



# **Fifth Five-Year Remedy Review Report for Savannah River Site Operable Units with Engineered Cover Systems (U)**

**Aiken, South Carolina**

**SRNS-RP-2016-00609**

**Redline Revision 1.1**

**August-November 2017**

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and  
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Aiken, South Carolina**

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with Engineered Cover Systems (U)  
Savannah River Site  
~~August~~ November 2017**

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period will occur over a four-year period (2016 to 2019). The first five-year phased report for native soil covers and LUCs was issued in 2015 (SRNS 2015a). The second five-year phased report for groundwater remedial actions was issued in 2017 (SRNS 2015b). A more detailed discussion of the phased reviews and transition schedule are provided in Appendix A.

This report documents the Fifth Five-Year Remedy Review for the third grouping of OUs with engineered cover systems selected as the final remedy and includes a review of ten remedy decision documents for ten USEPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) units at the SRS. CERCLIS is a database maintained by the USEPA as part of the Superfund program that assigns a unique tracking number to hazardous waste sites considered for cleanup under CERCLA. Remedy decision documents may include more than one CERCLIS unit and/or SRS OU. For this remedy review, the ten CERCLIS units are equivalent to the ten remedy decision documents reviewed.

The SRS OUs evaluated in this document were grouped together because of similar remedies. Table 1 identifies the OU name, CERCLIS number, remedial action(s), and issuance date of the remedy decision document for each of the OUs reviewed in this document. The issuance date represents the date the public was notified that the signed remedy decision document was available. Figure 1 identifies the location of the SRS OUs evaluated in this document. The data evaluation and visual inspections for the SRS OUs with engineered cover systems were conducted from August 2016 through November 2016.

This report was prepared using the *Comprehensive Five-Year Review Guidance* (USEPA 2001) and is supplemented by the *Recommended Evaluation of Institutional Controls: Supplement to the "Comprehensive Five-Year Review Guidance"* (USEPA 2011a) and *Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Reviews* (USEPA 2012). The updated USEPA Five-Year Review Summary Form was

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implemented (USEPA 2011b). This report summarizes common elements for the entire SRS. The ten remedy reviews are included as Appendix C through Appendix L.

## **II. SITE CHRONOLOGY**

The National Resources Defense Council (NRDC) Consent Decree (Civil Action No. 1:85-2583-6) was an agreement between the NRDC and other interested parties, SCDHEC, and USDOE to amend Parts A and B of the Resource Conservation and Recovery Act (RCRA) Permit Application to include the Metallurgical Laboratory Basin (904-11G) and associated Carolina Bay, the Acid/Caustic Basin (904-74G, 904-75G, 904-78G, and 904-80G), and the Mixed Waste Management Facility (904-28G) to include closure, groundwater monitoring and post-closure activities. The Savannah River Laboratory Seepage Basins (904-53G, 904-54G, and 904-55G) and New TNX Basin (904-120G) were also included in the Consent Decree for closure in a RCRA-like manner. The Consent Decree was signed on May 26, ~~1998~~1988. On December 21, 1989, SRS was included on the National Priorities List (NPL). The inclusion created a need to integrate the established RCRA Facility Investigation program with CERCLA requirements to provide for a focused environmental program. In accordance with Section 120 of CERCLA 42 United States Code Section 9620, the USDOE has negotiated a Federal Facility Agreement (FFA) (FFA 1993) with the USEPA and the SCDHEC to coordinate remedial activities at SRS into one comprehensive program which fulfills these dual regulatory requirements. USDOE functions as the lead agency for remedial activities at SRS, with concurrence by the USEPA-Region 4 and the SCDHEC.

A chronology of site events including the effective dates for the Consent Decree, the FFA, and the NPL Listing is provided in Appendix A. Table 1 provides a chronology of the decision documents for the SRS OUs with engineered cover systems evaluated in this report. Chronologies of significant activities and regulatory milestones for individual OUs are included in the site specific remedy review reports (Appendix C through Appendix L).

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### *Summary of Inspections and Interviews*

Interviews were conducted with Richard Feagin, O&M staff member, and Steve Willingham, O&M Staff Member, on September 20, 2016 at the O&M organization offices. No issues were identified for the CSBRP OU during these interviews.

