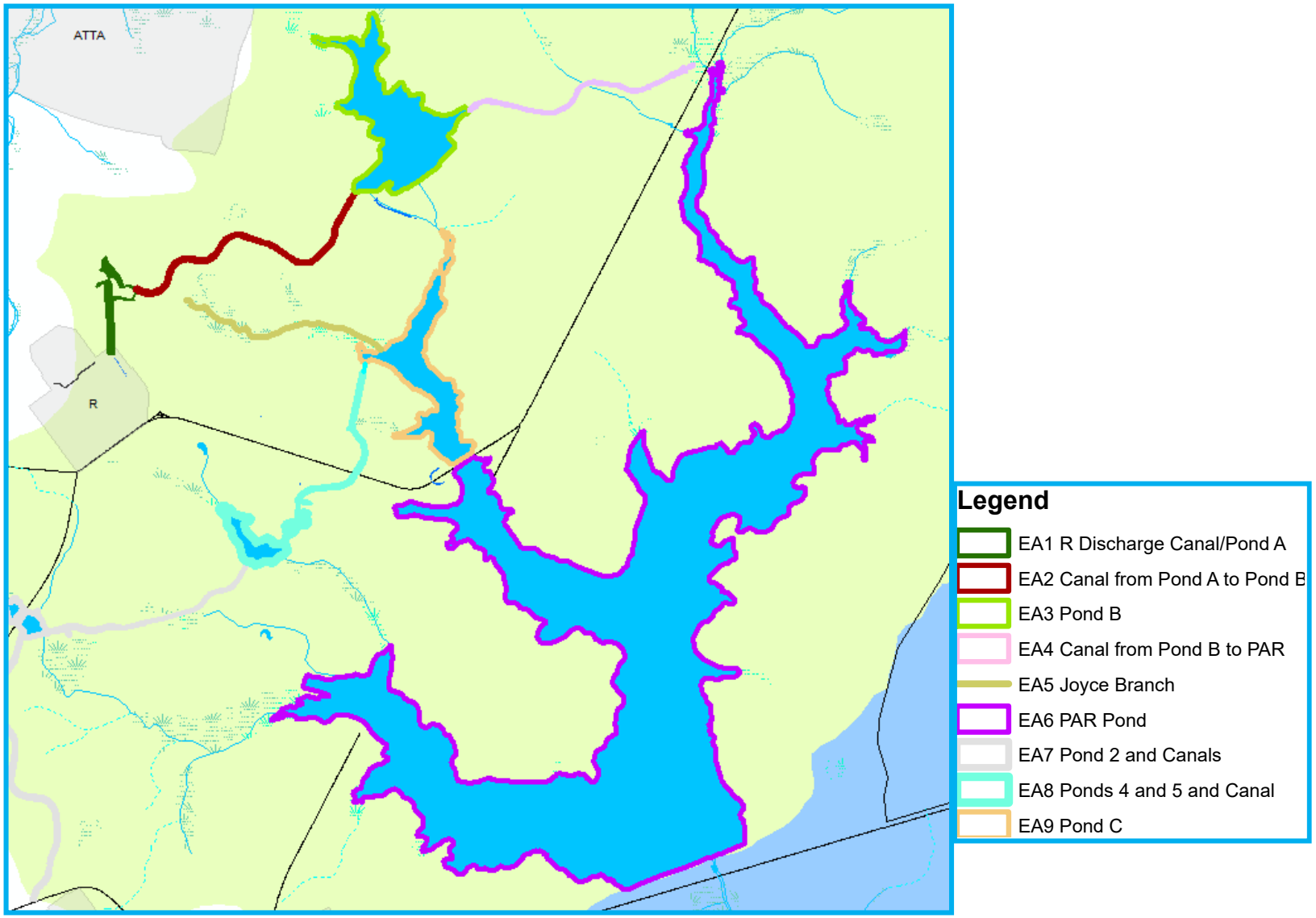


Figure 2. LTR IOU Upper subunit (Pond and Canal System) Exposure Areas

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