



**Department of Energy**  
 Savannah River Operations Office  
 P.O. Box A  
 Aiken, South Carolina 29802

JUN - 6 2019

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:** Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for D-Area Coal Storage Area (484-17D) (U) (SRNS-RP-2018-00813, Revision 1, June 2019) (Clean Copy), Savannah River Site's Responses to Regulatory Comments on the Revision 0 Document, and Draft Action Memorandum, SEMS Number: 63

In accordance with the terms of the Federal Facility Agreement, the U. S. Department of Energy (DOE) is submitting the subject Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for your files. The South Carolina Department of Health and Environmental Control (SCDHEC) and the U. S. Environmental Protection Agency (EPA) provided comments on the Revision 0 RSER/EE/CA in your letters dated January 24, 2019 and March 4, 2019 respectively. The responses to the EPA's and SCDHEC's comments on the Revision 0 RSER/EE/CA are enclosed and were incorporated into the Revision 1 RSER/EE/CA as noted in the responses.

In addition, the submittal includes a draft Action Memorandum for the Non-Time Critical Removal Action for the D-Area Coal Storage Area (484-17D) for your review and comment. Please review the draft Action Memorandum and provide your comments within thirty (30) days of receipt.

Questions from you or your staff may be directed to me at (803) 952-8365.

Sincerely,

A handwritten signature in blue ink, appearing to read "BTH", with a long horizontal stroke extending to the right.

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

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Ms. Susan Fulmer  
Mr. Jon Richards

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Enclosures:

1. Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for D-Area Coal Storage Area (484-17D) (U) (SRNS-RP-2018-00813, Revision 1, June 2019) SEMS Number: 63 (Clean Copy)
2. SRS Responses to EPA Comments on the Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for D-Area Coal Storage Area (484-17D) (U) (SRNS-RP-2018-00813, Revision 0, November 2018)
3. SRS Responses to SCDHEC Comments on the Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for D-Area Coal Storage Area (484-17D) (U) (SRNS-RP-2018-00813, Revision 0, November 2018)
4. Draft Action Memorandum and Responsiveness Summary for the Non-Time Critical Removal Action for the D-Area Coal Storage Area (484-17D) SEMS Number: 63

cc w/o encl:

D. Scaturo, SCDHEC-Columbia  
S. French, SCDHEC-Columbia  
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D. Lloyd, EPA-Atlanta  
M. McRae, TechLaw, Inc.

**SRS Responses to United States Environmental Protection Agency (US EPA) Comments on  
the Removal Site Evaluation Report / Engineered Evaluation / Cost Analysis  
(RSER/EE/CA) for the D-Area Coal Storage Area (484-17D) (U)  
SEMS Number: 63  
SRNS-RP-2018-00813, Revision 0, November 2018  
Comments Received March 4, 2019**

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**EPA GENERAL COMMENTS:**

1. The Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for the D-Area Coal Storage Area (484-17D) (U), SEMS Number: 63; SRNS-RP-2018-00813; dated November 2018 [RSER/EE/CA] evaluates the implementation of a non-time critical removal action in advance of a final remedial action for the DCSA. Alternatives evaluated focus on mitigating low-pH conditions in groundwater that have contributed to metals plumes.
  - a. Two remedial alternatives incorporating soil neutralization amendments are evaluated and provide costs estimates:
    - Table 3 [Detailed Cost Analysis for the D-Area Coal Storage Area, Alternative 2, Addition of Soil Neutralization Amendments (15 Acres)] and
    - Table 4 [Detailed Cost Analysis for the D-Area Coal Storage Area, Alternative 3, Partial Excavation of Coal Fragments (5 Acres) and Addition of Soil Neutralization Amendments (15 Acres)]

However, justification for line items such as “Liming Agent to be Spread on Acreage” are not supported in the text or tables. As a result, it is unclear how the liming agent mass was developed to ensure the Remedial Action Objective (RAO) stated in Section 3.2 (Remedial Action Objective) to “protect human health and the environment is to increase the pH in the DCSA vadose zone soils to more natural conditions to minimize future impacts to groundwater” will be achieved. Please provide this information that supports this assertion.