The CSBRP OU was inspected by Savannah River Nuclear Solutions, LLC (SRNS) and USDOE personnel on December 8, 2016. No issues were identified during this inspection. A site inspection was conducted by U.S. Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC) personnel, accompanied by USDOE and SRNS personnel on February 23, 2017. No significant problems regarding this OU were identified during the inspection.

On August 20, 2014, the USDOE submitted a letter (USDOE 2014) to USEPA and SCDHEC to reduce inspection frequencies from semiannual to annual for CSBRP OU. USEPA and SCDHEC approved the request October 2, 2014 and September 17, 2014, respectively. The field inspection frequency for the CSBRP OU was changed from semiannual to annual in 2015. Scheduled inspections performed at the CSBRP OU from FY2012 to FY2016 identified the following issues: overgrown grass on surveying benchmarks, broken signage, downed trees, evidence of hog rooting, and active ant mounds. These findings were documented on the field inspection checklists and resolved soon after discovery.

## **VII. Technical Assessment**

### **Is the Remedy Functioning as Intended by the Decision Document?**

The remedy is functioning as intended. Institutional controls (i.e., LUCs) have been effective in maintaining restricted (industrial) land use. Semiannual/annual site inspections and site maintenance have been effective in maintaining the integrity of the soil cover. Based on the site inspections, there is no indication of potential remedy failure that could place protectiveness at risk.

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The Land Use Control Implementation Plan (LUCIP) for the CSBRP OU, located in Appendix F of the PCR, governs LUC implementation, maintenance, monitoring, reporting and enforcement of LUCs (WSRC 2005). All LUC objectives are being met.

**Are Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives still valid?**

The exposure assumptions, toxicity data, and cleanup levels used at the time of final remedy selection are still valid. There have been no changes in physical conditions of the CSBRP OU that would affect the protectiveness of the remedy.

The USEPA standards and toxicity values have been updated since the last five-year remedy review as shown in Appendix B. The changes to the values for COCs at the CSBRP OU were not significant, and the RAOs continue to be met by the remedial action. No new standards or to-be-considered guidance have been identified that call into question the protectiveness of the remedy.

Fact sheets provided on the USEPA webpage regarding emerging contaminants were reviewed for applicability to this site. None of the listed emerging contaminants were identified as applicable to this OU.

**Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?**

No information has come to light that could call into question the protectiveness of the remedy.

**VIII. Issues**

There are no issues related to current site conditions or activities that prevent the remedy from being protective.

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## **IX. Recommendations and Follow-up Actions**

The ~~Land Use Control Implementation Plan (LUCIP)~~ for CSBRP OU is located in Appendix F of the PCR (WSRC 2005). Per the CSBRP OU LUCIP, groundwater monitoring will continue until there is a declining water level for three consecutive years.

## **X. Protectiveness Statement(s)**

The remedy at CSBRP OU is protective of human health and the environment.

Exposure pathways that could result in unacceptable risks are being controlled by institutional controls (i.e. LUCs) to prevent exposure to or ingestion of contaminated soil media. All threats to contaminated soil at the CSBRP OU have been addressed through excavation of the buried waste and implementation of physical access controls to prevent unauthorized entry to SRS (fences, guards, security patrols, etc.), administrative controls that maintain the CSBRP OU for industrial use only, and warning signs and use restrictions via the SRS Site Use/Site Clearance Program. Potential impacts to groundwater and wetlands (i.e. surface water) are controlled through improved stormwater management.

## **XI. Next Review**

The Fifth Five-Year Remedy Review Report and subsequent reports will be segregated into five phases. As shown in Appendix A, Table A-1, the next five-year review for SRS OUs with Engineered Cover Systems is scheduled for January 2022.

