



ARF- 021477

Department of Energy
Savannah River Operations Office
P.O. Box A
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APR - 4 2018

Ms. Susan B. Fulmer, P. G., Manager
Federal Remediation Section
Division of Site Assessment, Remediation and Revitalization
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Mr. Jon Richards
Acting Savannah River Site Remedial Project Manager
Superfund Division
U. S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303

Dear Ms. Fulmer and Mr. Richards:

SUBJECT: Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment and Corrective Measures Study/Feasibility Study for the G-Area Oil Seepage Basin (GOSB) (U) (SRNS-RP-2017-00218, Revision 1, ~~March~~ ^{April} 5/14/18 2018) (Redline Copy) and Savannah River Site's Responses to the Regulatory Comments on the Revision 0 Document, CERCLIS Number 93

In accordance with the terms of the Federal Facility Agreement, the U. S. Department of Energy (DOE) is submitting the subject information for your review. The South Carolina Department of Health and Environmental Control (SCDHEC) and the U. S. Environmental Protection Agency (EPA) provided comments on the Revision 0 document on December 20, 2017 and January 2, 2018, respectively. Please review the enclosures and provide your comments or approval within thirty (30) days of receipt. The effort and time that the EPA and SCDHEC have given on the subject operable unit are greatly appreciated.

Questions from you or your staff may be directed to me at (803) 952-8365 or the DOE Project Manager, Ms. Jasmin Selby, at (803) 952-7680.

Sincerely,

Brian T. Hennessey
SRS Remedial Project Manager
Infrastructure and Area Completion Division

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Ms. Susan B. Fulmer
Mr. Jon Richards

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Enclosures:

1. Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment and Corrective Measures Study/Feasibility Study for the G-Area Oil Seepage Basin (GOSB) (U) (SRNS-RP-2017-00218, Revision 1, ~~March~~ ^{April 2018} 2018) (Redline Copy)
2. SRS Responses to EPA Comments on: Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment and Corrective Measures Study/Feasibility Study (RFI/RI/BRA/CMS/FS) for the G-Area Oil Seepage Basin (GOSB) (U), CERCLIS Number: 93 (SRNS-RP-2017-00218, Revision 0, September 2017)
3. SRS Responses to SCDHEC Comments on: Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment and Corrective Measures Study/Feasibility Study (RFI/RI/BRA/CMS/FS) for the G-Area Oil Seepage Basin (GOSB) (U), CERCLIS Number: 93 (SRNS-RP-2017-00218, Revision 0, September 2017)

cc w/o encl:

D. Scaturo, SCDHEC-Columbia
S. French, SCDHEC-Columbia
M. D. Wilson, SCDHEC-Columbia
G. K. Taylor, SCDHEC-Columbia
T. Fuss, SCDHEC-Aiken Environmental Affairs Office
R. H. Pope, EPA-Atlanta

cc w/encl:

J. Tufts, EPA-Atlanta
M. McRae, TechLaw, Inc.

**SRS Responses to
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

Comments on:

**Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation
Report with Baseline Risk Assessment and Corrective Measures Study/Feasibility Study**

(RFI/RI/BRA/CMS/FS) for the G-Area Oil Seepage Basin (GSOB)(U)

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GENERAL COMMENTS

1. The Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment and Corrective Measures Study/Feasibility Study for the G-Area Oil Seepage Basin (GOSB) (U), CERCLIS Number 93, SRNS-RP-2017-00218, Revision 0, dated September 2017 (the Report) does not include an evaluation of the horizontal and vertical extent of contamination at the G-Area Oil Seepage Basin OU (GOSB OU). Sections 3.7.3, 3.8.3, 3.9.3, and 3.10.3 simply present a list of contaminant exceedances. Without this evaluation, it is unclear if data gaps exist in the characterization of the GOSB OU, and the conclusion presented in the RI Report that the Berm Subunit, Pipeline Subunit, and Effluent Discharge Subunit warrant no further evaluation is not supported. Revise the Report to provide an evaluation of the horizontal and vertical extent of contamination at the GOSB OU and clarify if any data gaps exist in the characterization of the site.

Response: Agree.

SRS will revise the nature and extent discussions for all four subunits to provide an evaluation of the horizontal and vertical extent of contamination at the GOSB to support the conclusion that there are no data gaps remaining at the site. The purpose of Sections 3.7.2, 3.8.2, 3.9.2, and 3.10.2 is to provide a summary of the characterization for the specific subunit. In the Revision 0 RI/BRA, these sections prematurely presented an incomplete list of constituents that exceeded risk based criteria. However, the nature and extent discussion in Sections 3.7.3, 3.8.3, 3.9.3, and 3.10.3 should focus on those constituents that exceed SRS background concentrations and are therefore, more likely to be present from unit related activities.

To support the nature and extent discussion, a new paragraph will be added to Section 3.2. Site Characterization and Data Usability to explain the process for identifying unit-specific constituents (USCs). Sections 3.7.2, 3.8.2, 3.9.2, and 3.10.2 will be revised to specifically discuss the characterization activities. Data evaluation for the GOSB OU Subunits, Sections 3.7.3, 3.8.3, 3.9.3, and 3.10.3, will be revised to focus on the nature and extent of the primary contaminants. The revised document will include new USC screening tables in Appendix A and new figures to support nature and extent. The new USC screening tables and figures are included in the Revision 1 Redline. The revised text for Sections 3.2, 3.7.2, 3.7.3, 3.8.2, 3.8.3, 3.9.2, 3.9.3, 3.10.2, and 3.10.3 are provided below.

Section 3.7.2 for the GOSB OU Interior Subunit will be revised as follows:

“Ten composite basin floor/wall sediment samples from five locations were collected from within the basin in 2009. At each location, one composite sediment sample was collected from the 0- to

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0.3-m (0- to 1-ft) depth interval and one composite sediment sample was collected from the 0.3- to 1.2-m (1- to 4-ft) depth interval. Sediment samples from the basin floor were collected below the leaf debris and decayed organic material. Paired surface water samples were collected at each of the sediment sample locations for a total of five basin water samples. Sediment and surface water samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. ~~The laboratory analyses of the 2009 GOSB Interior Subunit sediment samples from 0 to 0.3 m (0 to 1 ft) depth interval yielded seven constituents that exceed the respective RSL/PRG (Figure 3-2), including arsenic, benzo[a]pyrene, potassium-40, thallium, dieldrin, dichlorodiphenyldichloroethylene (DDE), and heptachlor epoxide.~~

Several of the surface water samples collected in 2009 had issues with high turbidity and yielded multiple exceedances. In 2015, the Core Team recommended additional sampling of the basin surface water (filtered and unfiltered) to further evaluate potential contamination from dissolved constituents. Six surface water samples were collected in 2016 from the within the basin and analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. Constituents detected in these surface water samples included inorganics (metals), VOCs, and radiological indicators. The 2016 unfiltered samples reported concentrations above the MCL/RSL for only alpha- and beta-benzene hexachloride. The corresponding filtered results have no exceedances of MCLs/RSLs. Figure ~~3-3~~ 3-2 shows the 2009 surface water and 2016 unfiltered surface water exceedances.”

Section 3.7.3 has been completely revised to focus on the nature and extent of the primary contaminants, pesticides. Some of the constituents identified in screening do not provide a reasonable representation of the nature and extent of contamination because they are either anomalous detections or observed at levels that are within SRS background. For this reason, two pesticides that are the most laterally and vertically extensive contaminants and pose some of the higher risks to human health and environment were determined to best represent the extent of contamination and are discussed in more detail.

The text in Section 3.7.3 for the GOSB OU Basin Interior Subunit will be replaced with the following text:

“Constituents identified as USCs for the GOSB Basin Interior Subunit are shown in Table A.2.1. The primary contaminants in the basin interior are pesticides. A group of pesticides including alpha-Chlordane, gamma-Chlordane, dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE), dieldrin, and heptachlor epoxide have been identified

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in sediment in the basin bottom of the Basin Interior Subunit. Silver present in the basin sediments is likely associated with a silver-containing pesticide.

The horizontal and vertical extent of contamination at the GOSB OU is represented by a series of maps and cross-sections. The contaminants are generally co-located. Two pesticides, dieldrin and gamma-Chlordane, have been selected to represent the extent of contamination because they are the most laterally and vertically extensive contaminants and pose some of the higher risks to human health and environment. The highest concentrations of contaminants are located in the shallowest depth interval at the deepest portion of the basin.

The lateral extent of dieldrin at the GOSB is depicted in three maps (Figures 3-3 through 3-5). In Figure 3-3, the concentrations of dieldrin measured in sediment and soil samples taken from the 0- to 0.3-m (0- to 1-ft) depth interval are posted on a map of the entire GOSB OU. Three sample locations this depth interval in the Basin Interior Subunit exceed human health and/or ecological risk based standards. In Figure 3-4, the concentrations of dieldrin from samples taken from the 0.3- to 1.2-m (1- to 4-ft) depth interval are posted on the map. No samples from the 1- to 4-ft depth interval exceed risk based standards for dieldrin.

