INFORMATION SHEET

PRESIDING: Chair Mitchell, Presiding; Commissioners Brown-Bland, Gray, Clodfelter, Duffley, Hughes, McKissick
PLACE: Held Via Videoconference
DATE: Tuesday, September 8, 2020
TIME: 1:30 p.m. – 4:32 p.m.
DOCKET NOS.: E-7, Sub 1214; E-7, Sub 1213; E-7, Sub 1187
COMPANY: Duke Energy Carolinas, LLC; Duke Energy Progress, LLC
DESCRIPTION: E-7, Sub 1213, In the Matter of Petition of Duke Energy Carolinas, LLC, for Approval of Prepaid Advantage Program; E-7, Sub 1214, In the Matter of Application of Duke Energy Carolinas, LLC, for Adjustment of Rates and Charges Applicable to Electric Utility Service in North Carolina; E-7, Sub 1187, In the Matter of Application of Duke Energy Carolinas, LLC, for an Accounting Order to Defer Incremental Storm Damage Expenses Incurred as a Result of Hurricane Florence and Michael and Winter Storm Diego

VOLUME NUMBER: 15

APPEARANCES
(See attached.)

WITNESSES
(See attached.)

EXHIBITS
(See attached.)

COPIES ORDERED: Downey, Culpepper, Holt, Cummings, Edmondson, Grantmyre, Dodge, Jost, Little, Luhr, Force, Townsend, Robinson, Kells, Mehta, Lee, Cress, Ross, Ledford, Smith, Schauer, Heslin, Su, Crystal and Beverly
CONFIDENTIAL TRANSCRIPTS and EXHIBITS ORDERED: Robinson, Heslin, Somers, Kells, Jagannathan, Mehta, Lee, Cress, Ross, Jenkins, Beverly, Ledford, Smith, Crystal, Su, Force, Townsend, Downey, Culpepper, Cummings, Dodge, Edmondson, Grantmyre, Holt, Jost, Little, and Luhr

REPORTED BY: Joann Bunze
TRANSCRIBED BY: Joann Bunze
DATE FILED: September 11, 2020

TRANSCRIPT PAGES: 133
PREFILED PAGES: 28
TOTAL PAGES: 161

PLACE: Held via Videoconference

DATE: Tuesday, September 8, 2020

TIME: 1:32 P.M. - 4:32 P.M.

DOCKET NO.: E-7, Sub 1214

E-7, Sub 1213

E-7, Sub 1187

BEFORE: Chair Charlotte A. Mitchell, Presiding

Commissioner ToNola D. Brown-Bland

Commissioner Lyons Gray

Commissioner Daniel G. Clodfelter

Commissioner Kimberly W. Duffley

Commissioner Jeffrey A. Hughes

Commissioner Floyd B. McKissick, Jr.

IN THE MATTER OF:

DOCKET NO. E-7, SUB 1214

Application of Duke Energy Carolinas, LLC,

for Adjustment of Rates and Charges Applicable to

Electric Utility Service in North Carolina

DOCKET NO. E-7, SUB 1213

Petition of Duke Energy Carolinas, LLC,

for Approval of Prepaid Advantage Program

DOCKET NO. E-7, SUB 1187

Application of Duke Energy Carolinas, LLC,

for an Accounting Order to Defer Incremental Storm

Damage Expenses Incurred as a Result of Hurricanes

Florence and Michael and Winter Storm Diego

VOLUME 15

A P P E A R A N C E S:

FOR DUKE ENERGY CAROLINAS, LLC:

Camal Robinson, Esq., Associate General Counsel

Brian Heslin, Esq., Deputy General Counsel

Duke Energy Corporation

550 South Tryon Street

Charlotte, North Carolina 28202

Lawrence B. Somers, Esq., Deputy General Counsel

Duke Energy Corporation

410 South Wilmington Street

Raleigh, North Carolina 27601

James H. Jeffries, IV, Esq.

McGuireWoods LLP

201 North Tryon Street, Suite 3000

Charlotte, North Carolina 28202

Andrea Kells, Esq.

McGuireWoods LLP

501 Fayetteville Street, Suite 500

Raleigh, North Carolina 27601

A P P E A R A N C E S Cont'd:

Molly McIntosh Jagannathan, Esq., Partner
Kiran H. Mehta, Esq., Partner
Troutman Pepper Hamilton Sanders LLP
301 South College Street, Suite 3400
Charlotte, North Carolina 28202

Brandon F. Marzo, Esq.
Troutman Pepper
600 Peachtree Street, NE, Suite 3000
Atlanta, Georgia 30308

FOR SIERRA CLUB:
Bridget Lee, Esq.
Sierra Club
9 Pine Street
New York, New York 10005

Catherine Cralle Jones, Esq.
Law Office of F. Bryan Brice, Jr.
127 W. Hargett Street
Raleigh, North Carolina 27601

A P P E A R A N C E S Cont'd:

FOR NC JUSTICE CENTER, NC HOUSING COALITION, NATURAL RESOURCES DEFENSE COUNCIL and SIERRA CLUB:

Gudrun Thompson, Esq., Senior Attorney
David L. Neal, Esq., Senior Attorney
Tirrill Moore, Esq., Associate Attorney
Southern Environmental Law Center
601 West Rosemary Street, Suite 220
Chapel Hill, North Carolina 27516

FOR CAROLINA INDUSTRIAL GROUP FOR FAIR UTILITY RATES III:

Christina D. Cress, Esq.
Bailey & Dixon, LLP
Post Office Box 1351
Raleigh, North Carolina 27602

FOR CAROLINA UTILITY CUSTOMERS ASSOCIATION, INC.:

Robert F. Page, Esq.
Crisp & Page, PLLC
4010 Barrett Drive, Suite 205
Raleigh, North Carolina 27609

A P P E A R A N C E S Cont'd:

FOR NC WARN:

Matthew D. Quinn, Esq.

Lewis & Roberts PLLC

3700 Glenwood Avenue, Suite 410

Raleigh, North Carolina 27612

FOR VOTE SOLAR:

Thadeus B. Culley, Esq., Regulatory Counsel

Senior Regional Director

1911 Ephesus Church Road

Chapel Hill, North Carolina 27517

FOR NORTH CAROLINA LEAGUE OF MUNICIPALITIES:

Deborah Ross, Esq.

Fox Rothschild LLP

434 Fayetteville Street, Suite 2800

Raleigh, North Carolina 27601

FOR NORTH CAROLINA CLEAN ENERGY BUSINESS ALLIANCE:

Karen Kemerait, Esq.

Fox Rothschild LLP

434 Fayetteville Street, Suite 2800

Raleigh, North Carolina 27601

A P P E A R A N C E S Cont'd:

FOR THE COMMERCIAL GROUP:

Alan R. Jenkins, Esq.
Jenkins At Law, LLC
2950 Yellowtail Avenue
Marathon, Florida 33050

Brian O. Beverly, Esq.
Young Moore and Henderson, P.A.
3101 Glenwood Avenue
Raleigh, North Carolina 27622

FOR NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION:

Peter H. Ledford, Esq., General Counsel
Benjamin Smith, Esq., Regulatory Counsel
North Carolina Sustainable Energy Association
4800 Six Forks Road, Suite 300
Raleigh, North Carolina 27609

A P P E A R A N C E S Cont'd:

FOR THE TECH CUSTOMERS:

Marcus W. Trathen, Esq.

Craig D. Schauer, Esq.

Matthew B. Tynan, Esq.

Charles E. Coble, Esq.

Brooks, Pierce, McLendon, Humphrey & Leonard, L.L.P.