- b. Also, while the RSER/EE/CA text clarifies limitations related to the vertical extent of soil neutralization (approximately four feet as limited by cost-effective agricultural equipment) it is unclear how the effectiveness of the liming of the proposed interval was determined to achieve the RAO. Revise the RSER/EE/CA to provide the basis (treatability studies, calculations, etc.) for the proposed liming agent mass and distribution relative to the stated RAO.

**Response: Clarification**

**The amount of liming agent was calculated based on the pH sampling results measured during the June 2018 soil sampling effort and cation exchange capacity (CEC) values of the coal yard soils. There are many purities and particle sizes available for calcium carbonate. Depending on the exact product chosen, the amount required to raise the pH to an average SRS soil background level of approximately 5.5 will vary. To support this RSER/EE/CA, it was assumed that high purity (> 90 %) calcium carbonate limestone (CaCO<sub>3</sub>) with a particle size of 60-mesh (0.25 mm) will be used. However, the exact product to be used has not been finalized and will be based on product/quantity availability and compatibility with the mixing equipment.**

**SRS Responses to United States Environmental Protection Agency (US EPA) Comments on  
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The required lime application rate (tons per acre) is a function of the CEC, soil pH buffering capacity, current soil pH, target soil pH, treatment depth, and lime effectiveness (function of lime type, particle size, moisture content, and impurity levels). Bounding calculations were made to estimate the lime application rate necessary to raise the pH of acidic DCSA soil to background levels for SRS upland soils. In the absence of total soil acidity data for the DCSA soil cores collected in June 2018, lime application rates were estimated three different ways. First, a model was developed based on setting total soil acidity equal to 100 percent of the soil CEC. Second, Moore-Sikora buffer pH test data for different soil types (sand, silt, and clay) published by Clemson Regulatory Services were extrapolated to current DCSA soil conditions. Third, published data for lime treatment of pyritic mine soils and coal mine waste by Cagnetta and Jencks (1990) and Yang et al. (2006), respectively, were used as the basis for the DCSA lime application rate. Optimistic, best estimate, and pessimistic cases were considered to bracket uncertainties. Subsequently, six near-surface soil samples were collected from the DCSA for CEC analysis. The CEC data support the assumptions made in the bounding model calculations; recommended lime application rates largely fall within the range of the optimistic and best-estimate model calculations.

**References:**

Cagnetta, P. J., and Jencks, E. M. (1990) An Evaluation of Lime Requirement Tests on Pyritic Minesoils. Paper presented at the 1990 Mining and Reclamation Conference and Exhibition, Charleston, West Virginia, April 23-26, 1990.

Yang, J. E., Skousen, J. G., Ok, Y. S., Yoo, K. Y., and Kim, H. J. (2006) Reclamation of Abandoned Coal Mine Waste in Korea using Lime Cake By-Products. *Mine Water and the Environment* 25(4), 227-232.

**Exact calculations will not be provided in the RSER/EE/CA because calculations and amounts of amendments will change based on the exact product used. General language will be added stating that amendments will be added to target a soil pH of 5.5.**

**Contact: Ashley Shull (803) 952-7090 ([ashley.shull@srs.gov](mailto:ashley.shull@srs.gov))**

2. Section 4.0 (Identification of Removal Action Alternatives) and subsequent sections state that the six- to eight-inch layer of coal fragments present in the southern five-acre portion of the area has similar pH measurements to the vadose zone soils, is likely weathered/oxidized, and poses no greater leaching threat than the affected vadose zone soils; however, the bases for these assumptions are not provided. Please provide information that supports these assertions.
  - a. While the referenced pH measurements are provided (Table 1), it is unclear if the liming agent mixing will enhance coal reactivity and reduce the effectiveness of the alternative, require the addition of an increased liming agent mass per soil/coal volume, etc., as no study results of similar evaluations are referenced. It is noted that this information is also relevant to the development of remedial alternatives; Alternative 2 relies upon liming while Alternative 3 incorporates removal of the