## **XII. Documents Reviewed**

FFA, 1993. *Federal Facility Agreement for the Savannah River Site*, Administrative Docket No. 89-05-FF (Effective Date: August 16, 1993)

USDOE, 1996. *Savannah River Site Future Use Project Report*, U.S. Department of Energy, Savannah River Operations Office, Savannah River Site, Aiken, SC

USDOE, 2014. Letter, B. T. Hennessey (USDOE) to S. B. Fulmer (SCDHEC) and R. H. Pope (USEPA), *Request to Change the Inspection Frequency for Central Shops*

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**Fifth Five-Year Remedy Review Report for SRS OUs  
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Central Shops Burning/Rubble Pits (631-1G and 631-3G)  
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*Burning/Rubble Pits (631-1G and 631-3G) and Ford Building Seepage Basin (904-19G) Operable Units, CERCLIS Numbers: 50 and 58, IACD-14-186, dated August 20, 2014, Department of Energy, Savannah River Operations Office, Aiken, SC*

WSRC, 1999. *Land Use Control Assurance Plan for the Savannah River Site*, WSRC-RP-98-4125, Revision 1.1, latest revision, Savannah River Nuclear Solutions, LLC Savannah River Site, Aiken, SC

WSRC, 2001. *RCRA Facility Investigation/Remedial Investigation with Baseline Risk Assessment for the Central Shops Burning/Rubble Pits (631-1G and 631-3G) (U)*, WSRC-RP-98-4043, Revision 1.2, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2002. *Record of Decision Remedial Alternative Selection for the Central Shops Burning/Rubble Pits(CSBRP) (631-1G and 631-3G) Operable Unit (U)*, WSRC-RP-2001-4265, Revision 1.1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2005. *Post-Construction Report (PCR)/Corrective Measures Implementation Report (CMIR) /Final Remediation Report (FRR) for the Central Shops Burning/Rubble Pits (631-1G and 631-3G/3GA Operable Unit (U)*, WSRC-RP-2004-4014, Revision 1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

Various – *Inspection Data Sheets - Field Inspection Checklist for Central Shops Burning Rubble Pits Operable Units 631-1G and 631-3G*, ER-IDS-019-031, Inspection Period 2012 through 2016 (semiannual through 2014; annually thereafter)

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## **VI. Five-Year Review Process**

The following tasks were performed as part of the review:

- Reviewed documents listed in Section XII. Documents Reviewed;
- Confirmed implementation of the remedial action;
- Inspected the OU, interviewed maintenance personnel; and documented the results on the Inspection Checklist provided in Attachment D-1 with the purpose of assessing the protectiveness of the remedy and the functionality of the access controls; and
- Reviewed changes in standards and to-be-considered guidance.

### ***Data Review***

Review of the annual inspection reports for the previous five-year period found grass on-unit needed mowing, active ant mounds, and the need to replace signs due to fading. There were no significant deficiencies noted.

A review of the groundwater monitoring program for the five-year period between 1998 and 2003, as summarized in Table D-3, indicated there were no exceedance of MCLs by any of the risk and hazard drivers. The data provides evidence of no appreciable leaching to groundwater of these chemicals. Based on the results of sampling over that five-year period, the U.S. Environmental Protection Agency (USEPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) approved discontinuing sampling of groundwater for this OU.

### ***Summary of Inspections and Interviews***

Interviews were conducted with Richard Feagin, O&M staff member, and with Steve Willingham, O&M Staff Member on September 20, 2016 at the O&M organization offices. No issues were identified for the DBRP OU during these interviews.

The DBRP OU was inspected by Savannah River Nuclear Solutions, LLC (SRNS) and USDOE personnel on November 4, 2016. No issues were identified during this inspection. A site inspection was conducted by USEPA and SCDHEC personnel, accompanied by

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USDOE and SRNS personnel, on February 28, 2017. No significant problems regarding this OU were identified during the inspections.

The field inspection frequency for the DBRP OU was changed from semiannual to annual in 2015. Scheduled inspections performed at the DBRP OU from FY2012 through FY2016 identified the following issues: overgrown vegetation, active ant mounds, and evidence of hog damage. These findings were documented on the field inspection checklists and resolved soon after discovery.

## **VII. Technical Assessment**

### **Is the Remedy Functioning as Intended by the Decision Document?**

The remedy is functioning as intended as demonstrated below:

- The native soil cover and institutional controls (i.e., LUCs) are effective in preventing exposure to PCBs to future industrial workers. The cover maintenance program and LUCs have been effective in maintaining the integrity of the soil cover. Based on the site inspections, there is no indication of potential remedy failure that could place protectiveness at risk.
- The confirmatory groundwater monitoring program was effective in verifying “no action” is appropriate for groundwater.