150 Fayetteville Street, Suite 1700

Raleigh, North Carolina 27601

FOR BIOLOGICAL DIVERSITY AND APPALACHIAN VOICES:

Howard M. Crystal, Esq.

Senior Attorney

Jean Su, Esq.

Staff Attorney and Energy Director

Biological Diversity

1411 K Street NW, Suite 1300

Washington, DC 20005

1 A P P E A R A N C E S Cont'd:
2 FOR HARRIS TEETER:
3 Kurt J. Boehm, Esq.
4 Jody Kyler Cohn, Esq.
5 Boehm, Kurtz, & Lowry
6 36 East Seventh Street, Suite 1510
7 Cincinnati, Ohio 45202
8
9 Benjamin M. Royster, Esq.
10 Royster and Royster, PLLC
11 851 Marshall Street
12 Mount Airy, North Carolina 27030
13
14 FOR THE USING AND CONSUMING PUBLIC AND ON BEHALF OF
15 THE STATE AND ITS CITIZENS IN THIS MATTER THAT AFFECTS
16 THE PUBLIC INTEREST:
17 Margaret A. Force, Esq., Assistant Attorney General
18 Teresa Townsend, Esq., Special Deputy Attorney General
19 North Carolina Department of Justice
20 Post Office Box 629
21 Raleigh, North Carolina 27603
22
23
24

1 T A B L E O F C O N T E N T S
E X A M I N A T I O N S

2

1 E X H I B I T S

2 IDENTIFIED/ADMITTED

19

20

21

22

23

24

Duke Energy Carolinas
Response to
Attorney General's Office Data Request
Request No. AGO 2

I/A

Docket No. E-7, Sub 1214

Date of Request: **November 27, 2019**
Date of Response: **December 17, 2019**

[X] **CONFIDENTIAL**

[ ] **NOT CONFIDENTIAL**

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to AGO Data Request No. 2-1, was provided to me by the following individual(s): Trudy H. Morris, Project Manager II, and was provided to AGO under my supervision.

Camal O. Robinson
Senior Counsel
Duke Energy Carolinas

AGO
Data Request No. 2
DEC Docket No. E-7, Sub 1214
Item No. 2-1
Page 1 of 3

Request:

1. In reference to Table 1 of Witness Bednarcik's Direct Testimony on page 17, please delineate for each referenced site: Allen, Belews Creek, Cliffside/Rogers, and Marshall, a breakdown and explanation of each cost incurred for each line item created, as follows:
a. EHS cost at each site
i. Cost of well installation at each site
1. Number and location of wells installed
2. Internal cost
3. Cost paid to each third party
4. For what purpose was each well installed
a. an internal decision/voluntary
b. a third party requirement
i. Cost attributable to a court order, SOC, or Settlement Agreement
ii. Cost attributable to CAMA
iii. Cost attributable to CCR Rule
c. Any other reason other than (4)(b)(i-iii)
ii. Cost of well sampling/groundwater monitoring at each site
1. How often wells sampled or monitored
2. How many wells sampled or monitored
3. Internal cost
4. Cost paid to each third party
5. Purpose of each sampling/monitoring event
a. Cost attributable to a SOC, other court order, or Settlement Agreement
b. Cost attributable to the CCR Rule
c. Cost attributable to CAMA
d. Cost attributable to sampling/monitoring for any other reason than those listed in (5)(a-c)
iii. Cost of bottled water at each site
1. Cost of permanent water supplies
a. identification of types of permanent water supplies provided with the exception of bottled water, and the cost of each
iv. other EHS related costs at each site
1. Purpose of costs being incurred
a. Costs incurred as a result of a court order, SOC, or Settlement Agreement
b. Costs incurred as a result of CAMA
c. Costs incurred as a result of the CCR Rule
d. Cost incurred for any other reason other than those listed in (1)(a-c)
b. Basin Closure/Engineering Design at each site
i. Internal cost
ii. Cost paid to each third party
iii. The actual documents prepared and activities conducted
iv. The purpose for which each document/report was prepared and activity conducted
a. Cost attributable to a court order, SOC, or Settlement Agreement
b. Cost attributable to CAMA

c. Cost attributable to CCR Rule
d. Cost attributable to any other reason other than those listed in (iv)(a–c)
c. Basin Support Projects at each site
i. Internal cost
ii. Cost paid to each third party
iii. Specific projects completed or scheduled to be completed
1. The specific cost for each project for each site
2. The purpose for which each specific project was conducted
a. Cost attributable to a court order, SOC, or Settlement Agreement
b. Cost attributable to CAMA
c. Cost attributable to CCR Rule
d. Cost attributable to any other reason other than those listed in (iii)(a–c)
d. Permanent Water Supply at each site
i. Internal cost
ii. Cost paid to each third party
iii. How this line item differs from those included in EHS
e. Permitting at each site
i. What applications for permits made
ii. What permits issued
iii. Purpose of permit(s) acquired for each site
1. Permits required under a court order, SOC, or Settlement Agreement
2. Permits required under CAMA
3. Permits required under the CCR Rule
4. Permits attributable to any other reason other than those listed in (iii) (1-3)
iv. Cost for each permit
1. Costs attributable to a court order, SOC, or Settlement Agreement
2. Costs attributable to CAMA
3. Costs attributable to the CCR Rule
4. Costs attributable to any other reason other than those listed in (iv)(1-3)
f. Other at each site
i. Internal cost
ii. Cost paid to each third party
iii. Purpose of costs being incurred
1. Costs incurred as a result of a court order, SOC, or Settlement Agreement
2. Costs incurred as a result of CAMA
3. Costs incurred as a result of the CCR Rule
4. Cost incurred for any other reason other than those listed in (iii) (1-3)

AGO
Data Request No. 2
DEC Docket No. E-7, Sub 1214
Item No. 2-1
Page 3 of 3

Confidential Response:

See attached documents.

2018-2019 GW Sampling Programs

AGO 2 narrative response.docx

DEC AG DR No.2 Other EHS Costs.xls›

AGO #2 Narrative:

The attached file labeled "CONFIDENTIAL DEC AG DR No.2 Detailed Trans – Jan 18 to Jun 19-FinalwSummary.xlsx" contains detailed transactions for each location (Allen, Belews Creek, Cliffside, Marshall, Buck, Dan River, Riverbend and WS Lee.) The detailed transactions are separated by location. In order to be responsive to the data request, Duke Energy has provided a number of pivot tables to help arrange the data.

The pivot table in the "DEC Summary" provides a summary of costs by Testimony Cost Group.

The tabs that contain the name of the location as well as "-Summary" after it includes two pivot tables. One is cost by resource type. Resource types includes labor, contract and outside services, employee expenses, material supplies/purchases, transportation and vehicles, and other. The second pivot table shows a description of the project and the vendor costs associated with the project.

Costs are not allocated between CAMA, CCR, SOC, or other, unless noted in the attachment.