The lateral extent of gamma-Chlordane at GOSB is depicted in three maps (Figures 3-7 through 3-9). In Figure 3-7 and Figure 3-8, the concentrations of gamma-Chlordane measured in sediment and soil samples taken from the 0- to 0.3-m (0- to 1-ft) and 0.3- to 1.2-m (1- to 4-ft) depth intervals are posted on a map of the entire GOSB OU. All five sample locations in the Basin Interior Subunit exceed human health and/or ecological risk-based standards for gamma-Chlordane in both depth intervals. The highest concentrations occur in the shallowest interval in the deepest portion of the basin.

The vertical extent of contamination at the GOSB OU is presented in stylized cross-sections (Figure 3-6 and Figure 3-10). In general, contaminant concentrations are highest in the shallowest interval at the deepest portion of the basin and decrease in concentration with depth.

Soil, sediment, and groundwater sampling at the GOSB are sufficient to determine the nature and extent of contamination for the Basin Interior Subunit, and the presence or absence of problems warranting response action. The highest concentrations of contaminants occur in the deepest portion of an open basin (that if filled-in will be approximately 3 m {10 ft} below ground surface). The highest concentrations of contaminants are in the shallowest interval and concentrations tend to decrease with depth. The contaminants are relatively immobile. A contaminant migration analysis has been performed as described in Section 3.7.4 G Area Oil Seepage Basin Interior Subunit Fate and Transport Evaluation Results. Results of the

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contaminant migration evaluation indicate that the contaminants in the Basin Interior Subunit are not a potential source for groundwater contamination. Groundwater samples from temporary water table wells (Figures 3-11 and 3-12), were taken to confirm that contaminants had not migrated to the groundwater. Groundwater samples taken from the water table at the GOSB were all non-detect for dieldrin and gamma-Chlordane.

Section 3.8.2 for the GOSB Berm Subunit will be revised as follows:

“Thirty-nine soil samples were collected from thirteen locations along the basin perimeter at 15-m (50-ft) intervals during the 2009 characterization sampling event. At each sampling location, soil samples were collected from the 0- to 0.3-m (0- to 1-ft), 0.3- to 1.2-m (1- to 4-ft), and 2.4- to 3-m (8- to 10-ft) intervals and analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. ~~Constituents detected in the berm soil samples were inorganics (metals), pesticides, PAHs, PCBs, VOCs, SVOCs and radiological indicators. There were five constituents that exceed the RSL/PRG in the Berm soils (Figure 3-9, Figure 3-10, and Figure 3-11), including arsenic, iron, thallium, potassium 40, and cesium-137.~~ No data gaps were identified for the GOSB Berm Subunit at the December 9, 2015, scoping meeting; therefore, no new data was collected for this subunit in the 2016-2017 sampling campaign.”

The text in Section 3.8.3 for the GOSB Berm Subunit will be replaced with the following:

“Constituents identified as USCs for the GOSB Berm Subunit are shown in Table A.2.2. The primary contaminants at the GOSB Berm Subunit are pesticides. The lateral and vertical extent of dieldrin and gamma-Chlordane at GOSB are depicted in six maps that show contamination at three depth intervals and two cross-sections (Figure 3-3 through Figure 3-10). Berm samples were taken at three depths (0- to 0.3-m {0- to 1-ft}, 0.3- to 1.2-m {1- to 4-ft}, and 2.4- to 3-m {8- to 10-ft}). There are no sample locations in the GOSB berm that exceed risk-based standards for dieldrin or gamma-Chlordane.”

Section 3.9.2 for the GOSB OU Pipeline Subunit will be revised as follows:

“In 2009, twenty-nine soil samples were obtained from twenty-nine sample locations (GOSB-1 through GOSB-29), which were spaced ~7.5-m (25-ft) apart along both sections of the Pipeline Subunit. The data objective was to characterize the impact of any leaks from the pipeline. All pipeline samples were collected from the 2.4- to 3-m (8- to 10-ft) interval along the buried clay pipe and analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. ~~Detected soil constituents included inorganics (metals),~~

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~~pesticides, VOCs, SVOCs, and radiological indicators. Arsenic, bismuth-214, lead-214, and potassium-40 were the only constituents reported in the sample set above the RSL/PRG.”~~

The text in Section 3.9.3 for the GOSB Pipeline Subunit will be replaced with the following text:

“Constituents identified as USCs for the GOSB Pipeline Subunit are shown in Table A.2.3. Samples were taken at a depth of 2.4- to 3-m (8- to 10-ft) below ground surface at the pipeline subunit to evaluate any potential leaks from the pipeline. Results for dieldrin and gamma-Chlordane at the Pipeline Subunit are depicted on Figure 3-5 and Figure 3-9. There are no samples from locations in the Pipeline Subunit that had detections of either dieldrin or gamma-Chlordane.”

Section 3.10.2 for the GOSB Effluent Discharge Subunit will be revised as follows:

“Six soil samples were collected from the Effluent Discharge Subunit during the 2009 sampling event from three locations (GOSB-30 through GOSB-32) at depth intervals of 0- to 0.3-m (0- to 1-ft) and 0.3- to 1.2-m (1- to 4-ft). Samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. ~~Detected soil constituents included inorganics (metals), pesticides, VOCs, SVOCs and radiological indicators.~~ In the December 9, 2015, scoping meeting, the Core Team determined that more soil samples were needed to further determine the nature and extent of contamination at the end of the pipeline.

In 2016, six additional soil samples were collected from three locations (GOSB-54 through GOSB-56) at intervals of 0- to 0.3-m (0- to 1-ft) and 0.3- to 1.2-m (1- to 4-ft) to further characterize the Effluent Discharge Subunit area between the end of the Pipeline Subunit (sample location GOSB-29) and the three soil sample locations from the 2009 sampling event. The 2016 soil samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. ~~Detected soil constituents included VOCs, pesticides, PCBs, inorganics (metals), and radiological indicators. The gross alpha radionuclide trigger (20 pCi/g) was exceeded in two locations, GOSB-56 (0- to 0.3-m [0- to 1-ft] and 0.3- to 1.2-m [1- to 4-ft] intervals) and GOSB-54 (0.3- to 1.2-m [1- to 4-ft] interval). Based on the results of the radiological indicators, speciation was performed for uranium-233/234, uranium-235, uranium-238, radium-226/228, thorium-228, thorium-230, and thorium-232. As shown on Figure 3-17, arsenic, potassium-40, cesium-137, tritium, radium-226, radium-228, thorium-228, thorium-230, thorium-232, uranium-233/234, uranium-235, and uranium-238 were reported at concentrations above their respective RSL/PRG.”~~

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The text in Section 3.10.3 for the GOSB Effluent Discharge Subunit will be replaced with the following:

“Constituents identified as USCs for the GOSB Effluent Discharge Subunit are shown in Table A.2.4. Samples were taken at the 0- to 0.3-m (0- to 1-ft) and 0.3- to 1.2-m (1-to 4-ft) depth intervals at the Effluent Discharge Subunit. The lateral and vertical extent of dieldrin and gamma-Chlordane at the Effluent Discharge Subunit are depicted in four maps that show contamination at two depths (Figure 3-3, Figure 3-4, Figure 3-7, and Figure 3-8). There are no exceedances of residential risk-based standards for dieldrin or gamma-Chlordane at the Effluent Discharge Subunit.”

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

2. Figure 3-17, 2009 and 2016 Sampling Exceedances – Soil, depicts the boundary of the extent of contamination at the Effluent Discharge Subunit. However, it is unclear how this boundary was determined. Based on review of Figure 3-17, contaminant exceedances were detected at all sample locations and no sample locations without exceedances are present to constrain the locations with exceedances. Revise the Report to clarify how the boundary of the extent of contamination at the Effluent Discharge Subunit was determined.

Response: Agree.

As described in General Comment #1, the lateral and vertical extents of contaminants are depicted in four maps that show representative contamination at two depths (Figure 3-3, Figure 3-4, Figure 3-7, and Figure 3-8). These maps and the corresponding text in Section 3.10.3 have been revised to clarify the extent of contamination in the Effluent Discharge Subunit. The depiction of a boundary was an error and with the revision of Section 3.10.2, Figure 3-17 will be deleted.

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

3. According to the Report, land use controls (LUCs) (and five-year reviews) will not be required under Alternative A-3 (Place 0.6-meter (2-foot) Clean Fill Layer and Manage Surface Water) or Alternative A-4 (Backfill Basin and Manage Surface Water). However, both alternatives consist of leaving contaminated sediment in place. Revise the Report to clarify why these remedy components are not necessary.
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Response: Clarification.