**SRS Responses to United States Environmental Protection Agency (US EPA) Comments on the Removal Site Evaluation Report / Engineered Evaluation / Cost Analysis (RSER/EE/CA) for the D-Area Coal Storage Area (484-17D) (U)**

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residual coal fragments (reducing uncertainty in the long-term effectiveness of liming of coal). Should additional liming agent be required to address residual coal fragments, costs associated with Alternative 2 may increase and effectiveness may be impacted. As such, it appears Alternative 3 reduces the uncertainty in the long-term effectiveness and permanence of the removal action and would be more effective as compared to Alternative 2. Revise the RSER/EE/CA to include an expanded justification for the assumptions regarding the reactivity of the residual coal fragments and the effectiveness of the proposed liming activities. In addition, revise the RSER/EE/CA table of comparative analysis rankings in Section 5.5 (Comparison of Removal Action Alternatives) to indicate Alternative 3 ranks higher relative to Alternative 2 regarding effectiveness.

**Response: Agree/Clarification**

**Based on calculations, a small increase (an additional ~140 tons) in the amount of lime is required to neutralize the thin coal layer. Although the thin coal layer may be weathered/oxidized, this calculation was conservative by assuming that the coal layer has not been weathered/oxidized at all. The additional lime in the southern 5-acres would account for any future acid production from the coal. Previous studies done on coal refuse disposal areas (*Reclamation of Coal Refuse Disposal Areas*, Virginia Cooperative Extension, Publication 460-131, <http://pubs.ext.vt.edu/460/460-131/460-131.html>) have shown that near surface coal with an oxygen source can quickly oxidize and that the addition of neutralizing material (including calcium carbonate) will increase the pH and reduce the dissolution and mobilization of acid, metals, and sulfate. The June 2018 sampling results indicate that the soils in the coal yard have become a source of prolonged acidity and elevated metals similar to the coal itself due to the many years of acid leachate. A description of the slight increase in additional lime required in the southern 5-acres as part of Alternative 2 will be added to the RSER/EE/CA. Additionally, the cost estimate for liming agent as part of Alternative 2 will be updated to reflect an additional amount of liming material required.**

**The coal layer can effectively be neutralized like the soils, therefore the effectiveness for Alternative 2 and Alternative 3 are both rated high. However, it is recognized that removal of the layer of coal fragments reduces the uncertainty associated with the additional amendments needed and the mixing application if the coal fragments remain.**

**For clarity, the text in Section 5.1, *Effectiveness* under Alternative 3 after the second sentence will be revised as follows: “... plumes in groundwater. Excavation of the layer of coal fragments would be slightly more effective than adding additional neutralization amendments as proposed in Alternative 2. This would remove any uncertainties associated with the amount of additional amendments necessary to neutralize additional acid generated from the coal fragments, as well as, any issues with thoroughly mixing the amendments with the coal fragments. The groundwater pH is ...”**

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3. Appendix A, Sampling and Analysis Plan for the DCSA, provides additional detail to support the collection of samples to assess the pH conditions approximately 1.5 years following the addition of soil neutralization amendments. However, it is unclear how the duration of 1.5 years was established to assess effectiveness. It is also unclear how the data will be evaluated to confirm performance, and what actions will be taken (e.g., application of additional neutralization amendments) if performance objectives are not achieved. Revise Appendix A and the RSER/EE/CA text to clarify neutralization performance objectives, provide a basis for the 1.5-year affect period and address what actions will be taken if performance objectives are not achieved. In addition, revise the RSER/EE/CA Table of contents and text to reference Appendix A.