This file is responsive to the following requests:

1.a.i.2
1.a.4.b.i-iii
1.a.i.3
1.a.ii.3 & 4
1.a.ii.5.a-d
1.a.iii.1.a –Also see response to Public Staff DEC Data Request 2-6. As requested in the response, bottled water costs were excluded.
1.a.iv.a, b, c, d
1.b.i & ii
1.b.iv.a-d
1.c.i & ii
1.c.iii.1
1.c.iii.2.a-d
1.d.i-iii – costs are not different than those included in EHS.
1.e.iv.1-4
1.f.i & ii
1.f.iii.1-4
2.a.i.2 & 3
2.a.i.4.b.i-iii
2.a.ii.3 & 4
2.a.ii.5.a-d
2.a.iii.1.a - Also see response to Public Staff DEC Data Request 2-6. As requested in the response, bottled water costs were excluded.
2.a.iv.a-d
2.b.i & ii

2.b.iv.a-d
2.c.i & ii
2.c.iv.1-4 – costs associated with the beneficiation facility construction are attributable to CAMA, although beneficiation will also allow for closure under the CCR rule.
2.d.i & ii
2.d.iii.1
2.d.iii.2.a-d
2.e.i & ii & iii & iv 1-4 - Also see response to Public Staff DEC Data Request 2-6. As requested in the response, bottled water costs were excluded.
2.f.iv.1-4
2.g.1.a-d
3.a.i.2 & 3
3.a.i.4.b.i-iii
3.a.ii.3 & 4
3.a.ii.5.a-d
3.a.iii.1.a - Also see response to Public Staff DEC Data Request 2-6. As requested in the response, bottled water costs were excluded.
3.a.iv.1.a-d
3.b.i & ii
3.b.iv.a-d
3.c.i & ii & iii – costs are not different than those included in EHS.
3.d.iv.1-4
3.e.1.a-d
4.a.i.2
4.a.i.3
4.a.i.4.b.i-iii
4.a.ii.3
4.a.ii.4
4.a.ii.5.a-d
4.a.iii.1.a - Also see response to Public Staff DEC Data Request 2-6. As requested in the response, bottled water costs were excluded.
4.a.iv.1.a-d
4.b.v & vi
4.b.vii.e-h
4.c.i-iii – costs are not different than those included in EHS.
4.d.iv.1-4
4.e.1.a-d
5.a.i.2 & 3
5.a.i.4.b.i-iii
5.a.ii.3&4
5.a.ii.5.a-d

5.a.iii.1.a - Also see response to Public Staff DEC Data Request 2-6. As requested in the response, bottled water costs were excluded.
5.a.iv.1.a-d
5.b.i & ii
5.b.iv.a-d
5.c.iv.1-4
5.d.i & ii
5.d.iii.1
5.d.iii.2.a-d
5.e.1.a-d

Responsive information to the following items can be found in the attached document titled "2018-2019 GW Sampling Programs DEC.xlsx". Also see response to Public Staff DEC Data Request 2-11 and 2-12.
1.a.ii.1 & 2 & 5
2.a.4.a-c
2.a.ii.1 & 2 & 5
3.a.i.1 & 4.a-c
3.a.ii.1 & 2 & 5
4.a.i.1 & 4.a-c
4.a.ii.1 & 2 & 5
5.a.i.1 & 4.a-c
5.a.ii.1 & 2 & 5

Responsive information to the following items can be found in the attached document titled "DEC AG DR No.2 Other EHS Costs"
1.a.iv.1
2.a.iv.1
3.a.iv.1
4.a.iv.1
5.a.iv.1

Additional responsive information
1.c.iii & 2.d.iii Basin Support Projects at each site; specific projects completed or scheduled to be completed
- At Buck, Dan River and Marshall, stormwater projects were completed or scheduled to be completed from January 1, 2018 to January 31, 2020. These projects were executed to stop flows to the basins.

Duke Energy will be providing supplemental information related to permitting, purpose of "other" costs at each site, documents prepared and activities conducted for basin closure and the beneficiation project at Buck.

Additional cost information has also been provided in the response to Public Staff DEC Data Request 102-6.

AGO Data Request #2 - As it relates to 1 other EHS costs at each site, please provide an explanation for the costs incurred and the purpose of costs being incurred.

Jurisdiction	Station Name	CCR Rule Requirement	State Agency/Court Order/Settlement Agreement Requirement	CAMA Requirement
DEC	**Allen**	One annual report, semi-annual statistical analysis reports, and semi-annual data validations will be completed per year for 1 multiunit. Assessment of Corrective Measures report.	Two tri-annual NPDES Groundwater reports (2018, new permit effective 8/1/18).	Quarterly data validation and data submittals. DEC annual reports and 2018 Annual Interim Monitoring Report. 2018 Updated Comprehensive Site Assessment. Surface Water Evaluation to Assess 15A NCAC 2B Compliance. Ash Basin Pumping Test. Groundwater gecochemical/fate and transport modeling. Revised Corrective Action Plan (to be submitted 12/2019).
DEC	**Belews Creek**	One annual report, semi-annual statistical analysis reports, and semi-annual data validations will be completed per year for 1 unit.Assessment of Corrective Measures report.	Semi-annual NCDEQ-DWM landfill report and annual landfill permit fees. Tri-annual NPDES Groundwater Report (2018 + one event in 2019 prior to receipt of new permit in March). Accelerated Remediation Interim Action Plan Effectiveness Monitoring Report, per Settlement Agreement.	Quarterly data validation and data submittals. DEC annual reports and 2018 Annual Interim Monitoring Report. 2017 Updated Comprehensive Site Assessment. Surface Water Evaluation to Assess 15A NCAC 2B Compliance. Ash Basin Pumping Test. Groundwater gecochemical/fate and transport modeling. Revised Corrective Action Plan (to be submitted 12/2019).
DEC	**Buck**	One annual report, semi-annual statistical analysis reports, and semi-annual data validations will be completed per year for 2 units. Assessment of Corrective Measures report.	Tri-annual NPDES Groundwater reports (2018).	Quarterly data validation and data submittals. DEC annual reports and 2018 Annual Interim Monitoring Report. Surface Water Evaluation to Assess 15A NCAC 2B Compliance.
DEC	**Cliffside (Rogers)**	One annual report, semi-annual statistical analysis reports, and semi-annual data validations will be completed per year for 4 units. Semi-annual alternative source demonstrations for 1 unit. Assessment of Corrective Measures report.	Semi-annual NCDEQ-DWM landfill report and annual landfill permit fees. Tri-annual NPDES Groundwater Reporting (2018).	Quarterly data validation and data submittals. DEC annual reports and 2018 Annual Interim Monitoring Report. 2018 Updated Comprehensive Site Assessment. Surface Water Evaluation to Assess 15A NCAC 2B Compliance. Ash Basin Pumping Test. Groundwater gecochemical/fate and transport modeling. Revised Corrective Action Plan (to be submitted 12/2019).
DEC	**Dan River**	One annual report, semi-annual statistical analysis reports, and semi-annual data validations will be completed per year for 2 units. Semi-annual alternative source demonstrations for 1 unit. Assessment of Corrective Measures report.	Semi-annual NCDEQ-DWM landfill report and annual landfill permit fees. Tri-annual NPDES Groundwater Reporting (2018 + one event in 2019 prior to receipt of new permit in March).	Quarterly data validation and data submittals. DEC annual reports and 2018 Annual Interim Monitoring Report. 2018 Updated Comprehensive Site Assessment. Surface Water Evaluation to Assess 15A NCAC 2B Compliance.
DEC	**Marshall**	One annual report, semi-annual statistical analysis reports, and semi-annual data validations will be completed per year for 1 multiunit. Assessment of Corrective Measures report and the Semi-Annual Progress Report.	Semi-annual landfill reports for two landfills and annual landfill permit fees. One Tri-annual NPDES Groundwater report in 2018 prior to NPDES renewal in April 2018 (2018).	Quarterly data validation and data submittals. DEC annual reports and 2018 Annual Interim Monitoring Report. 2018 Updated Comprehensive Site Assessment. Surface Water Evaluation to Assess 15A NCAC 2B Compliance. Ash Basin Pumping Test. Groundwater gecochemical/fate and transport modeling. Revised Corrective Action Plan (to be submitted 12/2019).
DEC	**Riverbend**	N/A	Tri-annual NPDES Groundwater reports (2018).	Quarterly data validation and data submittals. 2017 Updated Comprehensive Site Assessment. DEC annual reports and 2018 Annual Interim Monitoring Report. Surface Water Evaluation to Assess 15A NCAC 2B Compliance.
DEC	**WS Lee (SC)**	One annual report, semi-annual statistical analysis reports, and semi-annual data validations will be completed per year for 1 multiunit. Assessment of Corrective Measures report.	Groundwater well installations, Post Excavation Soil Sampling/Analysis, Assessment Report and Baseline Risk Assessment per SCDHEC Consent Agreement.	N/A

