

POST-CLOSURE CARE PLAN

Post-Closure Care Plan Upper (East) Pond CCR Closure

Virginia Electric and Power Company
Chesterfield Power Station
Chesterfield County, Virginia

GAI Project Number: C150035.00

January 2016



Prepared by: GAI Consultants, Inc.
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4198 Cox Road, Suite 114
Richmond, Virginia 23060

Prepared for: Virginia Electric and Power Company
5000 Dominion Boulevard
Glen Allen, Virginia 23060

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Acronyms

CCB	Coal Combustion Byproducts
CCR	Coal Combustion Residuals
CCR Closure Plan	Upper (East) Pond CCR Closure Plan
CCR Rule	"Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments" 40 CFR 257 (2015)
CFR	Code of Federal Regulations
DCR	Virginia Department of Conservation and Recreation
Dominion	Virginia Electric and Power Company d/b/a Dominion
EPA	Environmental Protection Agency
Station	Dominion Chesterfield Power Station
UEP	Upper (East) Pond
VAC	Virginia Administrative Code
VDEQ	Virginia Department of Environmental Quality
VPDES Permit	Virginia Pollutant Discharge Elimination System Permit No. VA004146
VSWMR	Virginia Solid Waste Management Regulations

1.0 Introduction

This Post-Closure Care Plan has been developed for the Upper (East) Pond (UEP), located at the Chesterfield Power Station (Station), in Chesterfield County, Virginia. The Station and UEP are owned by the Virginia Electric and Power Company d/b/a Dominion Virginia Power (Dominion). The UEP was constructed by Dominion in 1984 as a component of the Station's wastewater treatment system, serving as a settling pond for wastewater containing coal combustion byproducts (CCB), which include coal combustion residuals (CCR). Discharge from the UEP is regulated under the Virginia Department of Environmental Quality (VDEQ) Virginia Pollutant Discharge Elimination System Permit No. VA004146 (VPDES Permit).

In order to ensure compliance with the United States Environmental Protection Agency's (EPA's) "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments" (CCR Rule), which was published in the Federal Register on April 17, 2015 (with an effective date of October 19, 2015) (40 CFR 257), and post-closure care requirements of the Virginia Solid Waste Management Regulations (VSWMR), Dominion has filed a solid waste permit application with VDEQ to regulate the final closure of the UEP. This Post-Closure Care Plan meets the requirements of Section 257.104(d) of the CCR Rule.

The information provided in this report follows the format guidelines for Solid Waste Disposal Facilities as described in Submission Instruction No. 6, provided by the VDEQ in 2012.

2.0 Post-Closure Responsibilities and Activities

2.1 Post-Closure Period

As required by Section 257.104(c) of the CCR Rule, the post-closure care period for the UEP will be 30 years. Post-closure care will commence after VDEQ's approval of the final closure of the UEP.

2.2 Post-Closure Contact

Ms. Cathy C. Taylor with Dominion is designated as the contact person during the post-closure period. The contact information is as follows:

Ms. Cathy C. Taylor
Director, Electric Environmental Services
Dominion Resources Services, Inc.
5000 Dominion Blvd
Glen Allen, VA 23060
(804) 273-2929
cathy.c.taylor@dom.com

3.0 Inspections, Monitoring and Maintenance

3.1 Inspections

Inspections will be performed by a Dominion employee or independent registered engineer or other qualified person. The CCR Surface Impoundment Inspection Checklist, or equivalent, provided in Appendix A, will be used to document inspections. The closed CCR impoundment will be inspected at a frequency appropriate to maintain environmental and structural integrity of the cover system, but no less than monthly for the first year after closure, and quarterly thereafter.

3.2 Monitoring

Groundwater Monitoring will be performed for the UEP in accordance with the approved Groundwater Monitoring Plan. Monitoring will not be required for landfill gas generation, as there are no putrescible wastes placed within the UEP. Leachate collection monitoring will not be required as there is no leachate collection system in place.

