Post-Closure Care Plan
Landfill SWP #624

Clinch River Plant

Pond 2

Appalachian Power Company

Clinch River Plant, Carbo, Virginia

August 2017

Revised March 2018

Prepared By: American Electric Power Service Corporation

And Appalachian Power Company

1 Riverside Plaza

Columbus, OH 43215

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Table of Contents

I. Post-Closure Care Plan

Appalachian Power Company (APCo), doing business as American Electric Power (AEP), is submitting a landfill application for the closed Ash Pond 2 at the Clinch River Plant in Russell County, Virginia. Ash Pond 2 was used to dispose of bottom ash produced at the Clinch River Plant. The post-closure care activities described include long-term inspections, maintenance, and monitoring. Once the Solid Waste Permit is issued, the facility will require a post-closure care period of 30 years (per the Virginia Department of Environmental Quality).

The post-closure care activities identified in this section address the requirements of the VADEQ Office of Waste Permitting and Compliance document "Submission Instruction No. 6, Closure and Post-Closure Care Plans for Solid Waste Disposal and Management Facilities.

I.A Post-Closure Contact

Appalachian Power Company
1 Riverside Plaza
Columbus, Ohio 43215

Contact Name: David A. Miller
Director, Land Environment and Remediation Services
Telephone: (614) 716-2281

I.B Security

Access to the closed solid waste management facility is primarily controlled by guards at the Clinch River facility. Vehicle access can be denied by physical barriers (natural treeline, surface water channels/streams, and roadway barricades). No waste is exposed at the Pond 2 facility. Access to the closed site will not pose a health hazard.

I.C Inspection Plan

Inspections are performed for the items noted below. The frequencies of inspections are detailed in Table 1 of Appendix A. The inspection frequencies are scheduled to properly detect any issues so that repairs can be performed before significant harm occurs. A checklist for facility inspections is located in Appendix A.

- Security Control Devices: The serviceability of the roadway barricades will be inspected during regular inspections.
- Embankment: The entire waste embankment, including top surface and side-slopes, will be inspected for slides, settlement, subsidence, displacement, and cover condition (see below).
- Soil Dike: The soil dike will be inspected for slides, displacement, seepage, and erosion.

- Cover: The final cover will be inspected for erosion and for the condition of the vegetated cover, i.e., gaps in vegetation or presence of undesirable trees or brush. The integrity of the cover drainage system will also be inspected.
- Closure Cap Surface: The Pond Closure Cap surface will be inspected for any ponding of water or flat areas. Due to the design contours required to achieve the final cap grade, special attention will be focused to ensure that no depressions or flat areas exist and that no water is allowed to pond above the cap system.
- Surface Drainage System: The surface drainage system, including channels, culverts, slope drains, etc., will be inspected for erosion, integrity of channel lining, ponding, and accumulated sediment.
- Groundwater Monitoring System: The groundwater monitoring system will be inspected for the general integrity of the wells, well casings, and protective casings.
- Benchmark: The benchmarks will be inspected for general damage.

Table 1
Existing Benchmarks

Point No.	Northing	Easting	Elevation
3403	3519306.010	10401991.100	1566.550
3401	3522615.360	10403848.100	1570.580
6211	3522564.324	10403152.962	1584.990
6214	3522649.439	10404104.643	1516.894

I.D Maintenance Plan

Maintenance during the post-closure care period will be performed as discussed below, based upon the facility inspections described above and in the checklist in Appendix A.

- Security Control Devices: Any portions of the roadway barricades which might be damaged will be repaired or replaced as necessary.
- Erosion Damage Repair: Any areas exhibiting erosion will be repaired by replacing and compacting the material in-kind to design grade/specifications, and reseeding the area to the specifications. Applications of additional fertilizer, selective herbicides, rodent control

measures, etc. will be implemented as necessary. In the selection of fertilizers and herbicides, ensure their use will not impact the groundwater negatively. Follow-up monitoring of the repaired area will be conducted to ascertain the integrity of the repair.