Acronym	Definition
A	Annual
ALN	Allen Steam Electric Plant
ASV	Asheville Steam Electric Plant
CCR	Coal Combustion Residuals Final Rule
CAMA	Coal Ash Management Act
ASA	Asheville Airport
ASHB	Ash Basin
BLC	Belews Creek Steam Station
BNP	Brunswick Nuclear Station
BSC	Buck Steam Station
CFR	Cape Fear Steam Station
COMP	Compliance
CRLF	Craig Road Landfill
CLS	Cliffside Steam Station/ Rogers Energy Complex
CNS	Catawba Nuclear Station
BKLF	Background Landfill Event
DRC	Dan River Combined Cycle Station
FGDLF	FGD Landfill
LCC	H.F. Lee Steam Station
HNP	Shearon Harris Nuclear Station
HV	Huntersville Lab at McGuire Nuclear Station
LF	Landfill
LM	Landfarm
MSS	Marshall Steam Station
MNS	McGuire Nuclear Station
MAY	Mayo Steam Station
NH	New Hill Lab at Shearon Harris Nuclear Station
ONS	Oconee Nuclear Station
PHLF	Pine Hall Landfill
Q	Quarterly
RNP	H. B. Robinson Steam Electric Station
RP	Radiation Protection
RBS	Riverbend Steam Station
ROX	Roxboro Steam Station
S	Semiannual
SCC	Sutton Steam Station
T	Triannual
BK	Background Event
LEE	W.S. Lee Steam Station
WLs	Water Levels
DA/LEACHLF	Dry Ash and Leachate Landfill
WSC	Weatherspoon Steam Station
	Sampling Performed by Pace or SynTerra
	Tentative Event
	Sampling Performed by Duke's Groundwater Team

Colour	Program
	Special
	Tritium (H3)
	CAMA
	CCR
	Ash Basin
	Landfill
	Date CAMA Analysis is due by

Program	Site	Location	Number of Wells	Sampling Frequency	Months Sampled
Ash Basin - State NPDES	ALN		13	T	Mar, Jul, Nov
	BLC		9	T	Jan, May, Sep
	BSC		14	T	Mar, Jul, Nov
	CLS		8	T	Apr, Aug, Dec
	DRC		8	T	Jan, May, Sep
	LEE		15	S	Mar, Sep
	MSS		12	T	Feb
	RBS		22	T	Feb, Jun, Oct
CCR	ALN		54	T	
	BLC		35	T	
	BSC		63	T	
	CLS		125	T	
	DRC		43	T	
	LEE		38	T	
	MSS		34	T	
CAMA	ALN		125	Q	Q1, Q2, Q3, Q4
	BLC		109	Q	Q1, Q2, Q3, Q4
	BSC		110	Q	Q1, Q2, Q3, Q4
	DRC		57	Q	Q1, Q2, Q3, Q4
	CLS		175	Q	Q1, Q2, Q3, Q4
	MSS		135-170	Q	Q1, Q2, Q3, Q4
	RBS		94	Q	Q1, Q2, Q3, Q4
Landfill	BLC	Pine Hall	10	S	Apr, Oct
	CLS	CCP	17	S	Apr, Oct
	DRC	CCR	21	S	May, Nov
	MSS	Dry Ash Landfill	8	S	Feb, Aug
		FGD Landfill	9	S	Mar, Sep
		Industrial 1	2	S	Feb, Aug
SCDHEC Consent Agreement	LEE	Inactive Ash Basin and Ash Fill Area	41	Q	Q1, Q2, Q3, Q4

Program	Site	Location	Number of Wells				Number of Surface Waters/ Outfalls	Number of Leachate Cells	Months Sampled
			Semi-annually	Tri-annually	Quarterly	Annually			
Ash Basin - NPDES	BLC			9					Jan
	DRC			8					Jan
	LEE		15						Mar, Sep
	RBS			21					Feb, Jun, Oct
Landfill	BLC	Pine Hall	13				2		Apr, Oct
	CLS	CCP	13				3	1	Apr, Oct
	DRC	CCR	13				4	3	May, Nov
	MSS	Dry Ash Landfill	5						Feb, Aug
		FGD Landfill	9				1	1	Mar, Sep
		Industrial 1 Leachate						4	Feb, Aug
CCR	ALN		72						Mar, Sept
	BLC		62						Apr, Oct
	BSC		72						Feb, Aug
	CLS		134						Apr, Oct
	DRC		57						Jun, Dec
	LEE		36						Mar, Sept
	MSS		47						Feb, Aug
CAMA	ALN		103		33				Mar, Jun, Sep, Dec
	BLC		56		35				Jan, Apr, Jul, Oct
	BSC		74		31				Feb, May, Aug, Nov
	CLS		147		129				Jan, Apr, Jul, Oct
	DRC		43		7				Mar, Jun, Sep, Dec
	MSS		59		88	26			Feb, May, Aug, Nov (+June)
	RBS		66		23				Feb, May, Aug, Nov
SCDHEC Consent Agreement	LEE	Inactive Ash Basin and Ash Fill Area	3						Mar, Jun

Groundwater Monitoring Requirements of the CCR Rule – What's Next?

Thomas A. Mann, PE

SynTerra Corporation, 148 River Street, Greenville, SC 29601

CONFERENCE: 2017 World of Coal Ash – (www.worldofcoalash.org)

KEYWORDS: groundwater monitoring, coal combustion residuals, sampling and analysis, reporting

ABSTRACT

The U.S. Environmental Protection Agency published 40 CFR 257, Subpart D, the Coal Combustion Residuals (CCR) Rule [1] on April 17, 2015. This Rule includes provisions for groundwater monitoring of active, inactive, and new CCR landfills and impoundments. Various deadlines are set for the establishment of a groundwater monitoring system, the sampling and analysis of groundwater, and the statistical evaluation of groundwater data. The CCR Rule created three phases of groundwater monitoring that include Detection Monitoring, Assessment Monitoring, and Corrective Action Monitoring. Groundwater protection standards will need to be developed based upon maximum contaminant levels (MCLs) or background levels. Criteria that trigger these phases of monitoring include a statistically significant increase (SSI) and a statistically significant level (SSL). If SSLs are determined in Assessment Monitoring, then the nature and extent of a release must be determined and a corrective action remedy developed. Reporting requirements that need to be a part of the operating record and/or posted to the public internet site are established. This presentation will provide an overview of upcoming CCR Rule requirements and corresponding deadlines. In addition, selected case studies of current CCR groundwater monitoring system designs including single units and multi-units with interconnected hydraulic water-bearing units, sampling and analysis programs, and data quality management challenges will be described.

INTRODUCTION

On April 17, 2015, in an effort to nationally regulate coal combustion residuals, the United States Environmental Protection Agency (USEPA) published the Final Rule of the Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments[1]. This regulation addresses the safe disposal of coal combustion residuals (CCR) as solid waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA) and is referred to herein as the CCR Rule. The CCR Rule became effective on October 19, 2015 and established national minimum criteria for the safe disposal of CCR. The regulations cover new and existing CCR landfills, surface impoundments, and lateral expansions. Requirements for the design and operation of

CCR units are identified along with groundwater monitoring and corrective action, closure and post closure care, and recordkeeping/notification.