LUCs and five-year remedy reviews will be added to Alternative A-3. However, LUCs are not required for Alternative A-4 because filling the basin to grade will result in a clean fill thickness ranging from a minimum of 3.05 m (10 ft) at the shallow end of the basin to a minimum of 4.90 m (16 ft) at the deeper end of the basin. The Human Health RCOCs (alpha-Chlordane, gamma-Chlordane, DDE, dieldrin, and heptachlor epoxide) were found above the PRGs in one sample (GOSB-51) at the deeper end of the basin. However, dieldrin was also detected at a concentration (0.038 mg/kg) just slightly over the residential PRG (0.034 mg/kg) in an additional location (GOSB-50) in the middle of the basin. There were no contaminant migration RCOCs. A clean fill thickness of 4.90 m (16 ft) would eliminate human health exposure and would not warrant any LUCs. Filling the basin to grade also eliminates the physical hazards and safety concerns associated with an open basin with steep slopes, and therefore, eliminates the controls that would be required to mitigate these hazards.

The appropriate text in the Executive Summary, Chapters 5 and 6, and Appendix H (Detailed Cost Estimate) will be revised to include LUCs for Alternative A-3.

Section 5.1.2.3, Containment and Section 5.2.1.4 Alternative A-4: Backfill Basin and Manage Surface Water, will be modified to address how soil cover integrity and settlement will be managed without LUCs.

The modified text for Section 5.1.2.3 is shown below:

“The effectiveness of containment technologies depends upon the materials used and the design and effectiveness of the soil cover. ~~Cover integrity must be maintained for as long as contaminants will persist or until degradation or decay of the contaminants renders them harmless. Generally, cover integrity can be ensured using robust construction techniques and/or through continued maintenance as needed.~~ Maintenance activities....”

The modified text for Section 5.2.1.4 Alternative A-4: Backfill Basin and Manage Surface Water is as follows:

“Alternative A-4 consists of backfilling the basin to the natural grade with clean soil and construction of a soil and vegetated cover over the basin footprint soil. The thickness of the required fill material, a minimum of 3.05 m (10 ft) in the shallow end of the basin and a minimum of 4.9 m (16 ft) in the deeper end of the basin, will prevent exposure to pesticides buried at depth. Specifically, Specific activities associated with this remedial alternative includes dewatering of

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the basin, clearing and grubbing ~0.27 ha (0.67 ac), installation of temporary control measures, excavation of the berms, backfilling the basin with ~4,460 m³ (5,834 yd³) of clean soil and berm soil, compacting fill material to mitigate subsidence followed by compaction testing, and grading and construction of a soil and vegetated cover over the basin footprint. Temporary erosion control measures such as silt fencing along the haul roads and as necessary to protect nearby outfalls will be used during construction activities.

Controlled compaction is expected to be adequate to mitigate settlement and erosion; however, additional construction techniques such as the use of an aggregate bridging material layer may be used if the sediment is determined to be unstable. Clean fill will be verified in accordance with the approved SRS protocol for verification of fill and cover material. No debris is anticipated based on observations of the basin when it was drained in the early 1990's. However, any debris encountered will be managed as CERCLA waste and disposed of at an approved waste disposal facility. Trees cleared to gain access to the basin will be pushed aside and left near the site. Disturbance of the fill material and vegetative cover at the GOSB OU will be prevented by existing administrative site use procedures that prohibit unauthorized excavations at SRS. Alternative A-4 would not require LUCs or five-year remedy reviews."

Discussion in the Executive Summary regarding the preferred alternative will be removed.

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

4. The descriptions of Alternative A-3 (Place 0.6-meter (2-foot) Clean Fill Layer and Manage Surface Water) and Alternative A-4 (Backfill Basin and Manage Surface Water) lack sufficient detail. For example,
 - a. It is unclear how debris removed from the basin will be disposed;
 - b. It is unclear what the erosion control measures will include; and,
 - c. It is unclear if "clean" soil will undergo sampling and analysis prior to placement in the basin.

Revise the Report to provide the above-listed information at a minimum to demonstrate that each alternative was appropriately scoped and costed.

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Response: Agree:

The following details of the Alternatives will be added to the description of Alternatives A-3 and A-4 as appropriate.

- (a) No debris is anticipated based on observations of the basin when it was drained in the early 1990's. Offsite disposal of any debris encountered will be managed as CERCLA waste and disposed of at an approved waste disposal facility. Trees cleared to gain access to the basin will be pushed aside and left near the site. Root balls will not be removed, therefore all references to clearing and grubbing will be changed to just "clearing".
- (b) Silt fencing will be placed along portions of the haul roads and as necessary to protect nearby outfalls
- (c) Any clean fill will be verified in accordance with the approved SRS protocol for verification of fill and cover material.

Appendix H will be revised to reflect these changes. All text references to "grubbing" will be deleted.

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

- 5. The description of Alternative A-5 (Excavate and Manage Surface Water) lacks sufficient detail. For example,
 - a. It is unclear how debris removed from the basin will be disposed;
 - b. It is unclear what the erosion control measures will include;
 - c. It is unclear how many confirmation samples will be collected (or at what frequency they will be collected), from what depth(s) the samples will be collected, and for what the samples will be analyzed; and,
 - d. It is unclear how many waste characterization samples will be collected (or at what frequency they will be collected) and what analyses the samples will undergo.

Revise the Report to provide the above-listed information at a minimum to demonstrate that Alternative A-5 was appropriately scoped and costed.

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Response: Agree.

The following details will be added to the description of Alternative A-5.

- (a) No debris is anticipated based on observations of the basin when it was drained in the early 1990's. Offsite disposal of any debris encountered will be managed as CERCLA waste and disposed of at an approved waste disposal facility. Trees cleared to gain access to the basin will be pushed aside and left near the site. Root balls will not be removed, therefore all references to clearing and grubbing will be changed to just "clearing".**
- (b) Silt fencing will be placed along portions of the haul roads and as necessary to protect nearby outfalls.**
- (c,d) For cost estimating purposes, 10 post excavation confirmation soil samples (Pesticides and Metals) and 10 waste characterization samples (TCLP) were assumed.**

Appendix H will be revised to reflect these changes. All text references to "grubbing" will be deleted.

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

- 6. The assessment of long-term effectiveness and permanence presented for each alternative is inconsistent with EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA/540/G-89/004), dated October 1988 (RI/FS Guidance). The analysis to be conducted as part of the assessment of this criterion should focus on any residual risk remaining at the site after the completion of the remedial action. The assessment is to include consideration of the degree of threat posed by the hazardous substances remaining at the site and the adequacy and reliability of any controls (e.g., engineering or institutional controls) used to manage the hazardous substances remaining at the site. Revise the Report to discuss the long-term effectiveness of each alternative in terms of the magnitude of residual risk and the adequacy and reliability of controls.**

Response: Agree.

Section 5.4.3.3 will be modified as follows to enhance the long-term effectiveness evaluation:

"Placement of the soil cover and maintaining the basin berms to prevent storm water run-in will break the exposure pathway; however, there is uncertainty associated with long-term effectiveness due to the impacts from rainwater accumulation. Residual risk from exposure to

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RCOCs is possible if degradation of the 0.6-m (2-ft) cover material were to occur. Sampling of accumulated water will be necessary to ensure that contaminants beneath the soil layer do not affect future rainwater collected in the basin. Continued long-term effectiveness will be managed via engineering controls to monitor and maintain an adequate cover over the contaminants remaining in place and LUCs will prevent exposure to contaminated sediments.

Section 5.4.4.3 will be modified as follows:

“Backfilling the basin and construction of a vegetated soil cover will provide long-term effectiveness with no associated long-term O&M requirements. Residual risks will be mitigated by the placement of a clean soil layer ranging in thickness from approximately 3.05 to 4.90 m (10 ft to 16 ft). The thickness of the clean fill layer will ensure that exposure to contaminated sediments will be eliminated with no requirement to monitor and maintain. Additionally, this alternative eliminates the physical hazards associated with an open basin with steep slopes and eliminates the need for LUCs and five-year remedy reviews.”

Section 5.4.5.3 will be modified to add the following sentence:

“No contaminants would be left in place, therefore, there would be no remaining risk and LUCs would not be required.”

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

7. According to the RI/FS Guidance, the evaluation of short-term effectiveness should include a discussion of the amount of time until protection against the threats being addressed by the alternative will be achieved, when any remaining site threats will be addressed, and when remedial response objectives will be achieved. The assessments of short-term effectiveness for each alternative do not address these issues. Revise the Report to include a discussion of these items in the evaluation of short-term effectiveness.

Response: Agree.

Construction activities for Alternatives A-3, A-4, and A-5 are anticipated to be completed within 6 months from the commencement of construction activities. The following revisions will be added to Sections 5.4.3.5, 5.4.4.5, and 5.4.5.5:

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“This alternative can be completed in a short timeframe while posing no significant risk to the community ~~or workers~~. Initial protection against the threats associated with exposure to contaminated sediments and achievement of the RAOs would be achieved in less than 6 months from the commencement of construction activities. Remedial workers will have the greatest risk of exposure during construction activities. Use of best management practices during construction and strict adherence to the project-specific health and safety plan will prevent worker exposure to hazardous substances and will minimize risk to surrounding communities while activities are performed.”

