complexity, and potential hazards, an alternate closure schedule was developed that supported removal actions for the closure of these D-Area permitted facilities.

Because of the size and duration, the removal action activities were managed under two distinct Phases. Phase 1 included removal actions at the 488-2D Ash Basin and the 488-4D Ash Landfill completed in November 2016. Phase 2 included the removal actions at the 488-1D Ash Basin and the 489-D CPRB (Figure 3). This report documents the field implementation of the removal actions for Phase 2 (488-1D Ash Basin and the 489-D CPRB). A separate RAR (SRNS 2017a) was previously prepared for the Phase 1 (488-2D Ash Basin and the 488-4D Ash Landfill) removal activities and has been approved by USEPA and SCDHEC. Phase 2 removal action activities included the consolidation of coal fines and contaminated soil into the covered portion (eastern end) of the 488-1D Ash Basin that originated from the 489-D CPRB, the west end of the 488-1D Ash Basin, the 488-1D inlet basins, the roads surrounding the 488-1D Ash Basin, and the area located along the east side of the 488-4D Ash Landfill.

1.3 Removal Action Objectives

1.3.1 Removal Action Objectives 488-1D Ash Basin (~~i~~Including ~~i~~Inlet ~~b~~Basins)

Per the ~~*RSER/EE/CA for the D-Area Ash Basin (488-1D*~~ *Action Memorandum and Responsiveness Summary for the Non-Time Critical Removal Action for the D-Area Ash Basin 488-1D*~~)~~ (SRNS 2016~~b~~a), the ~~remedial~~removal action objectives (RAOs) for the D-Area Ash Basin (488-1D) subunit are follows:

- Achieve ecological risk-based thresholds and residential risk-based thresholds for unrestricted land use if possible. At a minimum, protect future industrial workers and ecological receptors from exposure to contaminants in surface sediments/soils.
- Prevent migration of potential contaminants to groundwater that could exceed groundwater protection standards.

1.3.2 Removal Action Objectives 489-D CPRB

Per the *Revision 3 Action Memorandum for the Non Time Critical Removal Action for the D-Area Coal Pile Runoff Basin 489-D* (USDOE 2015a) the RAOs are as follows:

- Protect future residents from exposure to arsenic at an exposure risk exceeding 1E-06 in surface sediment.
- Protect benthic organisms from exposure to arsenic and 2-methylnaphthalene at a Hazard Quotient (HQ) exceeding 1 and low pH in surface sediment.
- Protect aquatic organisms from exposure to aluminum, beryllium, cobalt, copper, iron, manganese, and zinc at a HQ exceeding 1 in surface water. In addition, protect aquatic organisms, mammals, and birds from exposure to low pH in surface water.
- Protect aquatic organisms from ARARs refined constituents of concern in surface water (e.g., aluminum, copper, iron, and zinc).

1.4 Selected Removal Actions

1.4.1 Selected Removal Action 488-1D Ash Basin

Per the ~~*RSER/EE/CA for the D-Area Ash Basin (488-1D)* (SRNS 2016b)~~ *Action Memorandum and Responsiveness Summary for the Non-Time Critical Removal Action for the D-Area Ash Basin 488-1D* (SRNS 2016a), the selected removal action for the 488-1D Ash Basin subunit is as follows:

"The selected action was Ash Consolidation and Geosynthetic Cover System." Based on information currently available, the lead agency believes that "Ash Consolidation and Geosynthetic Cover System" meets the effectiveness criteria and provides the best balance of tradeoffs among the other alternatives with respect to the evaluation criteria. The preferred action will satisfy the statutory requirements in CERCLA Section 121(b) to: 1) be protective of human health and the environment, 2) comply with ARARs, and 3) be cost-effective.

Placement of a cover system consistent with SCDHEC Class Three Landfill permeability requirements provides overall protection to human health and the environment by providing immediate protection to human and ecological receptors by preventing direct contact. The geosynthetic cover system also provides assurance regarding the protection of groundwater by reducing infiltration from contact of the contaminated ash media with stormwater. The contaminated ash and other material approved for disposal in the 488-1D Ash Basin will remain in place and land use controls (LUCs) will be required.