This paper will focus on the groundwater monitoring and corrective action requirements of the CCR Rule as identified in 40 CFR Parts 257.90 through 257.98 and applicable record keeping and notification requirements. The activities initially required to comply with the CCR Rule will be discussed first and include development of the Site Conceptual Model, the design and installation of the CCR Monitoring Well Network, and the Sampling & Analysis Program. After these initial activities are complete, the remaining 'What's Next?' CCR Rule groundwater monitoring requirements will be discussed. These requirements include:

1. Detection Monitoring (Initial Phase);
2. Statistical Evaluation;
3. Detection Monitoring;
4. Assessment Monitoring;
5. Assessment of Corrective Measures; and
6. Annual Report.

PRELIMINARY CCR RULE GROUNDWATER MONITORING ACTIVITIES

Site Conceptual Model

A site conceptual model (SCM) provides a description of relevant site features and surface/subsurface conditions so that transport and migration of identified potential contaminants of concern can be understood. A hydrogeologic investigation is performed to collect the needed information to develop the SCM and can be refined through an iterative process through additional data gap investigations. The level of detail of the conceptual model should match the complexity of the site and available data. Development of the SCM will support eventual risk assessment evaluations and remedial decision making. If the migration pathways identified by the SCM are monitored, then the performance standard for the CCR Rule groundwater monitoring system design will be achieved.

CCR Monitoring Well Network Design and Installation

The CCR Rule contains a performance standard and a prescriptive requirement regarding the groundwater monitoring well network design and installation. The groundwater monitoring system should consist of a sufficient number of wells at

appropriate locations and depths to collect groundwater samples from the uppermost aquifer to meet the following performance criteria from 40 CFR 257.91(a):

- "Accurately represent the quality of background groundwater that has not been affected by leakage from a CCR unit."[1]

- "Accurately represent the quality of groundwater passing the waste boundary of the CCR unit. The downgradient monitoring system must be installed at the waste boundary that ensures detection of groundwater contamination in the uppermost aquifer. All potential contaminant pathways must be monitored." [1]

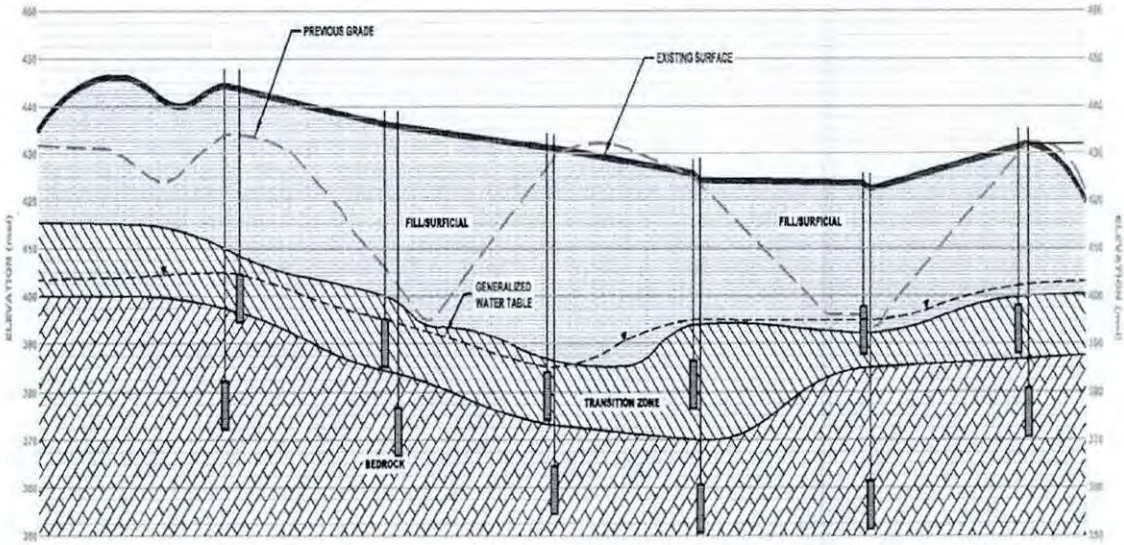
In addition, the CCR Rule prescribes that the monitoring system must include a minimum of one upgradient and three downgradient monitoring wells; however, additional monitoring wells must be installed as necessary to accurately represent the quality of background groundwater and the quality of groundwater passing the waste boundary of the CCR unit.

Background groundwater quality determinations do not have to be from hydraulically upgradient monitoring wells of the CCR unit. These exceptions include hydrogeological conditions that prevent the determination of what wells are hydraulically upgradient or other wells that are not hydraulically upgradient provide an indication of background qroundwater quality that is as representative as upgradient monitoring wells.

The downgradient wells "must be located at the hydraulically downgradient perimeter of the CCR unit or at the closest practical distance from this location."[2] Monitoring well locations must be chosen based on accessibility and proximity to the waste boundary at the unit to be in compliance with 40 CFR 257.91(a)(2). Typical well location restrictions include power transmission line right-of-ways, underground utilities, drainage ditches, wetland areas, seep areas, and drainage pipelines.

The uppermost aquifer is defined in the regulations at 40 CFR 257.53 as "the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. Upper limit is measured at a point nearest to the natural ground surface to which the aquifer rises during the wet season."[1] In addition, the definition of an aquifer "means a geologic formation, group of formations, or portion of a formation capable of yielding usable quantities of groundwater to wells or springs."[1] Therefore, the definition of a usable groundwater is based on the natural quality and the quantity. An example of a CCR monitoring well network that monitors hydraulically interconnected aquifers in the downgradient groundwater flow direction is shown below.

CCR MONITORING NETWORK FOR HYDRAULICALLY INTERCONNECTED AQUIFERS



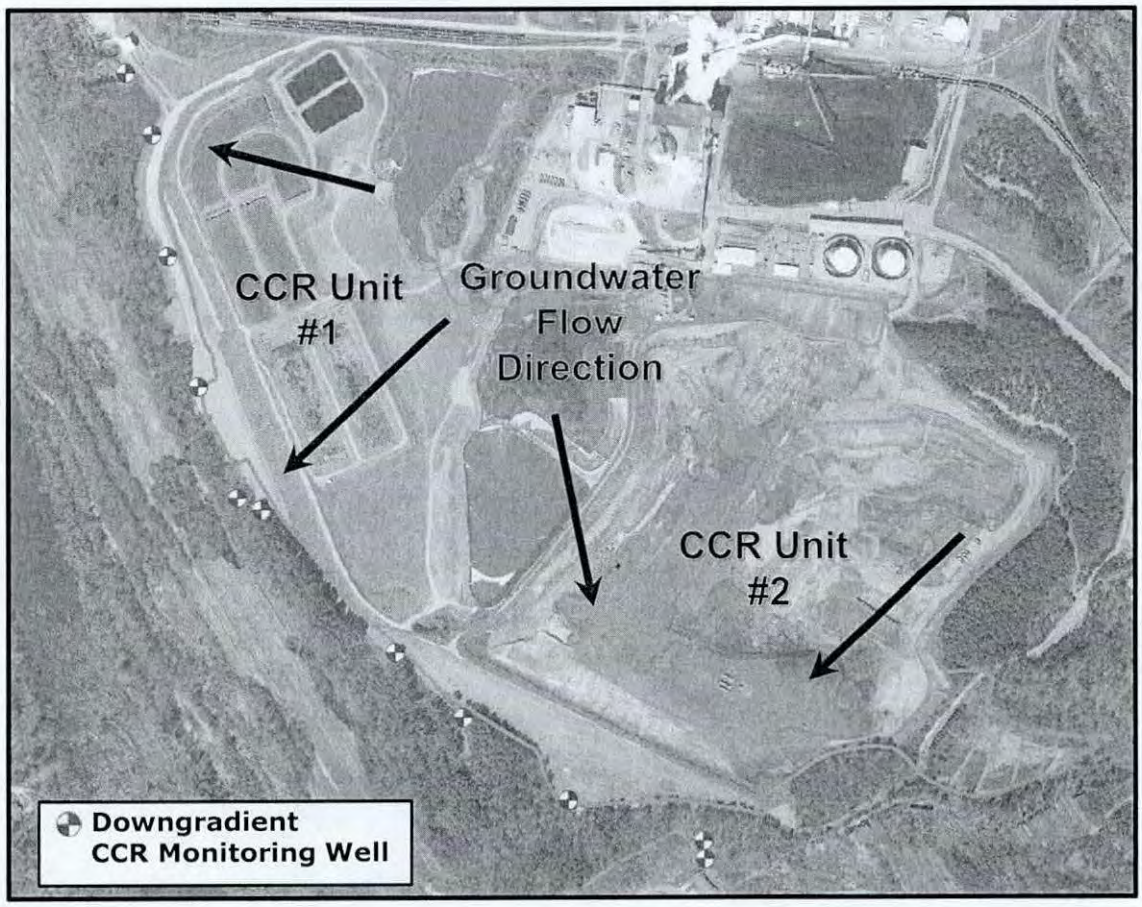
The CCR Rule provides a performance standard requiring groundwater monitoring wells to be constructed in a manner that maintains borehole integrity, consists of a screen, and is properly sealed to prevent cross contamination (40 CFR 257.91(e)). In addition to monitoring well installation and as part of the well construction process, wells must be developed to remove drill fluids, clay, silt, sand, and other fines which may have been introduced into the formation or sand pack during drilling and well installation, and to establish communication of the well with the aquifer.