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

8. The evaluations of the implementability of each alternative lack sufficient detail. For example, it is unclear why each alternative is considered to be administratively feasible. The following factors should be discussed as part of the implementability analysis: technical feasibility, administrative feasibility, and availability of services and materials, as outlined in the RI/FS Guidance. Revise the Report to provide a more detailed analysis of the implementability of each alternative, considering all of the aforementioned factors for each alternative.

Response: Agree:

The evaluations of implementability of each alternative in Sections 5.4.3.6, 5.4.4.6, and 5.4.5.6 will be revised to address technical feasibility, administrative feasibility and availability of services and materials. The revised text for Section 5.4.3.6 is shown below.

“Initial dewatering of the basin and placement of 0.6 m (2 ft) of fill material over the contaminated sediments is administratively feasible in that the only permits required would be a non-discharge permit for the land application of the basin water. Non-discharge permits have been granted for past remedial activities at SRS involving the land application of water. Alternative A-3 is also considered to be technically feasible in that ~~D~~dewatering and earth work can be achieved with standard, readily available equipment. There is ample forested area adjacent to the basin to receive irrigation from the dewatering effort. SRS has extensive experience in dewatering and earth moving activities. ~~It is anticipated that a non-discharge permit will be required to allow land application of the water.~~ Approximately 466 m³ (610 yd³) of clean fill will be required to be hauled from a borrow area and placed at the bottom of the basin. Because soil compaction is not required to prevent settling, this alternative can be completed relatively quickly and with less equipment.”

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Similar modifications will be made to sections 5.4.4.6, and 5.4.5.6.

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

9. The assumptions included in the cost estimates for each alternative (Appendix H, Detailed Cost Estimates) are not sufficiently detailed. As such, it is unclear if the remedial alternatives were appropriately scoped and costed so as to reflect a -30%/+50% margin as allowed for during the feasibility study process. For example, information (e.g., number of samples, analytical suites) to support the cost of the rainwater sampling and analysis is not provided. Similarly, information to support the cost of dewatering the basin is not presented. Note that this list of example deficiencies is not exhaustive. Revise the cost estimates for each alternative to ensure all assumptions are noted and substantiated.

Response: Agree.

The cost estimates in Appendix H for each alternative will be revised to ensure that all assumptions are noted and substantiated. The basis for the dewatering costs is an estimate that was developed for the D-Area Basin. This assumption is listed in Appendix H. Revised costs will be updated in the text and tables. Proposed modifications to Sections 5.4.3.7, 5.4.4.7, and 5.4.5.7 are listed below.

Section 5.4.3.7 will be revised as follows:

“Construction costs for Alternative A-3 would include clearing ~~and grubbing~~, erosion control, dewatering, ~~temporary excavation of the berms for access~~, and ~~testing~~, hauling and placing of clean fill. The O&M cost includes LUCs and sampling of accumulated rainwater to ensure long term effectiveness. ~~For estimating purposes, sampling of accumulated rainwater was assumed to occur once per year for a period of 5 years.~~”

Section 5.4.4.7 will be revised as follows:

“Construction costs for Alternative A-4 would include clearing ~~and grubbing~~, erosion control, ~~dewatering~~, excavation of the berms, ~~testing/hauling/placing~~ of clean fill ~~and top soil~~, and ~~sod installation.~~”

Section 5.4.5.7 will be revised to include the following sentence:

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“For estimating purposes 10 post-excavation confirmation samples are assumed with analyses for pesticides and metals, and 10 waste characterization samples are assumed with analysis for TCLP.”

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

SPECIFIC COMMENTS

- 1. Section 3.7.2, G-Area Oil Seepage Basin Interior Subunit Characterization and Data Summary, Page 3-9, and Section 3.7.3, G-Area Oil Seepage Basin Interior Subunit Nature and Extent of Contamination, Page 3-10**

According to these sections, sediment samples were collected from zero to one foot below ground surface (bgs) and one to four feet bgs; however, a discussion of the data and results is presented for the zero to one-foot interval only. For clarity and completeness, revise Sections 3.7.2 and 3.7.3 to include a discussion and evaluation of the contaminant detections and exceedances for the one to four-foot interval.

Response: Agree. Sections 3.7.2 and 3.7.3 will be revised as shown in the response to General Comment 1.

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

- 2. Section 3.7.3, G-Area Oil Seepage Basin Interior Subunit Nature and Extent of Contamination, Page 3-10**

Review of Figure 3-2, 2009 Sampling Exceedances – Sediment, indicates that arsenic, potassium-40, and thallium, were detected at concentrations above their Regional Screening Level/Preliminary Remediation Goal (RSL/PRG) in samples collected from the one to four-foot depth interval. Based on these exceedances, it is unclear if the vertical extent of contamination at the Interior Subunit has been defined, as this is not discussed in Section 3.7.3. Revise Section 3.7.3 to evaluate whether the vertical extent of contamination has been defined, or if data gaps exist in the characterization of the Interior Subunit.

Response: Agree.

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Section 3.7.3 and associated figures have been completely revised to focus on the nature and extent of the primary contaminants, pesticides. Some of the constituents identified in screening do not provide a reasonable representation of the nature and extent of contamination because they are either anomalous detections or observed at levels that are within SRS background. Refer to response to General Comment #1.

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

3. Section 3.8.2, G-Area Oil Seepage Basin Berm Subunit Characterization and Data Summary, Page 3-15, and Section 3.8.3, G-Area Oil Seepage Basin Berm Subunit Nature and Extent of Contamination, Page 3-15

According to these sections, five contaminants were detected in soil samples at concentrations exceeding their applicable RSL/PRG; however, these sections do not clarify at what depths these exceedances were detected. Similarly, it is unclear if the exceedances were concentrated in one area of the berm, or detected throughout the Berm Subunit. For clarity and completeness, revise Sections 3.8.2 and 3.8.3 to clarify at what depths the exceedances were detected. In addition, present an evaluation of the horizontal and vertical extent of contamination, clarifying if it has been defined, or if data gaps exist in the characterization of the Berm Subunit.

Response: Agree.

Sections 3.8.2 and 3.8.3 and associated figures have been completely revised to focus on the characterization and data summary (3.8.2) and the nature and extent (3.8.3) of the primary contaminants in the Berm Subunit. See the response to General Comment 1.

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

4. Section 3.9.3, Pipeline Subunit Nature and Extent of Contamination, Page 3-19

According to this section, arsenic, bismuth-214, lead-214, and potassium-40 were detected at concentrations above their applicable RSL/PRG in soil samples collected at the Pipeline Subunit. It is unclear if the horizontal and vertical extent of contamination has been defined as this is not discussed. Given the noted exceedances, revise this section to evaluate whether the horizontal and vertical extent of contamination has been defined, or if data gaps exist in the characterization of the Pipeline Subunit.

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Response: Agree.

Section 3.9.3 and associated figures have been completely revised to focus on the nature and extent of the primary contaminants, pesticides. Some of the constituents identified in screening do not provide a reasonable representation of the nature and extent of contamination because they are either anomalous detections or observed at levels that are within SRS background. Refer to response to General Comment #1.

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

5. Section 3.10.2, Effluent Discharge Subunit Characterization and Data Summary, Page 3-21, and Section 3.10.3, Effluent Discharge Subunit Nature and Extent of Contamination, Page 3-22

According to these sections, soil samples were collected from depths of zero to one foot bgs and one to four feet bgs, and numerous exceedances were reported. However, these sections do not clarify at what depths the exceedances were detected. In addition, it is unclear if the horizontal and vertical extent of contamination has been defined as this is not discussed or evaluated. Revise Sections 3.10.2 and 3.10.3 to clarify the depths at which the exceedances were detected. In addition, evaluate if the horizontal and vertical extent of contamination has been defined, or if data gaps exist in the characterization of the Effluent Discharge Subunit.

Response: Agree.

Section 3.10.3 and associated figures have been completely revised to focus on the nature and extent of the primary contaminants, pesticides, as indicated in the response to General Comment 1. The horizontal and vertical occurrence of the primary contaminants and adequacy of the data is discussed.

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

6. Section 5.2.1.2, Alternative A-2: Land Use Controls, Page 5-8

The discussion of LUCs lacks sufficient detail. For example, this section states that deed restrictions will be implemented; however, it is unclear what the deed restrictions would specifically restrict. Similarly, this section states, "and additional LUCs could easily be applied...." It is unclear what

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these additional LUCS may include. Revise the Report to provide additional detail regarding the LUCs that will be implemented under Alternative A-2.

Response: Agree.

