



POST-CLOSURE PLAN

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INACTIVE CCR SURFACE IMPOUNDMENTS POST-CLOSURE PLAN

Bremo Power Station



Submitted To: Bremo Power Station
1038 Bremo Bluff Road
Bremo Bluff, VA 23022

Submitted By: Golder Associates Inc.
2108 W. Laburnum Avenue, Suite 200
Richmond, VA 23227



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1.0 GENERAL

The Bremono Power Station (Station) is located in Fluvanna County, Virginia at 1038 Bremono Bluff Road, Bremono Bluff, Virginia. The Station contains three inactive Coal Combustion Residuals (CCR) surface impoundments as defined by the Federal Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule (40 CFR 257; the CCR rule): the North Ash Pond, East Ash Pond, and West Ash Pond.

The North and East Ash Ponds will be closed in place with an engineered final cover system as described in the Closure Plan. The West Ash Pond will be closed by removal of CCR and re-purposed as the West Treatment Pond to manage the Station's process wastewaters. The new West Treatment Pond will be regulated under the Station's existing Virginia Pollutant Discharge Elimination System (VPDES) permit (No. VA0004081). The three impoundments are being closed as inactive CCR surface impoundments under the CCR rule provisions at 40 CFR 257.100. Although the ponds were regulated under the VPDES permitting program during their operational lives, their long-term management, which includes closure, post-closure, and groundwater monitoring, will be governed by the Virginia Solid Waste Management Regulations (VSWMR). Existing groundwater monitoring, corrective action, and/or risk assessment plans currently in effect under the VPDES permit will remain in effect until such time that they are superseded by a groundwater monitoring program pursuant to a solid waste permit for closure and post-closure in accordance with the VSWMR.

This Post-Closure Plan has been prepared in accordance with the VSWMR; however, it also incorporates several of the measures described in the CCR rule. This Post-Closure Plan generally follows the format guidelines for Solid Waste Disposal Facilities as described in the Virginia Department of Environmental Quality's (DEQ's) Submission Instruction No. 6 (Rev. January 2012). This Post-Closure Plan is for the North and East Ash Ponds. The North and East Ash Ponds will be closed in place by constructing an engineered final cover system over the CCR surface as described in the Closure Plan. A Post-Closure Plan is not required for the West Ash Pond because it will be closed by removal of CCRs and a portion re-purposed as a wastewater treatment pond for the Station's source waters (West Treatment Pond).

Embankments remaining after closure for the North and East Ash Ponds and the West Treatment Pond will continue to be regulated by the Virginia Department of Conservation and Recreation (DCR) under the Impounding Structure Regulations 4VAC50-20.

1.1 Closure Schedule

All three CCR surface impoundments at the Station ceased receiving CCR prior to October 19, 2015. Closure activities for each impoundment are expected to occur on the following time table (Table 1).

Table 1: Tentative Construction Time Table

Surface Impoundment	End CCR Active Period	Begin Decanting	Begin Closure Activities	End Closure Activities
North Ash Pond	October 18, 2015	January 2016	March 2016	April 17, 2018
East Ash Pond	Inactive (>20 years)	January 2016	March 2016	April 17, 2018
West Ash Pond*	June 2014	November 2015	December 2015	April 17, 2018

*The West Ash Pond will achieve closure by removal of CCR prior to a portion of the former pond being re-purposed as the new West Treatment Pond.

The three impoundments will be closed as inactive CCR surface impoundments. The impoundments will be regulated under the VSWMR; however, additional measures from the CCR rule have been adopted into this Post-Closure Plan to provide more specific guidance for the proper care of the closed impoundments. The post-closure period will begin upon submission of final, written closure certification signed by a licensed professional engineer.

1.2 Contact Information

The post-closure contact for this facility will be:

Cathy C. Taylor
 Director, Electric Environmental Services
 5000 Dominion Boulevard
 Glen Allen, VA 23060
 (804) 273-2929

2.0 FINAL COVER SYSTEMS (NORTH AND EAST ASH PONDS)

The proposed final cover systems for the North and East Ash Ponds are expected to minimize the need for further maintenance of the impoundments. Specifically, the proposed final cover systems have been designed to resist the effects of erosion, settlement, and subsidence, and to minimize the infiltration of liquids into the CCR material. The proposed final cover systems will prevent the future impoundment of water within the CCR surface impoundments, and include measures to prevent sloughing, minimize erosion, and prevent excessive hydraulic head build-up in the protective cover soils.

3.0 INSPECTION, MONITORING, AND MAINTENANCE

3.1 Inspection

Inspections of the final cover systems will occur periodically in order to verify the proper function of the final cover systems, stormwater structures, etc. Inspections will be completed by competent personnel, and will be recorded (in logs such as that contained in Appendix A) and kept at the Station. The closed impoundments will be inspected at a frequency appropriate, but not less than annually, to maintain environmental and structural integrity of the final cover system.

3.2 Maintenance and Repair

Prudent care shall be taken when conducting work on covered areas to prevent damage to the final cover systems. Repairs to damaged areas will be conducted expeditiously and in accordance with established repair procedures.