- Settlement, Subsidence, Displacement: Any areas at the closed site exhibiting evidence of settlement, subsidence, or displacement will be examined to determine the cause of the movement. If backfilling or placing additional fill material is needed to maintain the integrity of the closed structure, it will be performed in accordance with the site/closure specifications, including seeding. If the condition reoccurs or persists, or if the severity of the condition initially is judged to warrant it, a detailed investigation of the cause will be performed and remedial action will be performed. Similarly, any areas of the soil dike exhibiting sliding, displacement, or seepage will be investigated. Repairs will be made as necessary. Follow-up monitoring of the area will be performed to ascertain that the problem has been corrected.
- Closure Cap Surface: Any areas that show signs of ponding water or flat contours will be examined and rectified. Due to the design contours required to achieve the final cap grade, special attention will be focused on the cap surface to ensure that any areas that hold water are re-graded to promote drainage, re-seeded to promote vegetative growth, and maintained to ensure that the ponding of water does not persist.
- Surface Water Drainage System: The channel linings are designed to withstand the design velocities. Maintenance of the surface water drainage system will consist of removing sediment and/or undesirable vegetation from the surface water runoff control system (channels and culverts) as required. Eroded areas will be repaired by back-filling and reseeding according to the specifications. Damage to culverts will be repaired; structure replacement will be performed if needed.
- Groundwater Monitoring Wells: Any damaged portions of the monitoring wells and/or their protective casings will be replaced in-kind. The protective casings are steel casings with locking covers to minimize tampering or damage due to vandalism.

I.E Monitoring Plan

Information regarding the proposed groundwater monitoring program can be found in the Groundwater Monitoring Plan Pond 2 (dated August 31 2017).

I.F Post-Closure Uses

There are no current plans to develop the site, which will remain closed to the general public. The anticipated post-closure use is open space. The site is vegetated to create a herbaceous rangeland habitat. AEP will notify the Virginia Department of Environmental Quality (VDEQ) if the site use changes during the post-closure care period.

I.G Training

Company landfill personnel responsible for post-closure monitoring, inspection, and maintenance will be under the direct supervision of the company's engineering staff during performance of these duties. If qualified company personnel are not available to perform these post-closure duties, then the company shall hire the services of a professional consultant registered with the Commonwealth to insure compliance with applicable provisions of the Solid Waste Management Regulations.

I.H Post-Closure Care Termination

AEP shall perform post-closure care for thirty (30) years following the issuance of a permit. As required by 10.1-1410.2 B, the facility shall submit to VDEQ a certificate, signed by a registered professional engineer Licensed in the Commonwealth, verifying post-closure care has been completed in accordance with the approved post-closure care plan. To discontinue post-closure care, the PE certificate shall be accompanied by an evaluation, prepared by a professional engineer licensed in the Commonwealth and signed by the facility, assessing and evaluating the landfill's potential for harm to human health and the environment in the event that all corrective action, post-closure monitoring, and maintenance are completed in accordance with the approved post-closure care plan. The certification and evaluation shall be submitted no less than 180 days prior to completion of post-closure care period specified in the plan to be evaluated by the Department.

Appendix A

INSPECTION CHECKLISTS

TABLE 1
GENERAL INSPECTION SCHEDULE

ITEM	POSSIBLE DEFICIENCY	INSPECTION FREQUENCY SITE
Closed Ash Embankment*	Surface breaks or slides, erosion, settlement, subsidence, displacement	M/Q
Vegetated Cover*	Brush, trees, gaps in cover, erosion	M/Q
Soil Dike and Bank*	Slides, sloughs, scarps, displacements, seepage, erosion	Q
Surface Water Collection System*	Accumulated sediment, ponding, erosion, vegetation	M/Q
Cap System Drainage	Flat areas or depressions resulting in the ponding of water.	M/Q
Monitoring Wells	Misc. damage	Q
Roadway Barricades, Benchmark(s)	Misc. damage	M/Q
Leakage Monitoring System (If Needed)	Clogging, miscellaneous damage, discharge	M/Q

INSPECTION FREQUENCY CODE

M/Q – Monthly for first 12 months; quarterly thereafter
Q – Quarterly

* Additionally, the integrity of the embankment, cover, vegetation, soil dike and surface water collection system will be inspected after the spring thaw, after any rainfall exceeding two inches, or any major rainfall event resulting in localized flooding.

SITE INSPECTION CHECKLIST
POND 2 COAL COMBUSTION RESIDUALS DISPOSAL SITE
CLINCH RIVER PLANT

Date of Inspection: _____
Temperature: _____
Weather Conditions on Date of Inspection: _____
General Weather Conditions during Previous Week: _____

Persons Present at Inspection:

Name	Title/Position	Representing

General Comments:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Inspector Name:_____ Site:_____ Inspection Date:_____