The Land Use Control Implementation Plan for the DBRP OU, located in Section 2.0 of the FRR, governs LUC implementation, maintenance, monitoring, reporting, and enforcement of LUCs (WSRC 1998). All LUC objectives are being met.

### **Are Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs still valid?**

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection are still valid except for the MCL for arsenic. At the time of the ROD issuance, the MCL for arsenic was 50 µg/L. In 2001, the MCL for arsenic was changed to 10 µg/L. However, arsenic was not detected in the DBRP OU groundwater during the five-year monitoring period; and therefore, the change had no impact on the effectiveness of the

The FHWMF OU was inspected by Savannah River Nuclear Solutions, LLC (SRNS) and USDOE personnel on November 17, 2016. No issues were identified for the FHWMF OU during this inspection. The FHWMF OU was inspected by USEPA and SCDHEC personnel, accompanied by USDOE and SRNS personnel, on February 22, 2017. No significant problems regarding this OU were identified during the inspection.

## **VII. Technical Assessment**

### **Is the Remedy Functioning as Intended by the Decision Document?**

The review of documents, Applicable or Relevant and Appropriate Requirements, risk assumptions, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD. The stabilization and placement of a multi-layer low permeability cover system has achieved the RAOs to prevent physical exposure to contaminants and to mitigate further migration of contaminants to the groundwater. The effective implementation of institutional controls has prevented exposure to and ingestion of contaminated groundwater.

O&M of the cover system, overall, has been effective based on the review of inspection reports as documented in Section VI.

There were no opportunities for optimization observed during this review.

The institutional controls (i.e., LUCs) that are in place include physical access controls to prevent unauthorized entry to SRS (fences, guards, security patrols, etc.); administrative controls that maintain the OU for industrial use only (SRS is a secured government facility with land use restrictions); OU-specific perimeter fencing, and warning signs; and use restrictions via the SRS Site Use/Site Clearance Program. No activities were observed that would have violated the institutional controls (i.e., LUCs).

The LUC requirements are discussed and approved as part of the closure/post-closure/permit application process and are governed by the RCRA Permit Renewal for the SRS (SCDHEC 2014). Therefore, a Land Use Control Implementation Plan is not required for this OU.

**Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives still valid?**

The exposure assumptions, toxicity data, and cleanup levels used at the time of final remedy selection are still valid. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. As the remedial work has been completed, the applicable standards set forth in the ROD (WSRC 1993) and the RCRA closure plan (WSRC 1991), associated with soils and basin sediments, have been met. Groundwater will be discussed in the five-year remedy reviews for the F-Area Groundwater OU.

There have been no changes in exposure pathways, land use or contaminant characteristics that would affect the protectiveness of the remedy. While no chemical specific soil remedial goals were set forth in the ROD (WSRC 1993), the remedy has eliminated the exposure pathway associated with soils.

Fact sheets provided on the USEPA webpage regarding emerging contaminants were reviewed for applicability to this site. None of the listed emerging contaminants were identified as applicable to this OU.

**Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?**

No other information has come to light that could call into question the protectiveness of the remedy.

**VIII. Issues**

There are no issues for the FHWMF OU.

**IX. Recommendations and Follow-up Actions**

In the 2000 RCRA Permit Renewal Application (SRNS 2016), SRS proposed to reduce the RCRA cap inspection frequency from monthly to quarterly, consistent with other RCRA cap inspection frequencies, and after major storms.

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South Carolina Department of Health and Environmental Control (SCDHEC) personnel, accompanied by USDOE and SRNS personnel, on February 23, 2017. No significant problems regarding this OU were identified during the inspections.

On August 20, 2014, the USDOE submitted a letter (USDOE 2014) to USEPA and SCDHEC to reduce inspection frequencies from semiannual to annual for FBSB OU. USEPA and SCDHEC approved the request on October 2, 2014 and September 17, 2014, respectively. Annual inspections for FBSB OU began in 2015.