Documentation of field activities can be achieved using a combination of log books and field forms. Log books are completed to provide a general record of activities and events that occur during daily tasks including detailed descriptions of subsurface media encountered and observations made during boring installation. During installation and development of the monitoring well, boring logs are used to document lithology and details of boring advancement. Monitoring well construction logs are used to detail final monitoring well construction details and well development records are created to track the well development process for each newly installed monitoring well.

Owners or operators must obtain a certification from a qualified professional engineer stating that the groundwater monitoring system was designed and constructed to meet the requirements of 40 CFR 257.91. In addition, Owners or operators will adhere to the recordkeeping and notification requirements of 40 CFR 257.91, 257.105, and 257.107. For existing units, the groundwater monitoring system certification must be placed in the owner or operator's operating record as it becomes available and then posted to the public internet site within 30 days of placing in the operating record.

The CCR Rule under 40 CFR 257.91(d) allows for groundwater monitoring of CCR units that are close to each other using a single system. A multi-unit groundwater monitoring system is allowed as long as this system is equally capable of detecting a release at the waste boundary as multiple single unit monitoring systems. With a multi-unit system, the number of monitoring wells required to meet the performance standard may be reduced. However, if the multi-unit system includes unlined CCR surface impoundments as defined in 40 CFR 257.71(a), then all of the unlined surface impoundments are subject to closure requirements under 40 CFR 257.101(a) if there is an Appendix IV statistical significant level detection (discussed later). Below is an example of a multi-unit system.

MULTI-UNIT GROUNDWATER MONITORING SYSTEM



Sampling and Analysis Program

Under 40 CFR 257.93(a), the CCR Rule requires the development of a sampling and analysis program so that consistent procedures and techniques result in an accurate representation of groundwater quality. The program should include procedures for sample collection, preservation, and shipment. In addition, techniques covering

analytical procedures, chain of custody control, and quality assurance and quality control (QA/QC) should be included. Though not expressly required by the CCR Rule, a sampling and analysis plan (SAP) is suggested to satisfy the sampling and analysis consistency requirements.

Groundwater samples are to be analyzed for total recoverable metals and field filtering is not allowed in accordance with 40 CFR 257.93(i). Analytical methods are required to be appropriate for groundwater and accurately measure constituent concentrations. Many sites may deal with turbid groundwater samples and low-flow sampling methods as well as proper well screen design should be considered to minimize this turbidity. Groundwater monitoring procedures including low-flow sampling should be developed in accordance with federal/state procedures such as the USEPA Region IV *Field Branches Quality System and Technical Procedures*.[3] Other data quality challenges may occur when other sources other than from CCR units are suspected to be the cause of groundwater concentrations of Appendix III and IV constituents. Isotope analyses can be performed to investigate the source of a constituent in an aquifer. For example, boron concentrations in an aquifer located near a coast may be related to salt water intrusion and could be confirmed by analyzing for a particular marine boron isotope. Thus, it may be possible to show that the boron concentrations in groundwater are not entirely associated with materials from a CCR unit. Speciation evaluations can also be performed on groundwater for certain Appendix III and IV constituents to gain a better understanding of the presence of these metals originating from a CCR unit source or natural groundwater conditions.

WHAT'S NEXT?

Detection Groundwater Monitoring (Initial Phase)

In accordance with 40 CFR 257.90, groundwater monitoring and corrective action is required for CCR landfills, CCR surface impoundments, and lateral expansions of CCR units. As part of the first phase of detection monitoring, at least eight independent sampling events of initial monitoring is to be conducted for the Appendix III and Appendix IV constituents (Table 1) prior to October 17, 2017 for existing units. At new CCR units, EPA interprets the requirements of 40 CFR 257.90(b)(2) and 257.94(b) to mean at least eight sampling events in background wells are to be collected and analyzed before first placement of CCR. Sample results will be used to develop Site-specific background concentrations for each Appendix III and Appendix IV constituent that will be utilized during the detection monitoring phase.

The Appendix III constituents are considered by EPA to be the leading indicators of whether constituents are migrating from a CCR unit. Appendix III constituents include: boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids.

After completion of the sampling and analysis of the initial Detection Monitoring phase, EPA interprets the regulations to mean that the first statistical evaluation (discussed next) is to be completed no later than October 17, 2017 for the Appendix III constituents

for statistically significant increases (SSI) over background concentrations for each constituent in every downgradient well. If there is a SSI for any constituent in any well, the Site must begin Assessment Monitoring within 90 days.

Table 1. Part 257 Appendix III and Appendix IV Constituents

Appendix III - Constituents for Detection Monitoring	Appendix IV – Constituents for Assessment Monitoring	
Boron	Antimony	Lead
Calcium	Arsenic	Lithium
Chloride	Barium	Mercury
Fluoride	Beryllium	Molybdenum
pH	Cadmium	Selenium
Sulfate	Chromium	Thallium
Total Dissolved Solids	Cobalt	Radium 226/228 combined
	Fluoride	

Statistical Evaluation

The CCR Rule identifies four statistical methods (40 CFR 257.93(f)) that may be selected to evaluate the groundwater monitoring data in each well and for each constituent. In addition, an option is given to select another statistical method as long as the performance standards of 40 CFR 257.93(g) are met. The four identified methods include:

1. Parametric analysis of variance followed by multiple comparison procedures;
2. Analysis of variance followed by multiple comparison procedures;
3. Tolerance or prediction interval procedure; and
4. Control chart approach.

If a control chart, prediction interval, or tolerance interval approach is used, it must be at least as effective in evaluating groundwater data as any other procedure identified in the CCR Rule. Non-detect data must also be evaluated with a statistical method that is at least as effective as any other identified method.