**Response: Agree/Clarification**

**The proposed sampling time-frame was chosen to allow infiltration of rainwater to aid in the dispersing and reactivity of the calcium carbonate. This will also allow some time to see any initial effects below the zone of treatment (>4 ft) and will support the DAG OU and/or the DAOU Feasibility Studies. The DAG OU CMS/FS is currently scheduled for submittal July 20, 2021. As mentioned in response to EPA general comment # 1, the neutralization effort is targeted to an average SRS soil background level of approximately 5.5. The intent of this action is to make improvements to the coal yard soils in the near term to minimize future impacts to groundwater and is not necessarily the final remedial action.**

**No additional actions under this RSER/EE/CA are proposed. Contaminant migration analysis associated with the D-Area Coal Storage Area (484-17D) will be performed in the future as part of the RI/BRA process. Any additional neutralization treatments of the vadose zone soils will be evaluated during the remedial alternative evaluation for the D-Area Groundwater Operable Unit and/or the D-Area Coal Storage Area (484-17D), as appropriate. This narrative will be added to the end of Section 6.0, *Preferred Removal Action Alternative*.**

**Appendix A will be added to the RSER/EE/CA Table of Contents and referenced in the text where applicable.**

**Contact: Ashley Shull (803) 952-7090 ([ashley.shull@srs.gov](mailto:ashley.shull@srs.gov))**

**EPA SPECIFIC COMMENTS**

1. **Section 4.0, Identification of Removal Action Alternatives, Pages 8 through 10 of 42:** This section states that the six- to eight-inch layer of coal fragments present in the southern five-acre portion of the area has similar pH measurements to the vadose zone soils, is likely

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weathered/oxidized, and poses no greater leaching threat than the affected vadose zone soils; however, review of Figure 5 (June 2018 Soil Sampling Locations within the DCSA), Figure 6 (June 2018 DCSA Soil Sampling pH Field Measurements) and Table 1 (June 2018 Soil Sample Field pH and Lab pH Measurements) indicates that pH conditions in the southern area were among the lowest (e.g., Location 8). Also, it is noted that the southern area was reworked and includes an overlying sod and top soil layer; it is unclear if this overlying layer of presumably more neutral soil is contributing to an increased pH condition. Revise the RSER/EE/CA to clarify the impact on observed pH of the sod/top soil layer overlying the layer of coal fragments in the southern area, and potential impacts on the development of removal alternatives.

**Response: Clarification**

**The topsoil layer does not appear to be having any impact on the underlying soils and coal layer as pH levels underneath the topsoil are in general not greater than deeper soil intervals. Although the pH results of the topsoil are more neutral as shown on Figure 6 and in Table 1, the topsoil layer is not a significant source of basic (acid neutralizing) material. A small amount of lime was likely used in the southern section at the surface prior to placement of the SOD/grass seed for vegetative purposes but would not be enough to infiltrate and affect the underlying soil. No changes to the RSER/EE/CA are proposed.**

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**SRS Responses to South Carolina Department of Health and Environmental Control  
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(RSER/EE/CA) for the D-Area Coal Storage Area (484-17D) (U)**

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**SRNS-RP-2018-00813, Revision 0, November 2018**

**Comments Received January 24, 2019**

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**SCDHEC General Comments**

1. The last paragraph of Section 2.5 indicates that, if left unmitigated, the continued presence of an acidic plume and the resulting impact on downgradient groundwater is estimated to persist for decades. The final sentence of this section indicates that neutralization of this acidity can eventually lead to reduction or elimination of the metals plume. For Alternative 2, the following statement (or similar) is made in Sections 4.0, 5.1 and 6.0: “The addition of soil neutralization amendments will assist in the return of vadose zone soil to more natural conditions and eventually allow groundwater pH to return to natural background levels over time.” Is there an estimate for a time frame in which this will occur? Additional sampling is proposed 1.5 years following the addition of soil neutralization amendments. Is this the expected time frame for groundwater pH levels to return to background levels, or will this sampling be more of a gauge to determine the immediate effectiveness of the soil neutralization amendments? Please elucidate.