3.3 Maintenance

Based upon the facility inspection schedule, maintenance will be performed as required by Section 257.104(b) of the CCR Rule and in accordance with this Post-Closure Care Plan, including:

- The vegetated final cover will be mowed a minimum of once per year or as necessary to deter the growth of woody vegetation, deter rodent habitat, and to allow access for inspection;
- Areas determined to be deficient in vegetative cover will be seeded, fertilized and mulched in order to deter erosion;
- Maintenance of the Groundwater Monitoring System will be performed in accordance with the Groundwater Monitoring Plan and include repairing and/or replacing damaged materials or components as needed;
- Areas exhibiting rill erosion of four inches or deeper will be repaired to maintain design grade/specifications and reseeded as per the CCR Closure Construction Specifications. Application of fertilizer, selective herbicides, rodent control measures, etc., will be implemented as necessary and repairs will be monitored until CCR Closure Construction Specifications are met;
- Areas exhibiting evidence of sliding or displacement due to settling will be examined to determine the cause of the movement. These areas will be backfilled with an appropriate material to maintain positive drainage, vegetation growth, and the integrity of the site. Backfilling will be performed in accordance with the UEP CCR Closure Plan and the Upper (East) Pond CCR Closure Construction Quality Assurance Plan; and
- Maintenance will consist of removing sediment and/or undesirable vegetation from the channels once accumulated sediments reach a depth of 25 percent of the hydraulic capacity. Damage to linings and hydraulic structures will be repaired or replaced if necessary.

Dominion will be responsible for post closure care, monitoring, inspection, and maintenance of this facility.

3.4 Training

Personnel responsible for conducting maintenance, inspection, and monitoring tasks will be competent individuals trained to perform their assigned tasks.

4.0 Post-Closure Uses

The closed UEP will be covered with vegetation, with the exception of durable surfaces such as concrete drainage channels and road surfaces. The eastern portion of the site may be utilized as an overflow public parking area for Henricus Historical Park; regular inspections of the parking area will be performed to monitor the safeguards in place that protect the final cover system from damage.

The UEP will be completely enclosed with security fencing, with locking gates and signs. Access will be limited to authorized personnel. The overflow public parking area on the eastern side of the UEP will be enclosed with security fence and barriers.

5.0 Post-Closure Cost Estimate

As required by VDEQ's "Closure and Post-Closure Care Plans for Solid Waste Disposal and Management Facilities" (Section III.E), a Post-Closure Care Cost Estimate was developed for the UEP using Worksheet CEW-02. The resulting annual Care Cost Estimate is approximately \$11.1 million over 30 years.

The Post-Closure Care Cost Estimate calculations are located in Appendix B.

6.0 Post-Closure Termination

The post-closure care period is anticipated to extend for 30 years following completion of closure. As required by Section 257.104(e) of the CCR Rule, no less than 60 days after the completion of post-closure care, a notification will be prepared verifying that post-closure care has been completed.

APPENDIX A
Upper (East) Pond Post-Closure Care Inspection
Checklist



Dominion CCR POST-CLOSURE CARE INSPECTION CHECKLIST

Site Name		Weather	
Date of Inspection		Temperature	
Inspected By		Rain in Last 24 Hours	

Embankment Slope and Crest

Conditions Present	Comments	Monitor	Investigate	Repair	Escalate
Animal Burrows					
Bare Spots/Erosion					
Horizontal Alignment					
Sinkhole/Depression					
Seeps, Standing Water					
Slide, Slough, Bulges					
Vegetation – High					
Vegetation – Stressed					
Condition of Sign/Fences/Gates					



Dominion CCR POST-CLOSURE CARE INSPECTION CHECKLIST

Closure area

Conditions Present	Comments	Monitor	Investigate	Repair	Escalate
Animal Burrows					
Bare Spots/Erosion					
Horizontal Alignment					
Sinkhole/Depression					
Seeps, Standing Water					
Slide, Slough, Bulges					
Vegetation – High					
Vegetation – Stressed					
Roadways & Parking Lot					

Channels and Outlet Structure

Conditions Present	Comments	Monitor	Investigate	Repair	Escalate
Channel Lining Condition					
Deposition in Channels					
Channels undercutting					
Standing Water/Ponding					
Erosions Adjacent to Channels					
Slide, Slough, Bulges					
Scour at/downstream of Spillway					



Dominion CCR POST-CLOSURE CARE INSPECTION CHECKLIST

Previous Conditions for Repair or Escalation have been mitigated and the condition has returned to monitor status? If no, provide date for completion in Comments box below.	Yes	No

Definitions

Monitor	Observation indicates a safe condition protective of the environment.
Investigate	Observation indicates a condition that has changed from a monitor condition and requires investigation to determine whether condition is unsafe or not protective of the environment.
Repair	Observation indicates a condition that requires a near term repair to ensure that condition does not worsen and become a serious concern.
Escalate	Observation indicates a condition that must be addressed immediately to ensure the safety of the surface impoundment, facilities, or public or protection of the environment.