A certification from a qualified professional engineer is required that states the "selected statistical method is appropriate for evaluating the groundwater monitoring data for the CCR management area" [1] (40 CFR 257.93(f)(6)). In addition, the certification must include a narrative description of whatever statistical method(s) was selected. For existing and new CCR units, the statistical method certification must be placed in the owner or operator's operating record as it becomes available and then posted to the public internet site within 30 days of placing in the operating record. The CCR Rule also requires that statistical procedures be developed by October 17, 2017 for existing facilities per 40 CFR 257.90(b).

Conclusions drawn from the statistical evaluation may be invalid or in error if sample data do not satisfy basic statistical assumptions, such as the data are not independent or identically distributed. The groundwater samples need to be representative of the underlying population. EPA is concerned about false negative results from the statistical evaluation. Therefore, EPA suggests that for groundwater sampling and statistical evaluations the guidelines in the *Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* [4]be followed. These guidelines were cited throughout the preamble to the final CCR Rule.

Detection Monitoring

Groundwater is monitored for evidence of a release under Detection Monitoring. Upon completion of the Initial Phase of Detection Monitoring described above, Detection Monitoring will begin after October 17, 2017 for existing units and after first placement of CCR at new units or lateral expansions. The same wells used for the Initial Phase of Detection Monitoring will be used to collect groundwater samples for the Appendix III constituents. These groundwater samples will be collected semiannually. It is possible to perform a demonstration for an alternative detection monitoring frequency that is greater than semiannual. As described in 40 CFR 257.94 (d), an evaluation may be conducted to support an alternative frequency based upon the following factors:

- "Lithology of the aquifer and unsaturated zone;
- Hydraulic conductivity of the aquifer and unsaturated zone;
- Groundwater flow rates; and
- Information documenting that the alternative frequency is no less effective in ensuring that any leakage from the CCR unit is discovered within a timeframe that will not materially delay establishment of an assessment monitoring program."[1]

A statistical evaluation must be completed within 90 days after completing sampling and analysis. The Appendix III constituents must be evaluated for SSIs over background concentrations for each constituent in every downgradient well. If there is a SSI for any Appendix III constituent in any downgradient well, the CCR unit must begin Assessment Monitoring within 90 days. The Detection Monitoring results must be reported in the Annual Report.

If there is a SSI, a written demonstration can be made within 90 days of the SSI determination that a source other than the CCR unit was the cause or the SSI resulted from a sampling and analysis error, statistical evaluation error, or natural groundwater quality variations as described under 40 CFR 257.94(e)(2). A CCR unit may continue with the detection monitoring program if a successful demonstration is made.

Assessment Monitoring Program

If a SSI above background groundwater concentrations has been determined for one or more constituents in Appendix III at one or more downgradient wells under Detection

Monitoring, then Assessment Monitoring is triggered. Appendix IV constituents must be sampled and analyzed within 90 days for each well. During Assessment Monitoring, all wells will be sampled at least annually for the Appendix IV constituents.

In accordance with 40 CFR 257.95(d)(1), within 90 days after receiving the analytical results and on a semiannual sampling basis thereafter, Appendix III and Appendix IV constituents with detected concentrations will be sampled and analyzed in all wells. An alternative monitoring frequency may also be demonstrated based upon the same factors as described above under Detection Monitoring.

Groundwater protection standards (GWPS) will also be established at this time for all constituents under the Assessment Monitoring program. The GWPS will be based upon maximum contaminant levels (MCLs) as established under 40 CFR 141.62 and 141.66 or background concentrations for constituents without an MCL identified or if background concentration is higher than the MCL. During assessment monitoring, downgradient concentrations will be evaluated for statistically significant levels (SSLs) relative to the GWPS.

If all downgradient Appendix III and IV constituents are shown to be at or below background and/or the GWPS after evaluating for SSLs for two consecutive sampling events, then the groundwater monitoring program for that CCR unit may return to the Detection Monitoring program. If any of the Appendix III or IV constituents are above background concentrations but below all of the GWPS, then the CCR unit will remain in the Assessment Monitoring program.

If there is an SSL above the GWPS for any constituent in any of the downgradient wells under Assessment Monitoring, Assessment of Corrective Measures must begin within 90 days or immediately upon determination of a release from a facility. The vertical and horizontal nature and extent of the Appendix IV constituent release must be determined. In addition, 40 CFR 257.95(g)(1)(iii) requires the installation of at least one additional groundwater monitoring well in the downgradient flow direction at the facility boundary. If constituents have migrated off-site, property owners or residents affected must be notified and the notifications placed in the operating record.

If the CCR unit is an existing unlined CCR surface impoundment operating after October 19, 2015 and an SSL determination has been made, the unlined surface impoundment is subject to closure or retrofit requirements under 40 CFR 257.101(a). Within 6 months of making the SSL determination, the existing unlined surface impoundment must cease accepting CCR and non-CCR waste streams and either close or retrofit.

If there is a SSL, a demonstration can be made within 90 days of the SSL determination that a source other than the CCR unit was the cause or the SSL resulted from a sampling and analysis error, statistical evaluation error, or natural groundwater quality variations as described under 40 CFR 257.95(g)(3). A CCR unit may continue with the assessment monitoring program if a successful demonstration is made.

Assessment of Corrective Measures

An Assessment of Corrective Measures is triggered by an SSL of any Appendix IV constituent from the Assessment Monitoring phase, or immediately upon detection of a release from a CCR unit. A 60 day extension for the Assessment of Corrective Measures is available upon a demonstration certified by a qualified professional engineer. The assessment evaluates the effectiveness of potential corrective measures to achieve the goals of the remedy including protectiveness of human health and the environment, achievement of the GWPS, and source control.

As soon as feasible, a remedy is selected upon the completion of the corrective measures assessment. As part of selecting the remedy, a remedial implementation and completion schedule must be developed. The corrective measures must be discussed in a public meeting at least 30 days prior to remedy selection.

Under the Assessment of Corrective Measures, the groundwater monitoring will be the same as the Assessment Monitoring program for that CCR unit. Additional monitoring wells may be installed within the plume boundaries to monitor the corrective action activities and the effectiveness of the remedy.

Corrective action groundwater monitoring, remedial activities and any interim actions must begin within 90 days of selecting a remedy for a CCR unit. When concentrations of Appendix IV constituents at all groundwater monitoring wells beyond the Detection Monitoring groundwater well system have not statistically exceeded the GWPS for 3 consecutive years, corrective action remediation and corrective action monitoring will be complete. The groundwater monitoring program can then return to the Detection Monitoring program.

The groundwater monitoring system must be operated and maintained throughout the Detection Monitoring Program, the Assessment Monitoring Program, or Correction Action Program. The post-closure care period will last 30 years unless the CCR unit is operating under the Assessment Monitoring Program at that time, then post-closure care continues after the 30 years until the CCR unit returns to the Detection Monitoring Program.

Annual Report

An Annual Groundwater Monitoring and Corrective Action Report will be prepared and placed into the operating record by January 31, 2018 for existing CCR landfills and CCR surface impoundments and annually thereafter, as required by 257.90(e). For new CCR units, this annual report is to be completed and placed into the operating record by January 31 of the following year after the groundwater monitoring system has been established. The annual report must also be posted to the public internet site within 30 days of placing in the operating record.

The annual report must describe the groundwater monitoring activities conducted, key actions, problem resolutions, and plans for the upcoming year. The minimum information required to be included in the annual report, if it is available, is found in 40 CFR 257.90(e). Some of these report elements include a figure showing the CCR unit and the surrounding monitoring well network, new or abandoned wells, a summary of the groundwater data, and the status of the groundwater monitoring program.

REFERENCES:

[1] Federal Register, 2015. 40 CFR 257 Subpart D – Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, published in 80 FR 21302 – 21501, April 17, 2015.