## **VII. Technical Assessment**

### **Is the Remedy Functioning as Intended by the Decision Documents?**

The remedy is functioning as intended as demonstrated below:

- The selected remedy of a compacted common fill cover over the FBSB is effective in preventing human and ecological receptors exposure to RCOCs.
- Site inspections (semiannually through 2014; annually thereafter [USDOE 2014]) are being performed and indicate the integrity of the common fill cover is intact and no problems have occurred.
- The selected remedy of a removal action at the Tank/Process Sewer Line Area Subunit was effective to protect future industrial workers from exposure to cesium-137 and cobalt-60 that exceeded RGs in the soil. This was accomplished by removing (1.2-m [4-ft]) deep contaminated soils that exceed RGs and land use restrictions for the Tank/Process Sewer Line Area are no longer needed.

The Land Use Control Implementation Plan for the FBSB OU, located in Appendix A of the Post-Construction Report/Corrective Measures Implementation Report/Final Remediation Report, governs LUC implementation, maintenance, monitoring, reporting, and enforcement of LUCs (WSRC 2003). All LUC objectives are being met.

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**Are Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives still valid?**

The exposure assumptions, toxicity data, and cleanup levels used at the time of remedy selection are still valid. There have been no changes in physical conditions at the FBSB OU that would affect the protectiveness of the remedy.

The USEPA standards and toxicity values have been updated since the last five-year remedy review as shown in Appendix B. The changes to the values for COCs at the FBSB OU were not significant, and the RAOs continue to be met by the remedial action. No new standards or to-be-considered guidance have been identified that call into question the protectiveness of the remedy.

Fact sheets provided on the USEPA webpage regarding emerging contaminants were reviewed for applicability to this site. None of the listed emerging contaminants were identified as applicable to this OU.

**Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?**

No other information has come to light that could call into question the protectiveness of the remedy.

**VIII. Issues**

There are no issues related to current site operations, conditions, or activities that prevent the remedy from being protective.

**IX. Recommendations and Follow-up Actions**

There are no recommendations or follow-up actions for this OU.

**X. Protectiveness Statement(s)**

The remedy at the FBSB OU is protective of human health and the environment.

Exposure pathways that could result in unacceptable risks are being controlled by the FBSB soil cover and institutional controls (i.e., LUCs). All threats to contaminated soil at the FBSB OU have been addressed through implementation of physical access controls to

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prevent unauthorized entry to SRS (fences, guards, security patrols, etc.); administrative controls that maintain the OU for industrial use only; and warning signs and use restrictions via the SRS Site Use/Site Clearance Program. Long-term protectiveness is ensured by continued compliance with effective land use controls.

## **XI. Next Review**

The Fifth Five-Year Remedy Review Report and subsequent reports will be segregated into five phases. As shown in Appendix A, Table A-1, the next five-year review for SRS OUs with Engineered Cover Systems is scheduled for January 2022.

## **XII. Documents Reviewed**

FFA, 1993. *Federal Facility Agreement for the Savannah River Site*, Administrative Docket No. 89-05-FF (Effective Date: August 16, 1993)

USDOE, 1996. *Savannah River Site Future Use Project Report*, U.S. Department of Energy, Savannah River Operations Office, Savannah River Site, Aiken, SC

USDOE, 2014. Letter, B. T. Hennessey (USDOE) to S. B. Fulmer (SCDHEC) and R. H. Pope (USEPA), *Request to Change the Inspection Frequency for Central Shops Burning/Rubble Pits (631-1G and 631-3G) and Ford Building Seepage Basin (904-19G) Operable Units*, CERCLIS Numbers: 50 and 58, IACD-14-186, dated August 20, 2014, Department of Energy, Savannah River Operations Office, Aiken, SC

WSRC, 1999. *Land Use Control Assurance Plan for the Savannah River Site*, WSRC-RP-98-4125, Revision 1.1, latest revision, Savannah River Nuclear Solutions, LLC Savannah River Site, Aiken, SC

WSRC, 2000. *RCRA Facility Investigation/Remedial Investigation with Baseline Risk Assessment for the Ford Building Seepage Basin (904-91G) Operable Unit (U)*, WSRC-RP-98-4096, Revision 1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2001. *Record of Decision Remedial Alternative Selection for the Ford Building Seepage Basin Operable Unit (904-91G) (U)*, WSRC-RP-2000-4156, Revision 1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