**Response: Agree/Clarification**

**Adjusting the pH of the vadose zone soils will help prevent future impacts to groundwater and does not address the current groundwater that is acidified in the aquifer. Groundwater pH levels are not expected to respond immediately to the vadose zone soil neutralization treatment in the near term. The soil sampling is to determine the effectiveness of the soil neutralization amendments and to allow infiltration of rainwater to aid in the dispersing and reactivity of the calcium carbonate within the vadose zone. As described in the RSER/EE/CA, the entire vadose zone will not be targeted, only the upper 4 feet. The soils below will remain acidified. This removal action will support the DAG OU CMS/FS and the final remedial action for DAOU, as necessary. The DAG OU CMS/FS is currently scheduled for submittal July 20, 2021. No changes to the RSER/EE/CA are proposed.**

**The Treatability Study (SRNS-TR-2018-00128) is being initiated to address the acidified groundwater by flushing the aquifer with an injection of near neutral pH groundwater upgradient of the 484-17D Coal Storage Area and 489-D Coal Pile Runoff Basin.**

**Contact: Ashley Shull (803) 952-7090 ([ashley.shull@srs.gov](mailto:ashley.shull@srs.gov))**

2. The RSER/EE/CA should be revised to be more clear about the expectations of the Preferred Removal Action Alternative (i.e., time frame for achieving RAO), and should also discuss in more detail the purpose and goals for the Sampling Plan for the D-Area Coal Storage Area (DCSA).

**Response: Agree/Clarification**

**The neutralization effort is aimed to increase the pH of the vadose zone soils to average SRS background levels of approximately 5.5. The neutralization amendments should affect the pH of the treated vadose zone soils relatively quickly (less than 1.5 years). The**

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**1.5-year timeframe after the addition of soil neutralization amendments to resample the vadose zone soils will allow infiltration of rainwater to aid in the dispersing and reactivity of the calcium carbonate within the vadose zone. The sampling is intended to check the pH levels of the vadose zone soils and any additional effect below the amended zone. The sampling results will support the DAG OU Corrective Measures Study/Feasibility Study (CMS/FS) and the final remedial action for DAOU, as necessary. The DAG OU CM/FS is currently scheduled for July 20, 2021. This information will be included in the RSER/EE/CA and Appendix A.**

**Contact: Ashley Shull (803) 952-7090 ([ashley.shull@srs.gov](mailto:ashley.shull@srs.gov))**

3. The document mentions that normal pH levels in native soils are generally above 5.0. It is unclear if the removal action objective is to raise the pH in the DCSA to 5.0. Please consider expanding Section 3.2 Removal Action Objective on page 8 of 42 to include more specific objectives for the removal action.

**Response: Agree**

**The neutralization effort is aimed to increase the pH of the vadose zone soils to average SRS background levels of approximately 5.5. This information will be included in the RSER/EE/CA.**

**Contact: Ashley Shull (803) 952-7090 ([ashley.shull@srs.gov](mailto:ashley.shull@srs.gov))**

### **SCDHEC Specific Comments**

1. Section 2.2, Previous Action, page 4. Figure 4 is referenced in the first sentence of this section which discusses the construction of a drainage ditch connecting the southern section of the DCSA to the southern 75% section of the 489-D Coal Pile Runoff Basin, as well as, grooming the area with topsoil and a grass cover. Figure 4 shows field pH measurements of groundwater and the beryllium plume at D-Area. It appears that Figure 5 may have been the intended referenced figure instead.

**Response: Agree**

**The figure reference will be corrected to Figure 5.**

**Contact: Ashley Shull (803) 952-7090 ([ashley.shull@srs.gov](mailto:ashley.shull@srs.gov))**

2. Section 4.0, Identification of Removal Action Objectives, Alternative 2, last paragraph, page 9. The document states: "The 15-20 cm layer of coal fragments in the southern 2-ha section has similar pH measurements to the vadose zone soils, is likely weathered/oxidized, and poses no greater leaching threat..." Please expand on how this is known to pose no greater threat, and how the characterization of the layer of coal fragments is known to have limited leaching potential. It is the State's opinion that if Alternative 2 is the accepted remedy and

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the coal layer is not removed, then additional follow-up soil pH sampling events be conducted to confirm the effectiveness of the removal action.