A more robust discussion of LUCs is provided in Section 5.1.1.2 and includes a discussion of the deed restrictions, including barring residential use, if the property is ever transferred to nonfederal ownership. The deed would include notification to the new property owner disclosing the former waste management and disposal activities as well as remedial actions taken onsite.

For clarity, the text in Section 5.2.1.2. Alternative A-2: Land Use Controls will be revised as shown below to provide more detail for the unit-specific LUCs.

“ 5.2.1.2 Alternative A-2: Land Use Controls

This alternative involves the use of LUCs to limit access to the entire prevent or reduce human exposure to contaminants remaining in place at the GOSB OU. LUCs, which

limit the human health exposure pathway, have been implemented successfully within Savannah River Site (SRS) and are fully employed in all areas of the site to limit access at the site boundary and facilities. LUCs would be implemented at the GOSB OU by posting will include warning and no trespassing signs to alert on-site workers to the presence of hazardous substances and to prevent unknowing entry and unrestricted use. LUCs will include administrative measures as managed through the SRS Site Use/Site Clearance Program to require authorization before beginning work activities at the site. Other administrative measures include property record notices and restrictions in the event the property is ever transferred to nonfederal ownership to disclose former waste management and disposal activities as well as remedial actions taken at the GOSB OU. The unit-specific LUCs for the GOSB OU will be included in the final ROD. This alternative includes five-year remedy reviews.” –implementation of a Land Use Control Implementation Plan, and deed restrictions in the event the property is ever sold. Any additional LUCs could be easily applied and would be protective of the industrial worker receptor as well as the hypothetical future resident scenario.

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

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GENERAL COMMENTS

- 1.a. The use of “frequency of detection” as a line of evidence for the refinement of constituents of concern (COC) needs to be addressed by the Core Team in future scoping meetings. For this document, there are a sufficient number of valid lines of evidence for each COC in the uncertainty analysis so that the “frequency of detection” line of evidence can be deleted.

Response: Agree. The issue of frequency of detection as a line of evidence for the refinement of constituents of concern will be addressed, as suggested, in future Core Team scoping meetings. For this document, the discussion of data quantity/quality (i.e., number of samples, abundance of detects, whether the detect is an estimated analytical result [i.e., J-qualified], etc.), will remain to support the understanding of the nature and extent of contamination. However, the frequency of detection criteria will be removed as an independent line of evidence for eliminating a constituent as a human health or ecological RCOC in Appendices C and D, respectively.

Responsible Party: Doug Martinson, (803) 952-6043, douglas.martinson@srs.gov

- 1.b. Furthermore, in the “Environmental Compliance and Area Completion Projects Regulatory Document Handbook” (ERD-AG-003), Protocol P.1.9 - Constituents of Concern Refinement Process, Section 2.0, Description of Uncertainty Factors (2006) discusses data quality of the data set, abundance of detects, and the quantity of the data points. The ERD-AG-003 does not mention a specific quantity of data points when there is a limited sample size for each area of concern nor does it define “infrequency of detection”. In Appendix C - Human Health Risk Assessment, Section C-2.3, page C-14, “frequency of detection” was not mentioned as a major category for the refinement of COCs. In Appendix D - Ecological Risk Assessment, Section D-2, Ecological Risk Assessment Process, page D-19, frequency of detection is mentioned in the first paragraph (and a couple of other areas in this section) with other uncertainties associated with certain COPCs and RCOCs but does not state a specific limit. The Department agrees with the Project Team that the discussion supports the understanding of the nature and extent of contamination, as stated in the Draft SRS Responses to SCDHEC for the most recent RI/BRA LTR IOU, SRNS-RP-2017-00139.

The EPA guidance document Risk Assessment Guidance for Superfund (RAGS) Part A, Chapter and Section 5.9 discusses further reduction of COCs in Section 5.9.3 Evaluate Frequency of Detection (1989). This strategy for refinement of COCs is continued in the updated EPA guidance

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documents for human health and ecological risk assessments in 2014 and 2015, respectively. Again, the Department reiterates our desire to discuss this with the Project Team in the future.

Response: Agree. Please see response to General Comment 1.a.

Responsible Party: Doug Martinson, (803) 952-6043, douglas.martinson@srs.gov

2. Chapter 5 discusses Alternative A-3: Place 0.6-meter (2-foot) Clean Fill Layer and Manage Surface Water and Alternative A-4: Backfill Basin and Manage Surface Water. Both of these alternatives would leave constituents in place that would be a potential risk to the industrial worker as well as an ecological risk. Consequently, LUCs and 5-year remedy reviews would be necessary. In Chapter 6, it is stated that Alternative A-4 may be the most favorable remedial action for the operable unit. However, being that the Department believes that this alternative will require LUCs and 5-year remedy reviews adding additional associated cost, Alternative A-5: Excavate and Manage Surface Water should be viewed as the most favorable based on the elimination of risk to the industrial worker and environment and the cost involved.

Response: Clarification. LUCs and five-year remedy reviews will be added to Alternative A-3. However, LUCs are not required for Alternative A-4 because filling the basin to grade will result in a clean fill thickness ranging from a minimum of 3.05 m (10 ft) at the shallow end of the basin to a minimum of 4.90 m (16 ft) at the deeper end of the basin. The Human Health RCOCs (alpha-Chlordane, gamma-Chlordane, DDE, dieldrin, and heptachlor epoxide) were found above the PRGs in one sample (GOSB-51) at the deeper end of the basin. However, dieldrin was also detected at a concentration (0.038 mg/kg) just slightly over the residential PRG (0.034 mg/kg) in an additional location (GOSB-50) in the middle of the basin. There were no contaminant migration RCOCs. A clean fill thickness of 4.90 m (16 ft) would eliminate human health exposure and would not warrant any LUCs. Filling the basin to grade also eliminates the physical hazards and safety concerns associated with an open basin with steep slopes, and therefore, eliminates the controls that would be required to mitigate these hazards.

The appropriate text in the Executive Summary, Chapters 5 and 6, and Appendix H (Detailed Cost Estimate) will be revised to include LUCs for Alternative A-3.

Section 5.1.2.3, Containment and Section 5.2.1.4 Alternative A-4: Backfill Basin and Manage Surface Water, will be modified to address how soil cover integrity and settlement will be managed without LUCs.

The modified text for Section 5.1.2.3 is shown below:

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“The effectiveness of containment technologies depends upon the materials used and the design and effectiveness of the soil cover. ~~Cover integrity must be maintained for as long as contaminants will persist or until degradation or decay of the contaminants renders them harmless. Generally, cover integrity can be ensured using robust construction techniques and/or through continued maintenance as needed.~~ Maintenance activities....”

The modified text for Section 5.2.1.4 Alternative A-4: Backfill Basin and Manage Surface Water is as follows:

“Alternative A-4 consists of backfilling the basin to the natural grade with clean soil and construction of a soil and vegetated cover over the basin footprint soil. ~~The thickness of the required fill material, a minimum of 3.05 m (10 ft) in the shallow end of the basin and a minimum of 4.9 m (16 ft) in the deeper end of the basin, will prevent exposure to pesticides buried at depth. Specifically, Specific activities associated with this remedial alternative includes dewatering of the basin, clearing and grubbing ~0.27 ha (0.67 ac), installation of temporary control measures, excavation of the berms, backfilling the basin with ~4,460 m³ (5,834 yd³) of clean soil and berm soil, compacting fill material to mitigate subsidence followed by compaction testing, and grading and construction of a soil and vegetated cover over the basin footprint. Temporary erosion control measures such as silt fencing along the haul roads and as necessary to protect nearby outfalls will be used during construction activities.~~

Controlled compaction is expected to be adequate to mitigate settlement and erosion; however, additional construction techniques such as the use of an aggregate bridging material layer may be used if the sediment is determined to be unstable. Clean fill will be verified in accordance with the approved SRS protocol for verification of fill and cover material. No debris is anticipated based on observations of the basin when it was drained in the early 1990’s. However, any debris encountered will be managed as CERCLA waste and disposed of at an approved waste disposal facility. Trees cleared to gain access to the basin will be pushed aside and left near the site. Disturbance of the fill material and vegetative cover at the GOSB OU will be prevented by existing administrative site use procedures that prohibit unauthorized excavations at SRS. Alternative A-4 would not require LUCs or five-year remedy reviews.”

Discussion in the Executive Summary regarding the preferred alternative will be removed.

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

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SPECIFIC COMMENTS

1. Chapter 2, Section 2.2.1, Surface Water Hydrology, page 2-2. The first sentence listing the five major streams at SRS includes Upper Three Runs twice; it should list Steel Creek instead.

Response: Agree. The text will be changed to “The five major streams that drain from the SRS to the Savannah River are the Upper Three Runs, Fourmile Branch, Pen Branch, ~~Upper Three Runs~~ Steel Creek, and Lower Three Runs (Figure 2-3).