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WSRC, 2003. *Post-Construction Report (PCR)/Corrective Measures Implementation Report (CMIR)/Final Remediation Report (FRR) for the Ford Building Seepage Basin (904-91G) Operable Unit (U)*, WSRC-RP-2003-4038, Revision 1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

Various - *Inspection Data Sheets – Field Inspection Checklist, Ford Building Seepage Basin (904-91G) (U)*, ER-IDS-019-024, Inspection period 2012 through 2016 (semiannually through 2014; annually thereafter)

Interviews were conducted with Richard Feagin, O&M staff member, and with Steve Willingham, O&M staff member, on September 20, 2016 at the O&M organization offices. No issues were identified for the HHWMF during these interviews.

The HHWMF OU was inspected by Savannah River Nuclear Solutions, LLC (SRNS) and USDOE personnel on November 17, 2016. No issues were identified for the HHWMF OU during this inspection. The HHWMF OU was inspected by U.S. Environmental Protection Agency (USEPA) and SCDHEC personnel, accompanied by USDOE and SRNS personnel, on February 22, 2017. No significant problems regarding this OU were identified during the inspection.

## **VII. Technical Assessment**

### **Is the Remedy Functioning as Intended by the Decision Document?**

The review of documents, applicable or relevant and appropriate requirements, risk assumptions, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD. The stabilization and placement of a multi-layer low permeability cover system has achieved the RAOs to prevent physical exposure to contaminants and to mitigate further migration of contaminants to the groundwater. The effective implementation of institutional controls has prevented exposure to, and ingestion of, contaminated groundwater.

O&M of the cover system has, on the whole, been effective based on the review of inspection reports as documented in Section VI.

There were no opportunities for optimization observed during this review.

The institutional controls (i.e., LUCs) that are in place include physical access controls to prevent unauthorized entry to SRS (fences, guards, security patrols, etc.); administrative controls that maintain the OU for industrial use only (SRS is a secured government facility with land use restrictions); OU-specific perimeter fencing and warning signs; and use restrictions via the SRS Site Use/Site Clearance Program. No activities were observed that would have violated the institutional controls (i.e., LUCs).

The LUC requirements are discussed and approved as part of the closure/post-closure/permit application process and are governed by the RCRA Permit Renewal for the SRS (SCDHEC 2014). Therefore, a Land Use Control Implementation Plan is not required for this OU.

**Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives still Valid?**

The exposure assumptions, toxicity data, and cleanup levels used at the time of final remedy selection are still valid. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

As the remedial work has been completed, the applicable standards set forth in the ROD (WSRC 1993) and RCRA closure plan (WSRC 2000) associated with soils and basin sediments have been met. Groundwater will be discussed in the five-year remedy reviews for the H-Area Groundwater OU.

There have been no changes in exposure pathways, land use or contaminant characteristics that would affect the protectiveness of the remedy. While no chemical specific soil remedial goals were set forth in the ROD (WSRC 1993), the remedy has eliminated the exposure pathway associated with soils.

Fact sheets provided on the USEPA webpage regarding emerging contaminants were reviewed for applicability to this site. None of the listed emerging contaminants were identified as applicable to this OU.

**Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?**

No other information has come to light that could call into question the protectiveness of the remedy.

**VIII. Issues**

There are no issues related to current site conditions or activities that currently prevent the remedy from being protective.

- Inspected the OU, interviewed maintenance personnel, and documented the results on the Inspection Checklist provided in Attachment I-1; and
- Ensured that all actions required under the RCRA Hazardous and Mixed Waste Permit Renewal (SCDHEC 2014) were implemented (i.e., quarterly inspections and maintenance to the soil covers and groundwater monitoring).

### ***Summary of Inspections and Interviews***

Interviews were conducted with Richard Feagin, O&M staff member, and Steve Willingham, O&M staff member, on September 20, 2016 at the O&M organization offices. No issues were identified for the MHWMF during these interviews.