Proper maintenance of the established vegetation will help prevent damage to the final cover systems. Fertilizer and mulch will be applied as necessary. Areas without a healthy stand of vegetation will be re-seeded and re-mulched as needed to re-establish vegetation as soon as practicably possible.

3.2.1 Erosion Repair

Areas observed to have damage caused by erosion will be filled in with appropriate soil and seeded. The cause of the erosion should be identified and corrected if needed, and/or additional erosion controls should be implemented to prevent further erosion.

3.2.2 Settlement/Sloughing

Settlement and sloughing may be temporarily treated by buttressing the final cover systems with available soil. Vehicle traffic on areas experiencing unusual settlement or sloughing should be restricted until a permanent solution has been implemented to help prevent further settlement and sloughing. A licensed professional engineer should be consulted to determine the cause and appropriate response and corrective action.

3.3 Stormwater Management Structures

The stormwater structures for the North and East Ash Ponds will be maintained throughout the post-closure period to ensure proper function, and to minimize the effects of erosion. Structures shall be kept clear of debris and sediment that may inhibit the flow of water. Head-cutting and other erosion shall be repaired with available soil or other appropriate materials. Stormwater channel linings (vegetation, rip-rap, etc.) shall be re-established as needed in accordance with the original design. Stormwater run-off will be managed in accordance with the Station's VPDES Permit.

3.4 Mowing

The final cover systems for the North and East Ash Ponds will be mowed a minimum of once per year or as necessary to deter the growth of woody vegetation, deter habitation by vectors, and to allow inspection and access to the cap features and related structures (e.g., groundwater monitoring wells and stormwater channels).

3.5 Groundwater Monitoring System

The three impoundments have been regulated under the VPDES program during their operational lives. Their long-term management, which includes closure, post-closure, and groundwater monitoring, will be governed by the VSWMR. Existing groundwater monitoring, corrective action, and/or risk assessment plans currently in effect under the VPDES permit will remain in effect until such time that they are superseded by a groundwater monitoring program pursuant to a solid waste permit for closure and post-closure in accordance with the VSWMR. The existing groundwater monitoring taking place on-site will be updated and supplemented to identify potential releases from the closed impoundments. Groundwater monitoring and repairs to groundwater monitoring wells will be conducted in accordance with the Groundwater Monitoring Plan that will be approved as part of the issuance of a solid waste permit for the Station.

4.0 LEACHATE COLLECTION SYSTEM

There are no leachate collection systems associated with the North and East Ash Ponds. Once closed, the North and East Ash Ponds will include a final cover system designed to minimize precipitation infiltration into the CCR. Once the final cover systems are installed, leachate generation is expected to significantly decrease throughout the post-closure period.

5.0 POST-CLOSURE PERIOD USE

Because the impoundments are contained within the controlled-access Station, no additional access controls (barriers, gates, etc.) are needed.

A deed restriction will be placed on the property to ensure that there is no impact to the closed impoundments. Post-closure use of the property is not expected to disturb the integrity of the final cover systems, or other components of the closed CCR impoundments, unless necessary to meet the requirements for post-closure care or make repairs. The DEQ may approve other disturbances if those disturbances will not increase the potential threat to human health or the environment.

5.1 Post-Closure Cost Estimate

Post-closure cost estimates were developed for the North and East Ash Ponds using site-specific conditions outlined in the Groundwater Monitoring Plan and DEQ financial assurance cost estimate worksheet. The post-closure cost estimates and annual financial assurance demonstrations consider those items required for closure monitoring and maintenance of the North and East Ash Ponds. There are no post-closure requirements for the West Ash Pond because the CCR will be removed. Post-closure activities are expected to include inspections, mowing, erosion repair, and groundwater monitoring throughout the post-closure period. The DEQ financial assurance cost estimate worksheet is presented in Appendix B for the North and East Ash Ponds, and with categories modified and/or added to reflect CCR surface impoundment post-closure activities.

Table 2: Summary of Post-Closure Costs

Impoundment	Post-Closure Cost
North and East Ash Ponds	\$1,276,387
TOTAL	\$1,276,387

6.0 TERMINATION OF POST-CLOSURE

The post-closure period will continue for at least 10 years from the date of closure. Post-closure shall continue until the DEQ approves termination of post-closure activities.

The owner may submit a request for termination of any or all post-closure activities upon completion of the minimum required 10-year post-closure period.