**Response: Agree/Clarification**

Based on calculations, a small increase (an additional ~140 tons) in the amount of lime is required to neutralize the thin coal layer. Although the thin coal layer may be weathered/oxidized, this calculation was conservative by assuming that the coal layer has not been weathered/oxidized at all. The additional lime in the southern 5-acres would account for any future acid production from the coal. Previous studies done on coal refuse disposal areas (*Reclamation of Coal Refuse Disposal Areas*, Virginia Cooperative Extension, Publication 460-131, <http://pubs.ext.vt.edu/460/460-131/460-131.html>) have shown that near surface coal with an oxygen source can quickly oxidize and that the addition of neutralizing material (including calcium carbonate) will increase the pH and reduce the dissolution and mobilization of acid, metals, and sulfate. The June 2018 sampling results indicate that the soils in the coal yard have become a source of prolonged acidity and elevated metals similar to the coal itself due to the many years of acid leachate. A description of the slight increase in additional lime required in the southern 5-acres as part of Alternative 2 will be added to the RSER/EE/CA. Additionally, the cost estimate for liming agent as part of Alternative 2 will be updated to reflect an additional amount of liming material required.

As proposed in Appendix A, follow-up soil pH sampling is proposed at 1.5 years after the addition of soil neutralization amendments.

**Contact: Ashley Shull (803) 952-7090 ([ashley.shull@srs.gov](mailto:ashley.shull@srs.gov))**

3. Section 5.4 Cost, Alternative 2, first paragraph, page 15, and Appendix A, Sampling Plan for the DCSA, page App A-1. The document states that a one-time sampling event will occur approximately 1.5 years after the soil amendment additions to confirm that the addition of soil neutralization amendments were effective. Please give some explanation as to why only one confirmation sampling event is sufficient and considered a long-term solution.

**Response: Agree/Clarification**

The neutralization amendments should affect the pH of the vadose zone soils relatively quickly (less than 1.5 years). The 1.5-year timeframe after the addition of soil neutralization amendments to resample the vadose zone soils will allow infiltration of rainwater to aid in the dispersing and reactivity of the calcium carbonate within the vadose zone. Once the soils have been neutralized, they should not become reacidified as the source (coal storage) is no longer present and any additional acid generation due to any remaining pyrite in the residual coal fragments will be neutralized with the additional lime that is added to the southern 5-acre section. The sampling results will support the DAG OU and/or DAOU Feasibility Study. The DAG OU CM/FS is currently scheduled for July 20, 2021. This information will be included in the RSER/EE/CA.

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4. Section 5.4, Cost, Alternative 3, first sentence, page 16. Please change the Alternative “2” to a “3”.

**Response: Agree**

**The text will be corrected to state Alternative “3”.**

**Contact: Ashley Shull (803) 952-7090 ([ashley.shull@srs.gov](mailto:ashley.shull@srs.gov))**

5. Section 5.5, Comparison of Removal Action Alternatives, page 17 and Section 6.0, Preferred Removal Action Alternative, page 18. The comparative analysis table for the three alternatives lists “High” in Acceptance for Alternative 2 and “Medium” for Alternative 3, yet the reason for these rankings is not provided along with those for Effectiveness, Implementability, and Cost in Section 6.0. Please provide discussion and justification for the Acceptance rankings.

**Response: Agree/Clarification**

**The Acceptance column is a combination of the Effectiveness, Implementability, and Cost criteria. In this case, Alternative 2 has a higher acceptance over Alternative 3 because the vadose zone soils and the thin layer of coal fragments can effectively be neutralized at a lower cost than Alternative 3. No Action has a low acceptance because it does not improve vadose zone conditions. Section 6.0 will include additional detail on the comparison analysis and rankings.**

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6. Appendix A, Sampling Plan for the DCSA, page A-1. The last sentence of this section states: “SRS will submit a Program Plan prior to collecting saturated soil samples from the DCSA.” Is this a Sampling and Analysis Plan? Please clarify.