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

2. Chapter 2, Section 2.2.3, Geology, page 2-3. The first sentence of the second paragraph of this section refers to Figure 2-5 while discussing the geologic units associated with GOSB OU. It appears that Figure 2-6, which shows the individual geologic units, should be referenced instead. Please correct.

Response: Agree. The text will be changed to “As shown on Figure ~~2-5~~ 2-6, the shallow geologic units associated with the GOSB OU include the middle to late Tertiary Age Dry Branch Formation, Tobacco Road Formation, and “Upland Unit” (correlative to the Altamaha Formation).”

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

3. Chapter 3, Section 3.7.2, G-Area Oil Seepage Basin Interior Subunit Characterization and Data Summary, page 3-9. The bottom of this page states that there are seven constituents that exceed the RSL/PRG at the Basin Interior Subunit; however, according to the data presented in Table C-1 of Appendix C, there are a total of fifteen including chromium, benzo[a]anthracene, benzo[b]fluoranthene, alpha-chlordane, gamma-chlordane, Cs-137, Th-232 and U-238 in addition to the seven listed. Please revise this section to include these constituents and also revise Section 3.7.3 accordingly.

Response: Agree. The purpose of Section 3.7.2 is to provide a summary of the characterization activities. In the Revision 0 RI/BRA, Section 3.7.2 prematurely presented an incomplete list of constituents that exceeded risk-based criteria. However, the nature and extent discussion in Section 3.7.3 should focus on those constituents that exceed SRS

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background concentrations and are therefore, more likely to be present from unit related activities.

To support the nature and extent discussion, a new paragraph will be added to Section 3.2. Site Characterization and Data Usability to explain the process for identifying unit-specific constituents (USCs). Section 3.7.2 will be revised to specifically discuss the characterization activities. Data evaluation for the GOSB OU Interior Subunit, Section 3.7.3 will be revised to focus on the nature and extent of the primary contaminants (i.e., pesticides) for the GOSB OU Interior Subunit. The revised document will include new USC screening tables in Appendix A and new figures to support nature and extent. The new USC screening tables and figures are included with the Revision 1 Redline and the revised text for Sections 3.2, 3.7.2, and 3.7.3 are provided below.

The following text will be added as a new paragraph to the end of Section 3.2 Characterization and Data Usability as follows:

“Unit-Specific Constituent Screening

A data evaluation to determine the nature and extent of contamination at the GOSB OU was conducted by comparing soil and sediment data for all depth intervals to SRS background data presented in Appendix B-2 (all depths) of the approved 2006 Background Soils Statistical Summary Report for the SRS Study (WSRC 2006). A constituent for which the maximum concentration is greater than twice the SRS background mean concentration is more likely to be present from unit related activities and is identified as a unit specific constituent (USC).

The USCs identified for the GOSB OU are provided in Appendix A in Tables A.2.1 through A.2.4. Constituents for which the maximum concentrations are greater than twice the SRS background mean concentrations are identified as USCs. Constituents for which no background concentrations are available are identified as USCs if detected at one or more location and depth interval. The nature and extent of unit-related contaminants is discussed in more detail in Sections 3.7.3, 3.8.3, 3.9.3, and 3.10.3.”

Section 3.7.2 for the GOSB Interior Subunit will be revised as follows:

“Ten composite basin floor/wall sediment samples from five locations were collected from within the basin in 2009. At each location, one composite sediment sample was collected from the 0- to 0.3-m (0- to 1-ft) depth interval and one composite sediment sample was collected from the 0.3- to 1.2-m (1- to 4-ft) depth interval. Sediment samples from the basin floor were collected below the leaf debris and decayed organic material. Paired surface water samples

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were collected at each of the sediment sample locations for a total of five basin water samples. Sediment and surface water samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. ~~The laboratory analyses of the 2009 GOSB Interior Subunit sediment samples from 0 to 0.3 m (0 to 1 ft) depth interval yielded seven constituents that exceed the respective RSL/PRG (Figure 3-2), including arsenic, benzo[a]pyrene, potassium-40, thallium, dieldrin, dichlorodiphenyldichloroethylene (DDE), and heptachlor epoxide.~~

Several of the surface water samples collected in 2009 had issues with high turbidity and yielded multiple exceedances. In 2015, the Core Team recommended additional sampling of the basin surface water (filtered and unfiltered) to further evaluate potential contamination from dissolved constituents. Six surface water samples were collected in 2016 from the within the basin and analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. Constituents detected in these surface water samples included inorganics (metals), VOCs, and radiological indicators. The 2016 unfiltered samples reported concentrations above the MCL/RSL for only alpha- and beta-benzene hexachloride. The corresponding filtered results have no exceedances of MCLs/RSLs. Figure 3-3 ~~3-2~~ shows the 2009 surface water and 2016 unfiltered surface water exceedances.”

Section 3.7.3 has been completely revised to focus on the nature and extent of the primary contaminants, pesticides. Some of the constituents identified in screening do not provide a reasonable representation of the nature and extent of contamination because they are either anomalous detections or observed at levels that are within SRS background. For this reason, two pesticides that are the most laterally and vertically extensive contaminants and pose some of the higher risks to human health and environment were determined to best represent the extent of contamination and are discussed in more detail.

The text in Section 3.7.3 for the GOSB Basin Interior Subunit will be replaced with the following text:

“Constituents identified as USCs for the GOSB Basin Interior Subunit are shown in Table A.2.1. The primary contaminants in the basin interior are pesticides. A group of pesticides including alpha-Chlordane, gamma-Chlordane, dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE), dieldrin, and heptachlor epoxide have been identified in sediment in the basin bottom of the GOSB Interior Subunit. Silver present in the basin sediments is likely associated with a silver-containing pesticide.

The horizontal and vertical extent of contamination at the GOSB OU is represented by a series of maps and cross-sections. The contaminants are generally co-located. Two pesticides,

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dieldrin and gamma-Chlordane, have been selected to represent the extent of contamination because they are the most laterally and vertically extensive contaminants and pose some of the higher risks to human health and environment. The highest concentrations of contaminants are located in the shallowest depth interval at the deepest portion of the basin.

The lateral extent of dieldrin at the GOSB is depicted in three maps (Figures 3-3 through 3-5). In Figure 3-3 the concentrations of dieldrin measured in sediment and soil samples taken from the 0- to 0.3-m (0- to 1-ft) depth interval are posted on a map of the entire GOSB Operable Unit. Three sample locations at this depth interval in the basin interior subunit exceed human health and/or ecological risk based standards. In Figure 3-4, the concentrations of dieldrin from samples taken from the 0.3- to 1.2-m (1- to 4-ft) depth interval are posted on the map. No samples from the 1- to 4-ft depth interval exceed risk based standards for dieldrin.

The lateral extent of gamma-Chlordane at GOSB is depicted in three maps (Figures 3-7 through 3-9). In Figure 3-7 and Figure 3-8, the concentrations of gamma-Chlordane measured in sediment and soil samples taken from the 0- to 0.3-m (0- to 1-ft) and 0.3- to 1.2-m (1- to 4-ft) depth intervals are posted on a map of the entire GOSB OU. All five sample locations in the Basin Interior Subunit exceed human health and/or ecological risk based standards for gamma-Chlordane in both depth intervals. The highest concentrations occur in the shallowest interval in the deepest portion of the basin.

The vertical extent of contamination at the GOSB OU is presented in stylized cross-sections (Figure 3-6 and Figure 3-10). In general, contaminant concentrations are highest in the shallowest interval at the deepest portion of the basin and decrease in concentration with depth.

Soil, sediment, and groundwater sampling at the GOSB are sufficient to determine the nature and extent of contamination for the Basin Interior Subunit, and the presence or absence of problems warranting response action. The highest concentrations of contaminants occur in the deepest portion of an open basin (that if filled-in will be approximately 3 m {10 ft} below ground surface). The highest concentrations of contaminants are in the shallowest interval and concentrations tend to decrease with depth. The contaminants are relatively immobile. A contaminant migration analysis has been performed as described in Section 3.7.4 *G Area Oil Seepage Basin Interior Subunit Fate and Transport Evaluation Results*. Results of the contaminant migration evaluation indicate that the contaminants in the Basin Interior Subunit are not a potential source for groundwater contamination. Groundwater samples from temporary water table wells (Figures 3-11 and 3-12), were taken to confirm that contaminants had not migrated to the groundwater. Groundwater samples taken from the water table at the GOSB were all non-detect for dieldrin and gamma-Chlordane.”

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Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

4. Section 3.8.2, G-Area Oil Seepage Basin Berm Subunit Characterization and Data Summary, page 3-15. This section states that there are five constituents that exceed the RSL/PRG at the Berm Subunit; however, iron, which is listed as one of them, exceeds the screening value of 0.1xRSL but not the RSL itself. Additionally, according to data presented in Table C-5, there are a total of nine constituents including chromium, benzo[a]pyrene, benzo[b]fluoranthene, Th-232 and U-238 in addition to arsenic, thallium, K-40 and Cs-137. Please revise this section and Section 3.8.3 accordingly.