2.3 Removal Action Activities

The following provides a summary outline of construction activities performed during the removal actions.

Activities Common to all Segments of the Project

- Mobilization
- Surveying
- Stormwater Pollution Prevention and Erosion Control
- Initial Land Disturbance
- Clearing and Grubbing
- Demolition
- Dewatering
- Well Installation
- Sampling
- Common Fill
- Compaction Requirements
- Top Soil
- Site Restoration (Final Vegetative Cover and Crushed Stone Surfacing)
- Rip Rap Aprons
- Demobilization
- Well Abandonment

Major Construction Segments

Area East of the 488-4D Ash Landfill -Excavation (Ash and Contaminated Soil)

- Clearing and Grubbing
- Excavation of Ash and Hauling of Material to the East End of 488-1D
- Confirmation Sampling
- Backfilling
- Site Restoration

489-D CPRB Excavation (Coal Fines and Contaminated Soil)

- Clearing and Grubbing
- Dewatering
- Excavation of Ash/Contaminated Soil and Hauling of Material to the East End of 488-1D
- Confirmation Sampling
- Backfilling
- Stormwater Modifications (including the isolation and rerouting of the storm sewer that ran under the closed Northern section of the CPRB)
- Site Restoration

Table 3. Summary Table of Demolished Items

Location	Material	Function	Disposal Route
488-1D northwest (NW) Corner	Two 24-in. cast iron pipes	Overflow Culverts	Crushed/broken and buried east end 488-1D
488-1D NW Corner	2Two18-in. cast iron pipes	Overflow Culverts	Crushed/broken and buried east end 488-1D
488-1D NW Corner	Concrete	Spillway	Crushed/broken and buried east end 488-1D
488-1D South Berm	Rip Rap	Wave Protection	Buried east end 488-1D
488-1D northeast (NE) Corner	12-in. corrugated metal pipe	Overflow Culverts	Crushed/broken and buried east end 488-1D
488-1D East Berm	Six 18-in. cast iron pipes	Overflow Culverts	Crushed/broken and buried east end 488-1D /Three Rivers Landfill
488-1D Inlet Basin	Concrete	Apron	Crushed/broken and buried east end 488-1D
488-1D South and West Berm	8-in. Poly vinyl chloride (PVC) pipe and manhole	Toe Drain	Three Rivers Landfill
488-1D Southwest Corner	36-in. corrugated metal pipe (CMP)	Culvert under roadway	Three Rivers Landfill
489-D CPRB North Side	96-in. manhole and misc. pipe	Stormwater collection	Crushed/broken and buried east end 488-1D
489-D CPRB South West Corner	8-in. PVC pipe, concrete supports, encasement, anti-seep collar, an 18-in. corrugated metal pipe concrete	Spillway	Crushed/broken and buried east end 488-1D

2.4.7 Sampling

Toxicity Characteristic Leaching Procedure (TCLP) sampling was performed on the material prior to hauling and placement on the east end of the 488-1D Ash Basin. The material placed into the east end of the 488-1D Ash Basin from the 489-D CPRB was not a hazardous waste under the RCRA program.

Following removal of ash material from the area east of the 488-4D Ash Landfill, the western end of the 488-1D Ash Basin (including inlet basins), and the 489-D CPRB, SRNS performed confirmatory sampling. Confirmation sampling requirements and sample results are discussed in Section 4.3.

2.5.3 Area East of the 488-4D Ash Landfill – Confirmation Sampling

Following removal of ash and soil from the area east of the 488-4D Ash Landfill, SRNS performed visual inspections of the area to confirm that all ash had been removed. Visual verification was followed by confirmatory sampling. Confirmation sampling requirements and sample results are discussed in Section 4.3.~~1~~2.