The MHWMF OU was inspected by Savannah River Site Nuclear Solutions, LLC (SRNS) and USDOE personnel on November 2, 2016. No issues were identified for the MHWMF OU during this inspection. The MHWMF OU was inspected by U.S. Environmental Protection Agency (USEPA) and SCDHEC personnel, accompanied by USDOE and SRNS personnel, on February 28, 2017. No significant problems regarding this OU were identified during the inspection.

Quarterly site inspections conducted from FY2012 to FY2016 identified overgrown vegetation, active ant mounds, and hog damage on the soil cover. These issues were resolved soon after discovery.

## **VII. Technical Assessment**

### **Is the Remedy Functioning as Intended by the Decision Document?**

The review of documents, applicable or relevant and appropriate requirements (ARARs), the results of the site inspection, and subsidence monitor surveys indicates that the remedy is functioning as intended by the IROD (WSRC 1992). The stabilization and placement of all contaminated materials (process sewer line and associated soils, contaminated soils from the seepage area and areas of Lost Lake) under the low permeability cover has achieved the purpose of the interim action, as stated in the IROD, to minimize migration

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of contaminants to the groundwater (WSRC 1992). The effective implementation of institutional controls (i.e. LUCs) has prevented exposure to, or ingestion of, contaminated soils, sediments, groundwater, and surface waters.

O&M of the cover system has, on the whole, been effective based on the review of inspection reports as documented in Section VI.

There were no opportunities for optimization observed during this review.

The institutional controls (i.e., LUCs) that are in place include physical access controls to prevent unauthorized entry to SRS (fences, guards, security patrols, etc.); administrative controls that maintain the OU for industrial use only (SRS is a secured government facility with land use restrictions); OU-specific perimeter fencing and warning signs; and LUCs (SRS Site Use/Site Clearance Program). No activities were observed that would have violated the institutional controls (i.e., LUCs).

The LUC requirements are discussed and approved as part of the closure/post-closure/permit application process and are governed by the RCRA Permit Renewal for the SRS (SCDHEC 2014). Therefore, a Land Use Control Implementation Plan is not required for this OU.

**Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives still Valid?**

The exposure assumptions, toxicity data, and cleanup levels used at the time of remedy selection are still valid. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Groundwater will be discussed in the five-year remedy reviews for the A/M Groundwater.

There have been no changes in exposure pathways, land use or contaminant characteristics. While no chemical specific soil remedial goals were set forth in the IROD (WSRC 1992), the remedy has eliminated the exposure pathway associated with soils.

The ARARs discussed in the IROD (WSRC 1992) for this limited action focus on the design and construction of the remedial action which was completed in 1990. Based on

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The Met Lab HWMF OU was inspected by Savannah River Nuclear Solutions, LLC (SRNS) and USDOE personnel on November 2, 2016. No issues were identified for the Met Lab HWMF OU during this inspection. The Met Lab HWMF OU was inspected by USEPA and SCDHEC personnel, accompanied by USDOE and SRNS personnel, on February 28, 2017. No significant problems regarding this OU were identified during the inspection.

Quarterly field inspections conducted from FY2012 to FY2016 have identified active ant mounds on the soil cover, overgrown grass, trees blocking roads and drainage ditches, overgrown vines, and vegetation growing in drainage routes. All issues were resolved soon after discovery. The annual subsidence monitoring logs indicate the cap is performing within design tolerances.

## **VII. Technical Assessment**

### **Is the Remedy Functioning as Intended by the Decision Document?**

The review of documents, applicable or relevant and appropriate requirements (ARARs), the results of the site inspection, and subsidence monitor surveys indicates that the remedy is functioning as intended by the IROD. The consolidation of process sewer lines within the basin and under the low permeability cover has achieved the purpose of the interim action to minimize migration of contaminants to the groundwater from the basin sediments and sediments associated with the process sewer line (WSRC 1992). The effective implementation of institutional controls (i.e., LUCs) has prevented exposure to, or ingestion of, contaminated soils, sediments, groundwater, and surface waters.

O&M of the cover system has, on the whole, been effective based on the review of the inspection reports as documented in Section VI.

There were no opportunities for optimization observed during this review.