Response: Agree. Please see the response to Specific Comment #3. Section 3.8.2 will be revised to specifically discuss the characterization activities and data evaluation for the GOSB Berm Subunit as follows:

“Thirty-nine soil samples were collected from thirteen locations along the basin perimeter at 15-m (50-ft) intervals during the 2009 characterization sampling event. At each sampling location, soil samples were collected from the 0- to 0.3-m (0- to 1-ft), 0.3- to 1.2-m (1- to 4-ft), and 2.4- to 3-m (8- to 10-ft) intervals and analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. ~~Constituents detected in the berm soil samples were inorganics (metals), pesticides, PAHs, PCBs, VOCs, SVOCs and radiological indicators. There were five constituents that exceed the RSL/PRG in the Berm soils (Figure 3-9, Figure 3-10, and Figure 3-11), including arsenic, iron, thallium, potassium-40, and cesium-137.~~ No data gaps were identified for the GOSB Berm Subunit at the December 9, 2015, scoping meeting; therefore, no new data was collected for this subunit in the 2016-2017 sampling campaign.”

The text in Section 3.8.3 for the GOSB Berm Subunit will be replaced with the following text:

“Constituents identified as USCs for the GOSB Berm Subunit are shown in Table A.2.2. The primary contaminants at the GOSB Berm Subunit are pesticides. The lateral and vertical extent of dieldrin and gamma-Chlordane at GOSB are depicted in six maps that show contamination at three depth intervals and two cross-sections (Figure 3-3 through Figure 3-10). Berm samples were taken at three depths (0- to 0.3-m [0- to 1-ft], 0.3- to 1.2-m [1- to 4-ft], and 2.4- to 3-m [8- to 10-ft]). There are no sample locations in the GOSB berm that exceed risk-based standards for dieldrin or gamma-Chlordane.”

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

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5. Chapter 3, Section 3.8.3, G-Area Oil Seepage Basin Berm Subunit Nature and Extent of Contamination, page 3-15. This section lists barium, manganese and Cs-137 as constituents that exceed two times the average SRS all-depths background concentrations; yet according to Table A.2.1.3 in Appendix A, the maximum all-depth concentrations for these constituents are below their respective background concentrations listed in Table C-5 of Appendix C. Furthermore, Table C-5 lists these constituents as “no” for “Exceeds 2X Average Background?”. Additionally, U-238 is listed as “YES” for “Exceeds 2X Average Background?” but is not listed in this section. Please correct.

Response: Agree. The nature and extent discussion in Section 3.8.3 should focus on those constituents that exceed SRS background concentrations and are more likely to be present from unit related activities. Therefore, Section 3.8.3 will be revised to focus on the nature and extent of the primary contaminants (i.e., pesticides) for the GOSB Berm Subunit as shown in the response to Specific Comment #4.

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

6. Chapter 3, Section 3.9.2, Pipeline Subunit Characterization and Data Summary, page 3-19. Based on the maximum concentration listed for chromium in Table A.3.1.1 in Appendix A (41.4 mg/kg), chromium should be added to the list of constituents that exceed their respective RSL/PRGs (0.3 mg/kg) in this section. Please correct.

Response: Agree. Please see the response to Specific Comment #3. Section 3.9.2 will be revised to specifically discuss the characterization activities and data evaluation for the GOSB Pipeline Subunit as follows:

“In 2009, twenty-nine soil samples were obtained from twenty-nine sample locations (GOSB-1 through GOSB-29), which were spaced ~7.5-m (25-ft) apart along both sections of the Pipeline Subunit. The data objective was to characterize the impact of any leaks from the pipeline. All pipeline samples were collected from the 2.4- to 3-m (8- to 10-ft) interval along the buried clay pipe and analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL inorganics, and radiological indicators/gamma spectroscopy. ~~Detected soil constituents included inorganics (metals), pesticides, VOCs, SVOCs, and radiological indicators. Arsenic, bismuth-214, lead-214, and potassium-40 were the only constituents reported in the sample set above the RSL/PRG.~~”

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Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

7. Chapter 3, Section 3.9.3, Pipeline Subunit Nature and Extent of Contamination, page 3-19. Based on the maximum concentration listed for silver in Table A.3.1.1 (1.76 mg/kg), silver should be added to the list of constituents that exceed two times the average background (0.73 mg/kg) in this section. Please correct.

Response: Agree.

The nature and extent discussion in Section 3.9.3 should focus on those constituents that exceed SRS background concentrations and are more likely to be present from unit related activities. Therefore, Section 3.9.3 will be revised to focus on the nature and extent of the primary contaminants (i.e., pesticides) for the GOSB Pipeline Subunit. The text in Section 3.8.3 for the GOSB Pipeline Subunit will be replaced with the following text:

“Constituents identified as USCs for the GOSB Pipeline Subunit are shown in Table A.2.3. Samples were taken at a depth of 2.4 to 3 m (8 to 10 ft) below ground surface at the Pipeline Subunit to evaluate any potential leaks from the pipeline. Results for dieldrin and gamma-Chlordane at the Pipeline Subunit are depicted on Figure 3-5 and Figure 3-9. There are no samples from locations in the Pipeline Subunit that had detections of either dieldrin or gamma-Chlordane.”

Responsible Party: Mary Baird, (803) 952-8738, mary.baird@srs.gov

8. Chapter 5, Section 5.1.2.4, Removal and Disposal, page 5-6, second sentence. Please change “Three Rivers Landfill” to “Three Rivers Solid Waste Authority Class Three Landfill (Three Rivers Landfill) [Permit #024202-1101]” for clarity.

Response: Agree. The text will be changed to “Contaminated sediment media could be excavated and hauled to an approved disposal facility, such as Three Rivers Solid Waste Authority Class Three Landfill (Three Rivers Landfill) [Permit #024202-1101].”

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

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9. Chapter 5, Section 5.1.2.4, Removal and Disposal, page 5-7, please include the management of basin water in the last paragraph of this section.

Response: Agree. The first paragraph of Section 5.1.2.4 will be modified as follows:

“Removal (excavation) and disposal of contaminated sediment media in an appropriate facility is one of the most aggressive approaches to remediation. Prior to excavation, the basin will be dewatered. Dewatering activities will be managed as a non-discharge land application.”

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

10. Chapter 5, Section 5.2.1.2, Alternative A-2: Land Use Controls, page 5-8. Please include that Alternative A-2 would include 5-year remedy reviews.

Response: Agree. A more robust discussion of LUCs is provided in Section 5.1.1.2 and includes a discussion of the deed restrictions needed if the property is ever transferred to nonfederal ownership. The deed would include notification to the new property owner disclosing the former waste management and disposal activities as well as remedial actions taken onsite.

For clarity, the text in Section 5.2.1.2. Alternative A-2: Land Use Controls will be revised as shown below to provide more detail for the unit-specific LUCs.

“5.2.1.2 Alternative A-2: Land Use Controls

This alternative involves the use of LUCs to limit access to the entire prevent or reduce human exposure to contaminants remaining in place at the GOSB OU. LUCs, which limit the human health exposure pathway, have been implemented successfully within Savannah River Site (SRS) and are fully employed in all areas of the site to limit access at the site boundary and facilities. LUCs would be implemented at the GOSB OU by posting will include warning and no trespassing signs to alert on-site workers to the presence of hazardous substances and to prevent unknowing entry and unrestricted use. LUCs will include administrative measures as managed through the SRS Site Use/Site Clearance Program to require authorization before beginning work activities at the site. Other administrative measures include property record notices and restrictions in the event the property is ever transferred to nonfederal ownership to disclose former waste management and disposal activities as well as remedial actions taken at the GOSB OU. The unit-specific LUCs for the GOSB OU will be included in the final ROD. This alternative includes five-year remedy reviews.” ~~implementation of a Land Use Control~~

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~~Implementation Plan, and deed restrictions in the event the property is ever sold. Any additional LUCs could be easily applied and would be protective of the industrial worker receptor as well as the hypothetical future resident scenario.~~

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

11. Chapter 5, Section 5.4, Detailed Analysis of Alternatives, pages 5-17 through 5-24. This section discusses the de-watering of the basin for three of the alternatives presented, and references Figure 5-2, page 5-28, which shows the intended area to receive the basin water via spray irrigation, but does not elaborate what this area is or the benefit this area would receive by receiving the basin water. Please clarify.

Response: Agree. The text will be modified in Section 5.4.3, 5.4.4, and 5.4.5 as follows:

“For the purpose of developing a cost estimate, dewatering of the ~1,567,160.48 liters (414,000 gallons) of rainwater in the basin is assumed to be accomplished by pumping and spray irrigating at the location shown on Figure 5-2. The area that will receive the rainwater is a pine forest downgradient and east of the basin. The irrigation will promote tree growth and mitigate runoff.”