Area Inspected	Condition	Action Required		Observations/Location
		Yes	No	
Closed Ash Embankment; Soil Dike and Bank Along New River	Wet Areas, Seepage			
	Surface Cracking			
	Slide, Slough, Scarp			
	Sinkhole, Animal Borrow			
	Erosion			
	Unusual Movement			
	Vegetation Control			
Vegetated Cover	Surface Cracking			
	Sinkhole, Animal Borrow			
	Low Area(s)			
	Ruts and/or Puddles			
	Vegetation Condition			
	(Trees, Brush, Gaps)			
Locking Gate, Benchmark(s)	Misc. Damage			
Additional Comments:				

Inspector Name:_____ Site:_____ Inspection Date:_____

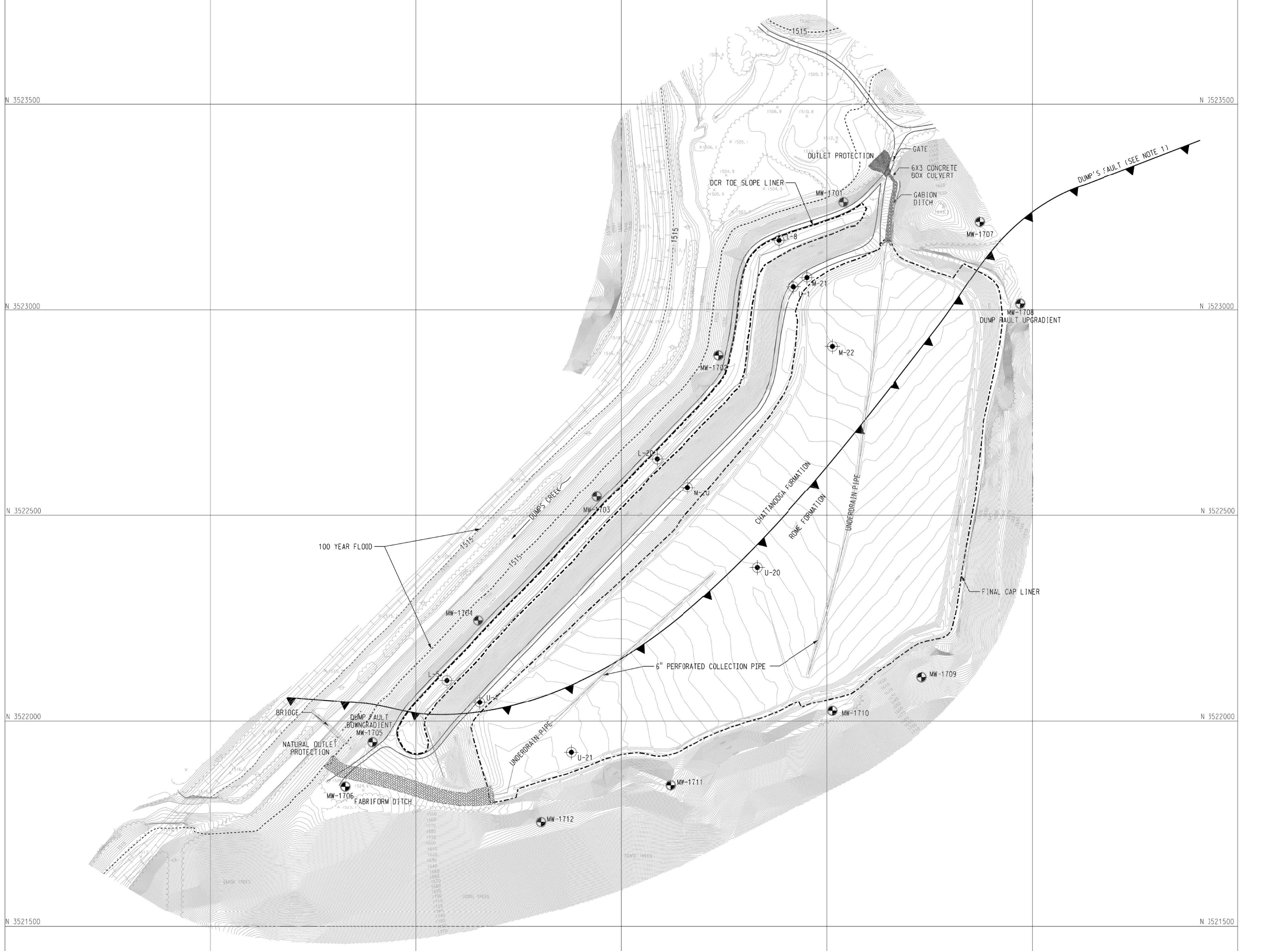
Area Inspected	Condition	Action Required		Observations/Location
		Yes	No	
Surface Water Drainage System	Ditches, Swales:			
	- Accumulated Sediment			
	- Erosion			
	- Vegetation Condition			
	- Ponding			
	Culverts:			
	- Accumulated Sediment			
	- Structural Integrity			
	- Inlet Condition			
	- Outlet Condition			
Monitoring Wells	Misc. Damage			
	- casing			
	- Cover			
	- Lock			
Additional Comments:				