The institutional controls (i.e., LUCs) that are in place include physical access controls to prevent unauthorized entry to SRS (fences, guards, security patrols, etc.); administrative controls that maintain the OU for industrial use only (SRS is a secured government facility

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with land use restrictions); OU-specific perimeter fencing and warning signs; and use restrictions (SRS Site Use/Site Clearance Program). No activities were observed that would have violated the institutional controls (i.e., LUCs).

The LUC requirements are discussed and approved as part of the closure/post-closure/permit application process and are governed by the RCRA Permit Renewal for the SRS (SCDHEC 2014). Therefore, a Land Use Control Implementation Plan is not required for this OU.

**Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives still Valid?**

The exposure assumptions, toxicity data, and cleanup levels used at the time of remedy selection are still valid. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Two ARARs were identified in the IROD (WSRC 1992). The first, a NPDES permit modification for discharge of basin rainwater to an outfall to surface water, has been met as the construction of the cover system is completed. The second ARAR includes SCHWMR R.61-79.265 for RCRA equivalent performance standards for the cap design. The cap was designed to meet the ARAR. Based on the review of this OU, the requirements of the ARAR (i.e. long-term minimization of migration of contaminants, function with minimum maintenance) continue to be met. There have been no changes in standards or to-be-considered guidance identified in the IROD that call into question the protectiveness of the remedy.

Fact sheets provided on the USEPA webpage regarding emerging contaminants were reviewed for applicability to this site. None of the listed emerging contaminants were identified as applicable to this OU.

**Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?**

No other information has come to light that could call into question the protectiveness of the remedy.

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restrictions (SRS Site Use/Site Clearance Program). No activities were observed that would have violated the institutional controls (i.e., LUCs).

The LUC requirements are discussed and approved as part of the closure/post-closure/permit application process and are governed by the RCRA Permit Renewal for the SRS (SCDHEC 2014). Therefore, a Land Use Control Implementation Plan is not required for this OU.

**Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives still Valid?**

The exposure assumptions, toxicity data, and cleanup levels used at the time of final remedy selection are still valid. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

As the remedial work has been completed, the applicable standards, set forth in the ROD (WSRC 1994) and RCRA closure plan (WSRC 1991), have been met. All standards and To-Be-Considered values associated with groundwater will be addressed as part of the MWMF Groundwater OU. Fact sheets provided on the USEPA webpage regarding emerging contaminants were reviewed for applicability to this site. 1,4-dioxane was identified in 1992 and was added to the Groundwater Protection Standards for the SWP emanating from the MWMF (SRNS 2013). SRS has been investigating various methods of potentially treating 1,4-dioxane. The 2013 RCRA Renewal Application (SRNS 2015) describes the corrective action for 1,4-dioxane. None of the other listed emerging contaminants were identified as applicable to this OU.

There have been no changes in exposure pathways, land use or contaminant characteristics. While no chemical specific soil RGs were set forth in the ROD (WSRC 1994), the remedy has eliminated the exposure pathway associated with soils and compacted waste.

**Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?**

No other information has come to light that could call into question the protectiveness of the remedy.

**VIII. Issues**

There are no issues for the MWMF OU.

**IX. Recommendations and Follow-up Actions**

There are no recommendations or follow-up actions for the MWMF OU under CERCLA.

**X. Protectiveness Statement(s)**

The remedy at the MWMF is protective of human health and the environment.

Exposure pathways that could result in unacceptable risk are being controlled by the low-permeability clay cover system and institutional controls (i.e., LUCs). LUCs include physical access controls to prevent unauthorized entry to SRS (fences, guards, security patrols, etc.), administrative controls that maintain the OU for industrial use only (SRS is a secured government facility with land use restrictions), OU-specific perimeter fencing and warning signs, and land use restrictions via the SRS Site Use/Site Clearance Program. In addition, exposure pathways associated with the groundwater contamination are being actively monitored and/or remediated as part of the MWMF Groundwater OU.

**XI. Next Review**

The Fifth Five-Year Remedy Review Report and subsequent reports will be segregated into five phases. As shown in Appendix A, Table A-1, the next five-year review for SRS OUs with Engineered Cover Systems is scheduled for January 2022.

**XII. Documents Reviewed**

FFA, 1993. *Federal Facility Agreement for the Savannah River Site*, Administrative Docket No. 89-05-FF (Effective Date: August 16, 1993)