2.5.4 Area East of the 488-4D Ash Landfill – Backfilling

Upon receipt of acceptable confirmation sample results described in Section 2.5.3 of the excavated area, the area was regraded and backfilled with common fill and topsoil from the D-Area Borrow Site to achieve the final grade shown in the construction drawings (Photo 27). A dozer equipped with GPS was used to cut and place materials. A vibratory, smooth drum compactor was used to compact the fill to design requirements (SRNS 2016a) as outlined in Section 2.4.9. Final site restoration included the placement of topsoil, sod, and crushed stone surfacing as described in Sections 2.4.10, 2.4.11 and 2.4.12 respectively (Photos 28 and 29).

2.6 489-D CPRB Excavation (Coal Fines and Contaminated Soil)

This section provides an overview of the construction activities during the removal action for the 489-D CPRB. Only minimal clearing and grubbing were required. All trees were located outside of the area with any potential coal fines deposits. However, they were visually checked as a precaution. The trees and root balls were transported to the D-Area Borrow Site for processing as discussed in Section 2.4.5.

2.6.1 489-D – CPRB Dewatering

Prior to any excavation activities at the 489-D CPRB, ~4 million (M) gallons (gal) of storm water were neutralized from April 22, 2016 through December 20, 2016 through a temporary Waste Water Treatment Plant (WWTP) (Photo 30) to ensure compliance to National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activities (Except Construction), SCR000000, Section 1.1.2 (Runoff from coal storage piles at steam electric generating facilities). Total suspended solids sampling was conducted at the beginning of operations with a result of 5 mg/L (50 mg/L limit). As part of operation routine

monitoring of pH was performed each day of operation as well as visual clarity of discharge. All discharge was maintained within the 6.0 to 9.0 pH range.

Once the coal residues and ~30.48 cm (12 in.) of under burden soils had been removed from the site, all subsequent stormwater management compliance shifted to the compliance requirements defined within the Comprehensive Stormwater Pollution Prevention Plan for the 488-1D Ash Settling Basin and 489-D Coal Pile Runoff Basin Closure (SRNS 2015a). All water was then pumped through a SWPPP BMP and discharged to the D-Area Discharge Canal.

2.6.2 489-D CPRB Excavation and Haul of Coal Fines to the east end of the 488-1D Ash Basin

Existing coal fines from within the footprint of the 489-D CPRB were removed using a D-6 size bulldozer, equipped with GPS, to push coal fines and contaminated soils into rows/piles. Prior to hauling the materials to the east end of the 488-1D Ash Basin, TCLP sampling was performed. Additional discussion and sample results is provided in Section 4.3.1. Upon receipt of acceptable sample results (i.e. nonhazardous), the material was loaded using tracked excavators and hauled in articulated trucks to the east end of the 488-1D Ash Basin. Excavation included a minimum of 30.5 cm (12 in.) of soil (Photo 31 and 32). Summary of the volume of materials placed in the 488-1D Ash Basin is located in Section 2.8.1, Table 7.

2.6.3 489-D Confirmation Sampling

Following removal of coal fines and soil from the 489-D CPRB, SRNS performed visual inspections of area to confirm that all ash had been removed. Visual verification was followed by confirmatory sampling. Confirmation sampling requirements and sample results are discussed in Section 4.3.1.

2.6.4 489-D - CPRB Backfilling

Following the removal of coal fines and soil from the 489-D CPRB and receipt of acceptable confirmation sample results discussed in Section 2.6.3, the surface of the basin bottom was regraded and backfilled with common fill from the D-Area Borrow Area. Backfill was hauled by articulated haul trucks. A dozer equipped with GPS placed material to achieve the final grade

Final site restoration included the placement of topsoil, sodding, and seeding as described in Sections 2.4.10 and 2.4.11. Photo 43 provides an aerial view of the of the CBRP following completion of all construction activities associated with this segment of the project.