Appendix B

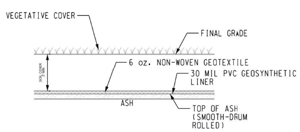
Pond 2 Site Plan

13-GSK-CR-13-082817

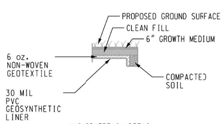
HORIZONTAL DATUM:NAD83 VIRGINIA SOUTH ZONE
VERTICAL DATUM: NGVD29



N 3523500
N 3523000
N 3522500
N 3522000
N 3521500
E 10403000
E 10403500
E 10404000
E 10404500
E 10405000
E 10405500
E 10406000
DUMP'S FAULT (SEE NOTE 1)
GATE
6X3 CONCRETE BOX CULVERT
GABION DITCH
OUTLET PROTECTION
DCR TOE SLOPE LINER
MW-1701
MW-1707
MW-1708
DUMP FAULT UPGRADIENT
M-21
M-22
MW-1702
L-21
M-20
MW-1703
DUMPS CREEK
CHATTANOOGA FORMATION
ROME FORMATION
UNDERDRAIN PIPE
U-20
FINAL CAP LINER
100 YEAR FLOOD
MW-1704
6" PERFORATED COLLECTION PIPE
MW-1709
MW-1710
BRIDGE
DUMP FAULT DOWNGRADIENT
MW-1705
NATURAL OUTLET PROTECTION
U-21
MW-1711
MW-1706
FABRIFORM DITCH
MW-1712
1515
0 50 100 200 300
Scale: 1"=100'



TYPICAL CAP SECTION
SCALE: N.T.S.



ANCHOR TRENCH DETAIL
SCALE: N.T.S.

GENERAL NOTES

1. DUMPS FAULT OUTLINE IS REFERENCED FROM APPENDIX B OF THE POND 2 CLOSURE PLAN GEOTECHNICAL ANALYSIS BY S&ME, INC.
2. 100 YEAR FLOOD STAGE REFERENCE FROM ANALYSIS BY AEP/GEOTECHNICAL DEPARTMENT.

LEGEND

x509.5	SPOT ELEVATION
	INTERMEDIATE CONTOUR
500	INDEX CONTOUR
	DEPRESSION CONTOUR
	TREES AND TREELINE
	STRUCTURE AND BUILDING
— x — x —	FENCE
	POLE
	ROADS
	EDGE OF WATER
	MANHOLES / CATCH BASIN
	POWER POLE
	PIPES
	TOWER
	FAULT LINE
....1515....	100 YEAR FLOOD STAGE (see note 2)
MW-1707	MONITORING WELL (PROPOSED)
M-22	PIEZOMETER
	LINER

REFERENCE

POND 2 CLOSURE DRAWINGS:

SERIES 13-30225-1 THRU 13-30225-13

GSK-CR-13-082817SH1	GW MONITORING WELL LOCATION MAP
GSK-CR-13-082817SH2	POTENTIOMETRIC MAP
GSK-CR-13-082817SH3	ALLUVIUM POTENTIOMETRIC MAP

ADDITIONAL POND 2 DRAWINGS:

13-30300	SITE GRADING AND DRAINAGE
13-30302	EROSION & SEDIMENT CONTROL SITE PLAN AND DETAILS

DATE	NO.	DESCRIPTION	APPD.
	A	ISSUED FOR PERMIT INFORMATION	

REVISIONS

THIS DRAWING IS CLASSIFIED AS:

AEP CONFIDENTIAL

REFERENCE AEP's CORPORATE INFORMATION SECURITY POLICY

APPALACHIAN POWER COMPANY

CLINCH RIVER PLANT

CARBO VIRGINIA

SKETCH

POND 2 CLOSURE CARE PLAN SITE PLAN

UNIT	DRAWING NUMBER	REV.
13	GSK-CR-13-082817	A

SCALE: 1" = 100'
CIVIL ENGINEERING
DR: AG
CH:
SUP:
ENG:
DATE: SEE REV 0
APPROVED BY

AMERICAN ELECTRIC POWER

AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

13-GSK-CR-13-082817

CROSS REFS:

Appendix C

Post Closure Cost Estimate

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

CLINCH RIVER POND 2 **SWP624**

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

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)	5	samples/event	b x c	10	samples/yr
d.	Total samples per year			b + c	30	samples/yr
e.	Analysis unit cost (Table 3.1 constituents)	$330.00	/sample			
f.	*Total Analysis cost*			d x e	*$9,900.00*	/yr
g.	GW Monitoring unit cost	$23,150.00	/event			
i.	*Total sampling cost*			f + (g x b)	*$56,200.00*	/yr
j.	Engineering fees & reports	$2,000	/yr			
	Yearly Groundwater Monitoring Cost			i + j	***$58,200***	***/yr***

II. Landfill Gas Monitoring, Maintenance, and Control

No gas

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

III. Leachate Management

No Leachate

a.	Quantity of leachate generated	-	gal/yr			
	On-site Leachate Management or Pre-Treatment					
b.	On-site treatment operating unit cost		/gal			
c.	*Total on-site management cost*			a x b	*$0*	/yr
	Leachate Disposal					
d.	Private disposal unit cost		/gal			
e.	POTW disposal unit cost		/gal			
f.	Direct discharge to POTW unit cost		/gal			
g.	Pump & Haul unit cost		/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		/sample			
k.	Frequency of leachate sampling & analysis		sample/yr			
l.	*Total leachate sampling & analysis cost*			j x k	*$0.00*	/yr
	Yearly Leachate Management Cost			c + i + l	***$0***	***/yr***

IV. Cap Maintenance & Repair

a.	Closed Landfill Area	30	acres			
	Mowing & Fertilization					
b.	Mowing frequency	2	visits/yr			
c.	Mowing unit cost	$226.00	/acre/visit			
d.	*Total mowing cost*			a x b x c	*$13,560*	/yr
e.	Fertilizer frequency		visits/yr	**Fertilizer not routinely applied at Landfill #223**		
f.	Fertilizer unit cost		/acre/visit			

g.	*Total fertilizer cost*			a x e x f	*$0* /yr
Cap Erosion & Repair					
h.	Area to reseed/year			33% x a	10.0 acres
i.	Reseeding unit cost	$2,904.00	/acre		
j.	*Total reseeding cost*			h x i	*$29,040.00* /yr
k.	Area of cap erosion/year			10% x a	3.0 acres
l.	Cap erosion repair unit cost	$11,293.33	/acre		
m.	Mobilization/Demobilization	$1,000.00	/yr		
n.	*Total cap erosion repair cost*			(k x l) + m	*$34,880* /yr
	Yearly Cap Maintenance & Repair cost			d + g + j + n	***$77,480 /yr***

V. Sediment Basin Maintenance & Repair

a.	Sediment basin cleanout frequency, 1 per	30	years	1 / a	0.03 event/yr
b.	Sediment basin cleanout unit cost	$0	/event		
c.	Mobilization/Demobilization		/event		
d.	*Total sediment basin maintenance cost*			a x (b + c)	*$0* /yr
e.	Total number of stormwater sampling locations	-	locations		
f.	Stormwater sampling frequency	-	events/yr		
g.	Total number of stormwater samples			e x f	0 samples/yr
h.	Analysis unit cost (VPDES permit parameters)		/sample		
i.	*Total Analysis cost*			g x h	*$0* /yr
j.	Mobilization unit cost		/event		
k.	Technician field unit cost		/event		
l.	*Total sampling cost*			f x (j + k)	*$0.00* /yr
m.	Engineering fees & reports		/yr		
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	$1,000	/yr		
	Yearly Vector and Rodent Control Cost			a	***$1,000 /yr***

VII. Post-Closure Care General Inspections

a.	General Inspection unit cost	$250	/inspection		
b.	Number of inspections per year	4			
	Yearly Post-Closure Care General Inspection Cost			a x b	***$1,000 /yr***

Annual Post-Closure Care Cost (APCC)				I + … + VII	$137,680 /yr
Length of post-closure care (LPCC)		30	years		
Post-Closure Care Cost				APCC x LPCC	$4,130,400
Engineering & Documentation				Engineering Sum	$10,000
Post-Closure Care Evaluation		$9,000			
Post-Closure Care Certification		$1,000			
Cost for survey and deed notation (if not completed at time of landfill closure)			**Performed at time of closure**		
FA Mechanism Maintenance Cost			/yr	FA maintenance x LPCC	$0
			Financial Test by AEP Legal		
Total Post-Closure Care Cost				Post-Closure Cost + Engineering + FA Maintenance	**$4,140,400**