General Comments [Document any unusual events or conditions]:

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APPENDIX B
Upper (East) Pond Post-Closure Care
Cost Estimate



Solid Waste Disposal Facility Cost Estimate Form

Facility Name:	Chesterfield Power Station, Upper (East) Pond	Permit No. SWP	
Address:	451 Coxendale Road		
City:	Chester	State:	Virginia
		Zip:	23836
FA Holder:	Virginia Electric and Power Company		
Estimate Prepared By:	Kevin M. Bortz, GAI Consultants, Inc.		

Indicate the plan versions for which this cost estimate was prepared, identifying the following information for each plan:

Closure Plan				Post-Closure Care Plan			
Title:	CCR Closure Plan			Title:	Post-Closure Care Plan, UEP CCR Closure		
Plan Date:	January 2016	Approved:		Plan Date:	January 2016	Approved:	
Consultant:	GAI Consultants, Inc.			Consultant:	GAI Consultants, Inc.		
Corrective Action Plan				Corrective Action Monitoring Plan			
Title:	N/A			Title:	N/A		
Plan Date:		Approved:		Plan Date:		Approved:	
Consultant:				Consultant:			

Cost Estimate Summary

Total Closure Cost:	\$29,401,434
Total Post-Closure Cost:	\$11,066,023
Total Corrective Action Cost:	\$N/A
TOTAL:	\$40,467,457

References

Please indicate references used to develop this cost estimate:
 CCR Closure Drawings from the CCR Closure Plan
 Unit Costs from Remedial Construction Services, L.P., Bid Estimate
 RSMMeans Site Work and Landscape Cost Data, 2014, 33rd Edition
 Treatment Costs developed by Geosyntec Consultants, Inc

Certification by Preparer:

This is to certify that the cost estimates pertaining to the engineering features and monitoring requirements of this solid waste management facility have been prepared by me and are representative of the design specified in the facility's approved Closure, Post-Closure and Corrective Action Plans. The estimate is based on the cost of hiring a third party and does not incorporate any salvage value that may be realized by the sale of wastes, facility structures, or equipment, land or other facility assets at the time of partial or final closure. In my professional judgment, the cost estimates are a true, correct, and complete representation of the financial liabilities for closure, post-closure care, and corrective action of the facility and comply with the requirements of 9 VAC 20-70 and all other DEQ rules and statutes of the Commonwealth of Virginia.

Name:	Kevin M. Bortz	Signature:	
Title:	Assistant Engineering Manager	Date:	1/7/2016

Acknowledgement by Owner/Operator :

Name:	DAVID A. CRAYMER	Signature:	
Title:	VP POWER GEN SYSTEM OPERATIONS	Date:	1/7/16

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

FILL IN THE BOXES. THE REST WILL BE CALCULATED FOR YOU

I. Groundwater Monitoring

		Calculation or Conversion	
a. Total number of monitoring wells	<input type="text" value="23"/> wells		
b. Total number of sampling events/year	<input type="text" value="2"/> events/yr	a x b	46 samples/yr
c. Quantity of additional samples (e.g. QA/QC)	<input type="text" value="1"/> samples/event	a x c	23 samples/yr
d. Total samples per year		b + c	69 samples/yr
e. Analysis unit cost (Table 3.1 constituents)	<input type="text" value="\$361.11"/> /sample	<i>based on estimated annual cost from a similar facility</i>	
f. Total Analysis cost		d x e	\$24,916.59 /yr
g. GW Monitoring unit cost	<input type="text" value="\$5,000.00"/> /event	<i>based on estimated annual cost from a similar facility</i>	
i. Total sampling cost		f + (g x b)	\$34,916.59 /yr
j. Engineering fees & reports	<input type="text" value="\$5,000"/> /yr	<i>based on estimated annual cost from a similar facility</i>	
Yearly Groundwater Monitoring Cost		i + j	\$39,917 /yr

II. Landfill Gas Monitoring, Maintenance, and Control

a. Frequency of LFG compliance monitoring	<input type="text"/>	events/yr	
b. LFG Monitoring unit cost	<input type="text"/>	/event	
c. Total perimeter LFG monitoring cost		a x b	\$0 /yr
d. Frequency of surface monitoring (air permit)	<input type="text"/>	events/yr	
e. Surface monitoring unit cost	<input type="text"/>	/event	
f. Total surface monitoring cost		d x e	\$0 /yr
g. Control system operating unit cost	<input type="text"/>	/yr	
h. Frequency of LFG control system inspections	<input type="text"/>	events/yr	
i. Control system inspection cost	<input type="text"/>	/event	
j. Total control system cost		g + (h x i)	\$0 /yr
Yearly Landfill Gas Monitoring, Maintenance, & Control Cost		c + f + j	\$0 /yr