2.7 488-1D Ash Basin (Including Inlet Basins)

2.7.1 488-1D Ash Basin Clearing and Grubbing

Clearing and grubbing, removal of trees, scrub brush, and root balls, of 488-1D Ash Basin was performed prior to ash excavation as discussed in Section 2.4.5. Photos 44 and 45 provide an aerial view of the clearing and grubbing process. A one-acre processing area was established at the northeast corner of the east end of the 488-1D Ash Basin and was used as a staging area to grind all vegetation material that was removed from 488-1D. The processing area was cleared and grubbed prior to being covered by a layer of clean backfill from D-Area Borrow Site. The process area was prepped and the backfill was spread using a small bulldozer. The backfill created a clean working area to prevent wood chips from being contaminated with ash during the grinding and loading operation and mitigated any potential issues with ash contaminated material being inadvertently placed within D-Area Borrow Site. Root balls were hauled to the Three Rivers Landfill and the remaining vegetation chipped for beneficial reuse. Waste totals are included in Section 2.10, Table 6.

Tracked excavators were used to remove trees and vegetation debris. A third excavator was used to assist in moving materials and to load out root balls for transport and disposal. As trees were dropped, the root balls were cut off by laborers and stacked for load out and transport to Three Rivers Landfill. Trees and vegetation debris taken from above grade were moved to the processing area and reduced by grinding. Wood chips were direct loaded into tandem dump trucks or stockpiled as needed. Stockpiled wood chips were loaded into trucks using a large frontend loader. Wood chips were transported to D-Area Borrow Site for future use.

2.7.2 488-1D Ash Basin (Including Inlet Basins) Dewatering

Permitted (NPDES Permit #SC0047431) industrial wastewater (i.e., ash contaminated) from the 488-1D Ash Basin was removed and managed in accordance with the current NPDES permit

All stormwater was removed/managed in accordance with the *Comprehensive Stormwater Pollution Prevention Plan (SWPPP) for the 488-1D Ash Settling Basin and 489-D Coal Pile Runoff Basin Closure* (SRNS 2015a).

2.7.3 488-1D Ash Basin (Including Inlet Basins) Excavation and Haul of Ash to the East End

The ash in the entire 488-1D Ash Basin was saturated prior to the start of any excavation activities. To facilitate drying, the contractor excavated and graded drainage ditches and sumps through the ash across much of the basin to allow for collection of water (Photo 46 and 47). Once collected, the water was pumped to the inlet basins. Sumps and ditches were continually changed, modified, and redirected as field conditions dictated. Removal of interstitial and rain water was critical throughout the removal process.

Ash in the west end of the 488-1D Ash Basin (including the inlet basins), was excavated and placed on the east end of the 488-1D Ash Basin. Access lanes were created, as needed, in the 488-1D Ash Basin to allow haul trucks to be direct loaded by tracked excavators. Excavators, both standard reach and long reach, were used extensively to process the saturated ash in the west end of the 488-1D Ash Basin before it could be loaded into haul trucks. This process consisted of mostly stacking and restacking of the material until sufficient water had been drained (Photo 48). When required, mats were used to provide safe access for equipment and articulated haul trucks.

All ash/contaminated soil was removed from the south inlet basin and a portion on the ash/contaminated soil was removed from the north inlet basin and placed in the 488-1D Ash Basin. Because the north inlet basin continued to function as a containment for any ash contacted rain water, the removal of the remaining ash/contaminated soils contained in the bottom of the north inlet basin material was not completed until August 2019. This material was hauled to the Three Rivers Landfill and is documented in Table 11.

Once the ash had dried sufficiently, it was loaded and hauled (Photo 49) to the east end of the 488-1D Ash Basin. Trucks were loaded to minimize spilling of material during transport between the areas.

GPS models were used for the excavation of the 488-1D Ash Basin bottom. The final excavation in the basin bottom was initiated after most of the bulk ash had been removed and the bottom of the basin exposed. Approximately 6.1 cm (2 ft) of ash was intentionally left in place to prevent constant tracking of ash (Photo 50). The final excavation included the ~6.1-cm (2-ft) layer of ash and the 30.48 cm (1 ft) of contaminated soil (Photo 51). The original basin bottom in the west end of the from 488-1D Ash Basin generally slopes downward from north to south. Removal of this material progressed in the same general sequence of north to south to allow for control of stormwater runoff from the visually clean surface to areas of the bottom still contaminated. Processing and removal of bulk ash from the west end of the 488-1D Ash Basin took approximately nine months. The volume of ash including removal of a minimum of 30.5 cm (1 ft) of additional soil from the foot print of the area, was ~183,356 m^3 (239,821 yd^3). Summary volumes for the project are included in Section 2.8.1.