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Africa	+ 27 11 254 4800
Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

solutions@golder.com
www.golder.com

Golder Associates Inc.
2108 W. Laburnum Avenue, Suite 200
Richmond, VA 23227 USA
Tel: (804) 358-7900
Fax: (804) 358-2900



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Appendix A
Inspection Checklist

**Post-closure Inspection Schedule
Bremo Power Station**

Item	Inspection Items	Frequency of Inspection
Facility Area	Gate and fence Erosion of closure final cover Settlement and subsidence Deterioration of vegetative final cover Trash, litter Stormwater control system	Monthly Monthly or after severe storms Monthly Monthly or after severe storms Monthly Monthly or after severe storms
Toe Drain Collection System	Embankment slopes, toe drains, pipe outfalls	Monthly
Groundwater Monitoring System	See Groundwater Monitoring Plan	See Groundwater Monitoring Plan



Appendix B

Post-Closure Cost Estimate

Worksheet CEW-02: FORMAT FOR THE ESTIMATION OF POST-CLOSURE COSTS

Facility Name: Bremo Power Station
 Permit Number: North and East Ash Ponds
 Facility Address: 1038 Bremo Bluff Road
 Bremo Bluff, Virginia 23022
 Facility Owner: Virginia Electric and Power Company
 Owner Representative: David Craymer
 Representative Completing Format: Golder Associates Inc., Ron DiFrancesco, P.E.
 Date Completed: December 1, 2015

Total Permitted Footprint	94.9 ac.	
Developed Ash Pond Area (To be Closed)	94.9 ac.	Requires Full Cap Section
Remaining Undeveloped Area	0 ac.	

I. Groundwater Monitoring

		Calculation or Conversion	
a. Total number of monitoring wells	10 wells		
b. Total number of sampling events/year	2 events/yr	a x b	20 samples/yr
c. Quantity of additional samples (e.g. QA/QC)	2 samples/event	b x c	4 samples/yr
d. Total samples per year		b + c	24 samples/yr
e. Analysis unit cost (CCR constituents)	\$1,250.00/sample		
f. Total Analysis cost		d x e	\$30,000.00 /yr
g. GW Monitoring unit cost	\$2,400.00/event		
i. Total sampling cost		f + (g x b)	\$34,800.00 /yr
j. Engineering fees & reports	\$25,000/yr		
Yearly Groundwater Monitoring Cost		i + j	\$59,800 /yr

II. Cap Maintenance & Repair

a. Closed Landfill Area	94.9 acres		
<i>Mowing & Fertilization</i>			
b. Mowing frequency	3 visits/yr		
c. Mowing unit cost	\$77.97/acre/visit		
d. Total mowing cost		a x b x c	\$22,198.06 /yr
e. Fertilizer frequency	1 visits/yr		
f. Fertilizer unit cost	\$76.00/acre/visit		
g. Total fertilizer cost		a x e x f	\$7,212.40 /yr
<i>Cap Erosion & Repair</i>			
h. Area to reseed/year		33% x a	31.32 acres
i. Reseeding unit cost	\$383.33/acre		
j. Total reseeding cost		h x i	\$12,004.75 /yr
k. Area of cap erosion/year		10% x a	9.49 acres
l. Cap erosion repair unit cost	\$150.00/acre		
m. Mobilization/Demobilization	\$5,000.00/yr		
n. Total cap erosion repair cost		(k x l) + m	\$6,423.50 /yr
Yearly Cap Maintenance & Repair cost		d + g + j + n	\$47,839 /yr

III. Sediment Basin Maintenance & Repair

a. Sediment basin cleanout frequency, 1 per	<input type="text" value="5"/> years	1 / a	0.20 event/yr
b. Sediment basin cleanout unit cost	<input type="text" value="\$50,000"/> /event		
c. Mobilization/Demobilization	<input type="text" value="\$0"/> /event		
d. <i>Total sediment basin maintenance cost</i>		a x (b + c)	\$10,000 /yr
e. Total number of stormwater sampling locations	<input type="text" value="-"/> locations		
f. Stormwater sampling frequency	<input type="text" value="-"/> events/yr		
g. Total number of stormwater samples		e x f	0 samples/yr
h. Analysis unit cost (VPDES permit parameters)	<input type="text" value="\$0"/> /sample		
i. <i>Total Analysis cost</i>		g x h	\$0 /yr
j. Mobilization unit cost	<input type="text" value="\$0.00"/> /event		
k. Technician field unit cost	<input type="text" value="\$0.00"/> /event		
l. <i>Total sampling cost</i>		f x (j + k)	\$0.00 /yr
m. Engineering fees & reports	<input type="text" value="\$0"/> /yr		
n. <i>Total Stormwater Sampling & Analysis cost</i>		i + l + m	\$0 /yr
<i>Yearly Sediment Basin Maintenance & Repair</i>		d + n	\$10,000 /yr

IV. Post-Closure Care General Inspections

a. General Inspection unit cost	<input type="text" value="\$2,500"/> /inspection		
b. Number of inspections per year	<input type="text" value="4"/>		
<i>Yearly Post-Closure Care General Inspection Cost</i>		a x b	\$10,000 /yr

Annual Post-Closure Care Cost (APCC) \$127,639 /yr

Length of post-closure care (LPCC) years

Post-Closure Care Cost APCC x LPCC \$1,276,387

Engineering & Documentation

Post-Closure Care Evaluation	<input type="text" value="\$0"/>	Engineering Sum	\$0
Post-Closure Care Certification	<input type="text" value="\$0"/>		
Cost for survey and deed notation (if not completed at time of landfill closure)	<input type="text" value="\$0"/>		

FA Mechanism Maintenance Cost /yr FA maintenance x LPCC \$0

Total Post-Closure Care Cost Post-Closure Cost + Engineering + FA Maintenance **\$1,276,387**