**Response: Clarification**

**A Sampling and Analysis Plan will not be submitted. SRS will submit a “Hydrogeologic and Geotechnical Projects Program Plan” to support this Sampling Plan (Appendix A) because some of the soil samples will likely be collected within the water table. The groundwater injection as part of the Treatability Study will raise the water table within the Coal Yard above levels that were seen during the June 2018 sampling event.**

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# DRAFT

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  
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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: Action Memorandum and Responsiveness Summary for the Non-Time Critical Removal Action for the D-Area Coal Storage Area (484-17D), SEMS Number: 63

Pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan [40 CFR Section 300.415(b)(2)(iv)] that states removal actions shall be considered when “*High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that might migrate.*”, the U.S. Department of Energy (DOE) prepared a Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for the D-Area Coal Storage Area (484-17D) (SRNS-RP-2018-00813, Revision 1, May 2019) SEMS Number: 63. The regulatory review of the Revision 0 RSER/EE/CA occurred from November 29, 2019 to March 4, 2019. The Savannah River Site (SRS) received comments from the South Carolina Department of Health and Environmental Control (SCDHEC) on January 25, 2019 and the U.S. Environmental Protection Agency (EPA) on March 4, 2019. The SRS’ responses to the EPA’s and SCDHEC’s comments were incorporated into the Revision 1 RSER/EE/CA, which was made available for public review and comment from June 13, 2019 to July 13, 2019. Comments received during the public comment period are addressed in the enclosed Responsiveness Summary, which will be made part of the Administrative Record. In addition, a notice will be filed in the Environmental Bulletin within two (2) weeks of submittal of the Action Memorandum and Responsiveness Summary to the Administrative Record File/Information Repository File

The D-Area Coal Storage Area (484-17D) is located within the D-Area Operable Unit (DAOU) at the SRS. DAOU is located within the southwest quadrant of SRS approximately 3,000-feet east of the nearest site boundary, the Savannah River. The DAOU contains surface units and source areas in D Area that potentially pose a threat to human health and the environment. The D-Area Coal Storage Area is approximately fifteen acres in size and supported the D-Area Powerhouse (484-D) as a temporary storage area for coal prior to use at 484-D. The D-Area Powerhouse was built in 1953 and shut down in 2012 after 59 years of operation. The facility burned approximately 160,000 tons of coal per year during this period.

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The justification to perform a removal action is to reduce the acidity in the upper portion of the vadose zone and subsequently reduce the amount of acidic leachate to groundwater. The removal action objective to protect human health and the environment is to increase the pH in the D-Area Coal Storage Area vadose zone soils to more natural conditions resulting in the minimization of future impacts to groundwater.

The preferred removal action for the D-Area Coal Storage Area is Alternative 2, Addition of Soil Neutralization Amendments, which meets the effectiveness, implementation, cost, and acceptance criteria. Alternative 2 will mix in soil neutralization amendments such as lime or calcium carbonate material to a targeted depth of 4 feet below ground surface across the entire 15 acres D-Area Coal Storage Area, including the 6 to 8 inches layer of coal fragments. The addition of soil neutralization amendments to raise the pH of the vadose zone soils will reduce the acidic leachate that contributes to low pH and metals plumes in groundwater. This alternative will employ treatment by the addition of soil amendments and meets the criteria to reduce toxicity by raising the pH of the leachate prior to discharge to groundwater. Through treatment of the vadose zone soils and reduction in acidic leachate, groundwater pH is expected to return to more natural background levels over time. Reducing the leaching of metals and returning the groundwater to an approximate pH of 5.5 (background condition) over time is more protective of human health and the environment as compared to no action.

Removal activities are scheduled to commence April 30, 2020. Upon conclusion of the removal action, a Removal Action Report that summarizes the work will be prepared and submitted to document the completion of the removal action.

Questions from you or your staff may be directed to me at (803) 952-8365.

Sincerely,

Brian T. Hennessey  
SRS Remedial Project Manager  
Area Completion Project

IACD-19-xxx  
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Enclosure:

Responsiveness Summary for the Non-Time Critical Removal Action for the for the D-Area Coal Storage Area  
(484-17D) SEMS Number: 63 (ERD-EN-2016-xxx, Revision 0, Month Year)

cc w/o encl:

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cc w/encl:

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