2.7.4 488-1D Ash Basin Confirmation Sampling

Following removal of ash and soil from the west end of 488-1D Ash Basin, SRNS performed visual inspections of the area to confirm that all ash had been removed. Visual verification was followed by confirmatory sampling (Photo 51 and 52). Confirmation sampling requirements and sample results are discussed in Section 4.3.2.

2.7.5 488-1D Ash Basin (Including Inlet Basins Placement of Ash on the East End

Ash and contaminated soil from the area east end of the 488-4D Ash Landfill (including inlet basins), the west end of the 488-1D Ash Basin, and coal fines and contaminated soil from 489-D CPRB were hauled in articulated off-road trucks to the east end of the 488-1D Ash Basin (Photo 53). Ash was dumped onto the existing ash surface and spread into 15.2-cm (6-in.) to 30.4-cm (12-in.) thick loose lifts by a D-6 size dozer equipped with GPS. Ash that was too wet to compact was spread and allowed to dry. A disc or plow was used to turn the wet material to assist in drying (Photo 54). Any time rain was forecast, the ash surface was sealed by compacting with a vibratory smooth drum compactor to minimize impacts of precipitation.

During periods of heavy rainfall, work related to ash placement, conditioning, grading, and/or compaction was essentially stopped until conditions became manageable. Rain and weather events

soil under an unrestricted (residential) land use scenario. The supporting text and documentation are in Appendix R.

4.3 Sampling (488-1D Ash Basin, 489-D CPRB, and Area East of 488-4D Ash Landfill)

Confirmation sample results were evaluated to demonstrate that the coal and/or ash had been successfully removed from the 489-D CPRB, 488-1D Ash Basin and Inlet Basins and the area east of the 488-4D Ash Landfill. The confirmation sampling was conducted in accordance with the *Confirmation Sampling and Analysis Plan for Coal and/or Ash Removal at the Savannah River Site* (SRNS 2014b) and the site-specific Field Sampling Plans (FSPs) as appropriate. A summary of the confirmation sampling for each of the subunits is provided below.

4.3.1 489-D CPRB

Confirmation sampling was conducted in accordance with the *Field Sampling Plan for the 489-D Coal Pile Runoff Basin* (SRNS 2015c). In addition to the 11 sample locations identified in the FSP, an additional 12 samples were collected at locations where soil/coal fines were staged (within the 489-D CPRB) for TCLP prior to placement in the 488-1D Ash Basin. Therefore, a total of 23 confirmation sample results were evaluated to demonstrate that the coal residue had been successfully removed from the 489-D CPRB. The *Human Health and Ecological Evaluation for the Confirmation Sampling at the 489-D Coal Pile Runoff Basin* (SRNS 2017d) concluded that the residual concentrations of all analytes met the pre-established cleanup levels for unrestricted land use. The *Data Usability Report* (DUR) *for Confirmation Sampling at the 489-D Coal Pile Runoff Basin* is presented in Appendix S.1.

Material from each of the staged piles was composited into three separate samples and submitted to the laboratory for TCLP analysis. The results are presented in Table 13. Only barium was detected. The maximum detected concentration of 0.159 milligrams per liter (mg/L) is below the regulatory threshold of 100,000 mg/L for toxicity characteristic hazardous waste. These sample results confirm the process knowledge that material from the 489-D CPRB is not a RCRA hazardous waste.