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

12. Chapter 5, Section 5.4.5.2, Compliance with ARARs, Action Specific ARARs, page 5-23. Please use the complete regulation title for clarity: Regulation 61-107.5 SWM: Collection, Temporary Storage and Transportation of Municipal Solid Waste and Regulation 61-107.19 SWM: Solid Waste Landfills and Structural Fill.

Response: Agree. The text will be changed to “Disposal and transportation of solid waste generated from Alternative A-5 would be handled in accordance with ~~Federal and State regulations (40 CFR 262.11(b) and SCDHEC 61-107.5(D)(3))~~ Regulation 61-107.5 SWM: Collection, Temporary Storage and Transportation of Municipal Solid Waste and Regulation 61-107.19 SWM: Solid Waste Landfills and Structural Fill.”

Responsible Party: Monique Rabin, (803) 952-6695, monique.rabin@srs.gov

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13. Appendix B, Section B-2.4, G-Area Oil Seepage Basin Modeling Parameters, page B-19. Based on the data in the Tier 1 Screening Results tables for each subunit in Appendix B, a constituent is retained as a Tier 1 CM COPC only if the source zone concentration is greater than both the Tier 1 Source-Specific SSL and the Tier 1 MLSSL. This should be stated in Step 3 on page B-19 for the Tier 1 screening methodology, which references “action levels” as the benchmark for comparison in determining Tier 1 CM COPCs.

Response: Agree. The text in Section B-2.4, Step #3 will be revised as follows:

“3. VZCOMML[®] Tier I screening is performed, using two conservative assumptions: a) for each analyte, the maximum detected soil concentration is used to represent the soil concentration (Ct), and b) the thickness of the source zone is assumed to be equal to the depth of the deepest available soil sample. ~~Analytes predicted to impact groundwater at concentrations exceeding action levels, under the conservative conditions simulated, are retained as Tier I CM COPCs.~~ An analyte was retained as a Tier I CM COPC if the source zone concentration was greater than both the Tier I Source-Specific SSL and the Tier I MLSSL.”

Responsible Party: Doug Martinson, (803) 952-6043, douglas.martinson@srs.gov

14. Appendix B, Section B-2.4, G-Area Oil Seepage Basin Modeling Parameters, page B-19 and Tables B-5, B-7, B-9 and B-11. The methodology for selecting Tier II CM COPCs is unclear. According to Step 4 on page B-19, analytes predicted to exceed regulatory standards within 1,000 years are retained as Tier II CM COPCs. These “regulatory standards” are not defined in this section, nor are they defined in the Tier II Screening tables for each subunit. Specifically, the following analytes are listed as having predicted groundwater concentrations higher than their regulatory standards yet are not retained as Tier II CM COPCs: arsenic (Tables B-7 and B-9), K-40 (Table B-9) and Ra-226 (Table B-11). The predicted groundwater concentration for cobalt exceeds the Tier II SSL in Table B-5, but apparently because it is below the regulatory standard listed in this table, it fails the Tier II screening process. Furthermore, the predicted groundwater concentration for arsenic in Table B-9 is higher than both the listed regulatory standard and the Tier II SSL; however, it is not retained as a Tier II CM COPC. Please explain.

Response: Agree. The text in Section B.2-4, Step #4 will be revised as follows:

“4. VZCOMML[®] Tier II Simulation 1 is run, using two conservative assumptions: (a) for each analyte, the maximum detected soil concentration is used to represent the soil

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concentration (Ct), and (b) the thickness of the source zone is assumed to be equal to the depth of the deepest available soil sample. Analytes predicted to impact groundwater at concentrations exceeding regulatory standards within the evaluation time of 1,000 years, under the conservative conditions simulated, are retained as Tier II CM COPCs. Regulatory standards refer to the Tier II $SSL_{T/12}$, the Tier II $MLSSL_{T/12}$, and either the May 2016 USEPA MCL or Tapwater Standard. For an analyte to be retained as a Tier II CM COPC in VZCOMML[®], the “predicted concentration in aquifer” must be greater than all 3 regulatory standards and the analyte must have a mean travel time of less than 1,000 years.”

In response to the specific analytes in question and based on the added sentence to Step #4 (with no additional changes in the text), consider the following explanations:

- Arsenic (Table B-7), mean travel time = 2,780 years, which is greater than 1,000 years
- Arsenic (Table B-9), mean travel time = 2,050 years, which is greater than 1,000 years
- K-40 (Table B-9), mean travel time = 3,943 years, which is greater than 1,000 years
- Ra-226 (Table B-11), mean travel time = 4,933 years, which is greater than 1,000 years
- Cobalt (Table B-5), the regulatory standard of 6 µg/L was not exceeded

Responsible Party: Doug Martinson, (803) 952-6043, douglas.martinson@srs.gov

15. Appendix C, Section C-2.3, Refinement of Constituents of Concern/Results. These pages discuss the uncertainty analysis for the refinement of COCs. Please remove as a line of evidence those that list infrequently detected. See General Comment #1.

Response: Agree. Per response to General Comment 1.a, the frequency of detection criteria will be removed as an independent line of evidence for eliminating a constituent as a human health RCOC in Appendix C.

Responsible Party: Doug Martinson, (803) 952-6043, douglas.martinson@srs.gov

16. Appendix C, Section C-2.3.1.1 Sediment Media, page C-16, first sentence. This sentence references Table C-1 for the results of the Human Health COPCs in the GOSB Interior Subunit, pages C-51-52. Therefore, please change GOSB Berm Subunit to GOSB Interior Subunit in the first sentence.
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Response: Agree. The first sentence in Section C-2.3.1.1 will be revised as follows:

“Table C-1 presents the result of the sediment screening for GOSB ~~Berm~~ Interior Subunit.”

Responsible Party: Doug Martinson, (803) 952-6043, douglas.martinson@srs.gov

17. Appendix C, Section C-2.3.1.2, Basin Surface Water, pages C-25-C-35. Please change the line of evidence for cadmium, chromium, lead, and bismuth-214 from “The mean concentration is below the screening level,” to “The mean concentration is below the MCL.” Also, please make this change for lines of evidence that include the “most recent sampling event are well below...” for these constituents.

Response: Agree. The text in Section C-2.3.1.2 for cadmium and chromium will be revised as follows:

“ - The mean concentration is below the screening-level MCL

- The subunit concentrations from the most recent sampling event are well below the screening-level MCL”

The text in Section C-2.3.1.2 for lead will be revised as follows:

“ - The subunit concentrations from the most recent sampling event are well below the screening-level MCL”

The text in Section C-2.3.1.2 for Bi-214 will be revised as follows:

“ - The mean activity concentration is equal to the screening-level MCL”

Responsible Party: Doug Martinson, (803) 952-6043, douglas.martinson@srs.gov

18. Appendix D, Section D-2.3, Results/Refinement of Constituents of Concern. These pages discuss the uncertainty analysis for the refinement of COCs. Please remove as a line of evidence those that list infrequently detected. See General Comment #1.
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**SRS Responses to
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Comments on:**

**Resource Conservation and Recovery Act Facility Investigation / Remedial Investigation Report
with Baseline Risk Assessment and Corrective Measures Study / Feasibility Study
(RFI/RI/BRA/CMS/FS) for the G-Area Oil Seepage Basin (GOSB) (U),
CERCLIS Number: 93, (SRNS-RP-2017-00218, Revision 0, September 2017)**

Comments received December 20, 2017

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Response: Agree. Per response to General Comment 1.a, the frequency of detection criteria will be removed as an independent line of evidence for eliminating a constituent as an ecological RCOC in Appendix D.

Responsible Party: Doug Martinson, (803) 952-6043, douglas.martinson@srs.gov

The following comments were noted during the Department's review. No response is necessary.

1. Appendix D, Section D.2.3.2.2, Refinement Results for GOSB Berm Subunit for Soil Media (0 to 1 ft), page D-61. Please change the table number in the first sentence from Table D-3 to D-6.

Agree. The first sentence in Section D-2.3.2.2 will be revised as follows:

“Using EPC values (i.e., 95% UCL on the mean), Table ~~D-3~~ D-6 identifies the following constituents ...”

2. Appendix D, Section D.2.3.4.4, Screening Results for Effluent Discharge for Soil Media (1 to 4 ft), page D-78. Please change the table number in the first sentence from Table D-9 to D-11.

Agree. The first sentence in Section D.2.3.4.4 will be revised as follows:

“Using maximum detected values, Table ~~D-9~~ D-11 identifies the following constituents...”

3. Appendix D, Section D.2.3.4.5, Refinement Results for Effluent Discharge for Soil Media (1 to 4 ft), page D-79. Please change the table number in the first sentence from Table D-10 to D-12.

Agree. The first sentence in Section D-2.3.4.5 will be revised as follows:

“Using EPC values (i.e., 95% UCL on the mean), Table ~~D-10~~ D-12 identifies the following constituents ...”