III. Groundwater Management

a. Quantity of groundwater pumped	<input type="text" value="21,240,000"/> gal/yr	<i>Toe/Underdrain Discharge</i>	
		<i>Quantity from Geosyntec Consultants, Inc.</i>	
<i>On-site Water Treatment</i>			
b. On-site treatment operating unit cost	<input type="text" value="\$0.005"/> /gal	<i>Onsite pump and treat through LowVolume Wastewater Pond</i>	
c. Total on-site management cost		a x b	\$106,200 /yr

Disposal

d. Private disposal unit cost	<input type="text"/>	/gal	
e. POTW disposal unit cost	<input type="text"/>	/gal	
f. Direct discharge to POTW unit cost	<input type="text"/>	/gal	
g. Pump & Haul unit cost	<input type="text"/>	/gal	
h. Subtotal leachate disposal unit cost		d + e + f + g	\$0.00
i. Total leachate disposal cost		a x h	\$0 /yr
j. Leachate sampling & analysis unit cost	<input type="text"/>	/sample	
k. Frequency of leachate sampling & analysis	<input type="text"/>	sample/yr	
l. Total leachate sampling & analysis cost		j x k	\$0.00 /yr
Yearly Leachate Management Cost		c + i + l	\$106,200 /yr

IV. Cap Maintenance & Repair

a. Closed Landfill Area	<input type="text" value="112"/> acres		
<i>Mowing & Fertilization</i>			
b. Mowing frequency	<input type="text" value="2"/> visits/yr	<i>Assume spring and fall mowing</i>	
c. Mowing unit cost	<input type="text" value="\$177.00"/> /acre/visit	<i>RS Means (Mowing with tractor and 5' cutting attachment)</i>	
d. Total mowing cost		a x b x c	\$39,648 /yr
e. Fertilizer frequency	<input type="text" value="2"/> visits/yr		
f. Fertilizer unit cost	<input type="text" value="\$235.00"/> /acre/visit	<i>RS Means (hydrosprayed fertilizer @\$5.40/msf)</i>	
g. Total fertilizer cost		a x e x f	\$52,640 /yr

Cap Erosion & Repair

h. Area to reseed/year		33% x a	37.3 acres
i. Reseeding unit cost	<input type="text" value="\$1,860.00"/>	<i>Contractor Unit Cost - Lime, Fertilizer, Seed, Mulch</i>	
j. Total reseeding cost		h x i	\$69,440.00 /yr
k. Area of cap erosion/year		10% x a	11.2 acres
l. Cap erosion repair unit cost	<input type="text" value="\$4,836.00"/>	<i>Unit Cost - Off Site soil purchase, haul, and grade</i>	
m. Mobilization/Demobilization	<input type="text" value="\$1,000.00"/>	<i>2 trucks at \$250 and 1 Dozer at \$500</i>	
n. Total cap erosion repair cost		(k x l) + m	\$55,163 /yr
Yearly Cap Maintenance & Repair cost		d + g + j + n	\$216,891 /yr

V. Sediment Basin Maintenance & Repair

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

VI. Vector & Rodent Control

a. Vector and rodent control unit cost	<input type="text"/>	<i>N/A - Industrial Landfill</i>	
Yearly Vector and Rodent Control Cost		a	\$0 /yr

VII. Post-Closure Care General Inspections

a. General Inspection unit cost	<input type="text" value="\$1,900"/>	<i>Engineer for 8 hours in field and 4 hours for report + expense.</i>	
b. Number of inspections per year	<input type="text" value="1"/>		
Yearly Post-Closure Care General Inspection Cost		a x b	\$1,900 /yr

Annual Post-Closure Care Cost (APCC)

I + ... + VII \$364,908 /yr

Length of post-closure care (LPCC)

years

Post-Closure Care Cost

APCC x LPCC \$10,947,234

Engineering & Documentation

Post-Closure Care Evaluation	<input type="text" value="\$36,491"/>	Engineering Sum	\$43,789
Post-Closure Care Certification	<input type="text" value="\$7,298"/>	<i>10% of APCC</i>	
Cost for survey and deed notation (if not completed at time of landfill closure)	<input type="text" value="\$0"/>	<i>2% of APCC</i>	
		<i>completed during Closure</i>	

FA Mechanism Maintenance Cost

/yr FA maintenance x LPCC \$75,000

Total Post-Closure Care Cost

Post-Closure Cost + Engineering + FA Maintenance **\$11,066,023**