Table 13. D-Area Coal Pile Runoff Basin 489-D TCLP Sample Results

D-Area Coal Pile Runoff Basin 489-D TCLP SAMPLE RESULTS											
Station Name	**Sample Use**	**Collection Date**	**Analyte Name**	**Analytical Method**	**MDL**	**PQL**	**Lab Qual**	**Result**	**Result Units**	**Regulatory Level (µg/L)**	**Exceeds Regulatory Level?**
489D-01	TCLP	9/22/2016	Arsenic	EPA6010C	50	300	U	300	µg/L	5,000	No
489D-02	TCLP	9/29/2016	Arsenic	EPA6010C	50	300	U	300	µg/L	5,000	No
489D-03	TCLP	10/18/2016	Arsenic	EPA6010C	50	300	U	300	µg/L	5,000	No
489D-01	TCLP	9/22/2016	Barium	EPA6010C	10	50		159	µg/L	100,000	No
489D-03	TCLP	10/18/2016	Barium	EPA6010C	10	50		153	µg/L	100,000	No
489D-02	TCLP	9/29/2016	Barium	EPA6010C	10	50		78.3	µg/L	100,000	No
489D-01	TCLP	9/22/2016	Cadmium	EPA6010C	10	50	U	50	µg/L	1,000	No
489D-02	TCLP	9/29/2016	Cadmium	EPA6010C	10	50	U	50	µg/L	1,000	No
489D-03	TCLP	10/18/2016	Cadmium	EPA6010C	10	50	U	50	µg/L	1,000	No
489D-02	TCLP	9/29/2016	Chromium	EPA6010C	10	50	U	50	µg/L	5,000	No
489D-03	TCLP	10/18/2016	Chromium	EPA6010C	10	50	U	50	µg/L	5,000	No
489D-01	TCLP	9/22/2016	Chromium	EPA6010C	10	50	U	11.6	µg/L	5,000	No
489D-01	TCLP	9/22/2016	Lead	EPA6010C	33	100	U	100	µg/L	5,000	No
489D-02	TCLP	9/29/2016	Lead	EPA6010C	33	100	U	100	µg/L	5,000	No
489D-03	TCLP	10/18/2016	Lead	EPA6010C	33	100	U	100	µg/L	5,000	No
489D-01	TCLP	9/22/2016	Mercury	EPA7470A	0.67	2	U	2	µg/L	200	No
489D-02	TCLP	9/29/2016	Mercury	EPA7470A	0.67	2	U	2	µg/L	200	No
489D-03	TCLP	10/18/2016	Mercury	EPA7470A	0.67	2	U	2	µg/L	200	No
489D-01	TCLP	9/22/2016	Selenium	EPA6010C	60	300	U	300	µg/L	1,000	No
489D-02	TCLP	9/29/2016	Selenium	EPA6010C	60	300	U	300	µg/L	1,000	No
489D-03	TCLP	10/18/2016	Selenium	EPA6010C	60	300	U	300	µg/L	1,000	No
489D-01	TCLP	9/22/2016	Silver	EPA6010C	10	50	U	50	µg/L	5,000	No
489D-02	TCLP	9/29/2016	Silver	EPA6010C	10	50	U	50	µg/L	5,000	No
489D-03	TCLP	10/18/2016	Silver	EPA6010C	10	50	U	50	µg/L	5,000	No

4.3.2 488-1D Ash Basin (~~i~~Including ~~i~~Inlet ~~b~~Basins) and Area East of the 488-4D Ash Landfill

Confirmation sampling was conducted in accordance with the *Field Sampling Plan for the 488-1D Ash Basin* (SRNS 2015d). In addition to the 19 samples that were collected from the western end of the 488-1D Ash Basin (16 basin interior, 3 basin berms), two additional samples were collected from the area east of the 488-4D Ash Landfill. Therefore, a total of 21 samples were evaluated to demonstrate that the ash has been successfully removed from the areas of excavation. The *Human Health and Ecological Evaluation for Confirmation Sampling at the 488-1D Ash Basin and Inlet Basins* (SRNS 2019) concluded that the residual concentrations of all analytes, except hexavalent chromium, met the pre-established cleanup levels for unrestricted land use. The concentration of hexavalent chromium did not exceed the threshold level for an industrial use scenario. The report recommended that land use controls to prevent unrestricted use (i.e., residential) be implemented at the 488-1D Ash Basin and Area East of the 488-4D Ash Landfill.

The *Data Usability Report for Confirmation Sampling at the 488-1D Ash Basin* is presented in Appendix S.2.

Two samples were collected from the area east of the 488-4D Ash Landfill prior to placement into the 488-1D Ash Basin. Results of the TCLP analysis are reported in Appendix C of the *Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for the D-Ash Basin (488-1D)* (SRNS 2016b). Detected constituents include arsenic, barium, boron, cadmium, chromium, selenium, and thallium. No constituents exceeded the regulatory thresholds for toxicity characteristic hazardous waste. These sample results confirm the process knowledge that ash media found in D-Area is not a RCRA hazardous waste.

Inlet Basins: Confirmation sampling was conducted in accordance with the *Field Sampling Plan for the D-Area 488-1D Inlet Basins* (SRNS 2014c). The FSP identifies eight samples total, four from each of the two basins. The *Human Health and Ecological Evaluation for Confirmation Sampling at the 488-1D Ash Basin and Inlet Basins* (SRNS 2019) concluded that the residual concentrations of all analytes met the pre-established cleanup levels for unrestricted land use. The *Data Usability Report for Confirmation Sampling at the Inlet Basins* is presented in Appendix S.3.

Operating Procedures for "Waste Site Unit Inspection and Maintenance" (SRNS 2018c) until the DAOU Early Action Land Use Control Implementation Plan is approved and implemented. These annual inspections will include the 488-2D Ash Basin as part of the storm water management system associated with the 488-4D Ash Landfill and 488-1D Ash Basin. The inspections will include verification of road accessibility; there are no excavations, digging or construction activities; integrity of drainage systems; no woody vegetation growth; density of the vegetation; no signs of unacceptable erosion or depressions (subsidence); and no sign of burrowing animals on the cover.

8.0 PROJECT COSTS

The cost in the RSER/EE/CA for the 488-1D Ash Basin included only the cost for the 488-1D Ash basin. As identified in the RSER/EE/CA for the 488-1D Ash Basin the estimated cost, direct and indirect, for the 488-1D Ash Basin was $27,735,175 (SRNS 2016b).

As stated in *Revision 3 Action Memorandum for the Non-Time Critical Removal Action for the D-Area Coal Pile Runoff Basin 489-D* (USDOE 2015a) "The purpose of the action memorandum is to document the change from in-situ closure of the remaining 75% southern section outlined in the first revision to the action memorandum to excavation and disposal with unrestricted land use." An evaluation of an excavation and disposal removal alternative was included in the 2009 RSER/EE/CA (SRNS 2009). Based on the Alternate 3 cost for excavation and disposal provided in the 2009 RSER/EE/CA, assuming a 25% reduction in total cost and a yearly escalation of 3.0 percent (as prescribed by SRNS site estimating) for seven years the estimated total cost for the 75% southern section of the 489-D CPRB are $9,413,101.

The final total actual cost associated with the removal action of Phase 2, 488-1D Ash Basin was $33,515,706 and 489-D CPRB was $3,229,113, for a total ~~of the~~ project cost of ~~were~~ ~~$36,767,276~~36,744,819 as provided in Table 14. Approximately 1% under the estimated cost.

Table 14. Project Cost Comparison

Project Cost Comparison 488-1D Ash Basin & 489-D CPRB						
Cost	**488-1D Estimated Cost 2016 RSER/EE/CA** *($)*	**489-D CPRB Estimated Cost (Escalated) 2009 RSER/EE/CA** *($)*	**~~Total Project Estimated~~ 488-1D Actual Cost** *($)*	**489-D CPRB Actual Cost** *($)*	**~~Actual~~** *~~($)~~*	**Delta Cost** *(%)*
Total Cost	$27,735,175	$9,413,101	~~$37,148,276~~ $33,515,706	$3,229,113	~~$36,767,276~~ $36,744,819	1%