[2] Federal Register, 2015. 40 CFR 257 Subpart D – Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, published in 80 FR 21400, April 17, 2015.

[3] USEPA Region IV, *Field Branches Quality System and Technical Procedures*, January 2012.

[4] USEPA, Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, EPA 530/R–09–007, March 2009.

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination

Allen Steam Station

April 1, 2019

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination
Allen Steam Station

Executive Summary

The Coal Ash Management Act (CAMA) establishes criteria for the closure of coal combustion residuals (CCR) surface impoundments. The CCR surface impoundments located at Duke Energy Carolinas, LLC's (Duke Energy) Allen Steam Station (Allen) in Gaston County, NC have received a low-risk classification. Therefore, according to N.C. Gen. Stat. § 130A-309.214(a)(3), the closure option for CCR surface impoundments is at the election of the North Carolina Department of Environmental Quality (DEQ). CAMA provides three principal closure pathways: (a) closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill [CAMA Option A]; (b) closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill [CAMA Option B]; or (c) closure in accordance with the federal CCR rule adopted by EPA [CAMA Option C].

In preparing to make its election, DEQ requested information from Duke Energy related to closure options. By November 15, 2018, Duke Energy provided the following options for consideration: closure in place, full excavation, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing CCR surface impoundments. DEQ held a public information session on January 29, 2019 in Belmont, NC where the community near Allen had the opportunity to learn about options for closing coal ash CCR surface impoundments and to express their views about proposed criteria to guide DEQ's coal ash closure decision making process. To evaluate the closure options, the Department considered environmental data gathered as part of the site investigation, permit requirements, ambient monitoring, groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the CCR surface impoundments at the Allen facility in accord with N.C. Gen. Stat. § 130A-309-214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from unlined CCR surface impoundments at Allen is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

Duke Energy will be required to submit a final Closure Plan for the CCR surface impoundments at Allen by August 1, 2019. The Closure Plan must conform to this election by DEQ.

I. Introduction

DEQ has evaluated the closure options submitted by Duke Energy for the two CCR surface impoundments at the Allen Steam Station. This document describes the CAMA requirements for closure of coal ash CCR surface impoundments, the DEQ evaluation process to make an election under CAMA for the subject CCR surface impoundments at the Allen site, and the election by DEQ for the final closure option.

II. Site History

Duke Energy owns and operates the Allen Steam Station which is located along the west shore of Lake Wylie, a man-made reservoir created by the impoundment of the Catawba River. Allen is a five-unit, 1,140 megawatts, coal-fired generating facility. Allen began commercial operation in 1957 with units 1 and 2. Unit 3 began operation in 1959, unit 4 in 1960, and unit 5 in 1961. Allen historically wet sluiced CCR into two CCR surface impoundments located on the property. These CCR surface impoundments are known as the Retired Ash Basin (RAB) which is also referred to as the Inactive Ash Basin (IAB), and the Active Ash Basin (AAB), which are impounded by the following dams: Retired Ash Basin (GASTO-016) and Active Ash Basin (GASTO-061).

The RAB received CCR products from initial operation in 1957 until 1973, when it reached capacity and was retired. Duke Energy then commissioned the AAB and began wet sluicing CCR products into this new basin. In 2009, Duke Energy replaced its fly ash wet sluicing operation with a dry ash handling system and began placing dry fly ash into a landfill constructed over a portion of the RAB (Permit No. 36- 12). Duke Energy currently wet sluices only bottom ash into the AAB and this operation will cease once the dry bottom ash system becomes operational, which is scheduled to occur in early 2019. The two CCR surface impoundments are subject to the CAMA closure requirements in N.C. Gen. Stat. § 130A-309.214(a)(3).

III. CAMA Closure Requirements

CAMA establishes closure requirements for CCR surface impoundments. The General Assembly has mandated that DEQ "shall review a proposed Coal Combustion Residuals Surface Impoundment Closure Plan for consistency with the minimum requirements set forth in subsection (a) of this section and whether the proposed Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part." N.C. Gen. Stat. § 130A-309.214(b). Similarly, the General Assembly has required that DEQ "shall disapprove a proposed Coal Combustion Residuals Surface Impoundment Closure Plan unless the Department finds that the Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and other complies with the requirements of this Part." N.C. Gen. Stat. § 130A-309.214(c).

CAMA requires DEQ to review any proposed Closure Plan for consistency with the requirements of N.C. Gen. Stat. § 130A-309.214(a). See N.C. Gen. Stat. § 130A-309.214(b). DEQ must disapprove any proposed Closure Plan that DEQ finds does not meet these requirements. See N.C. Gen. Stat. § 130A-309.214(c). Therefore, an approvable Closure Plan must, at a minimum, meet the requirements of N.C. Gen. Stat. § 130A-309.214(a).

Pursuant to N.C. Gen. Stat. § 130A-309.213(d)(1), DEQ has classified the CCR surface impoundments at Allen as low-risk. The relevant closure requirements for low-risk CCR surface impoundments are in N.C. Gen. Stat. § 130A-309.214(a)(3), which states the following:

- Low-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2029;
- A proposed closure plan for a low-risk impoundment must be submitted as soon as practicable, but no later than December 31, 2019; and
- At a minimum, impoundments located in whole above the seasonal high groundwater table shall be dewatered and impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable.

In addition, N.C. Gen. Stat. § 130A-309.214(a)(3) requires compliance with specific closure criteria set forth verbatim below in Table 1. The statute provides three principal closure pathways: (a) closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill [CAMA Option A]; (b) closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill [CAMA Option B]; or (c) closure in accordance with the federal CCR rule adopted by EPA [CAMA Option C]. For each low-risk impoundment, the choice of the closure pathway in CAMA is at the "election of the Department."

Table 1: CAMA Closure Options for Low-Risk CCR Surface Impoundments
N.C. Gen. Stat. § 130A-309.214(a)(3)

At the election of the Department, the owner of an impoundment shall either:

a. Close in any manner allowed pursuant to subdivision (1) of this subsection; [CAMA Option A]

b. Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall install and maintain a cap system that is designed to minimize infiltration and erosion in conformance with the requirements of Section .1624 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, and, at a minimum, shall be designed and constructed to (i) have a permeability no greater than 1 x 10-5 centimeters per second; (ii) minimize infiltration by the use of a low-permeability barrier that contains a minimum 18 inches of earthen material; and (iii) minimize erosion of the cap system and protect the low-permeability barrier from root penetration by use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth. In addition, the owner of an impoundment shall (i) install and maintain a groundwater monitoring system; (ii) establish financial assurance that will ensure that sufficient funds are available for closure pursuant to this subdivision, post-closure maintenance and monitoring, any corrective action that the Department may require, and satisfy any potential liability for sudden and nonsudden accidental occurrences arising from the impoundment and subsequent costs incurred by the Department in response to an incident, even if the owner becomes insolvent or ceases to reside, be incorporated, do business, or maintain assets in the State; and (iii) conduct post-closure care for a period of 30 years, which period may be increased by the Department upon a determination that a longer period is necessary to protect public health, safety, welfare; the environment; and natural resources, or decreased upon a determination that a shorter period is sufficient to protect public health, safety, welfare; the environment; and natural resources. The Department may require implementation of any other measure it deems necessary to protect public health, safety, and welfare; the environment; and natural resources, including imposition of institutional controls that are sufficient to protect public health, safety, and welfare; the environment; and natural resources. The Department may not approve closure for an impoundment pursuant to sub-subdivision b. of subdivision (3) of this subsection unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment; [CAMA Option B] or

c. Comply with the closure requirements established by the United States Environmental Protection Agency as provided in 40 CFR Parts 257 and 261, "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities." [CAMA Option C]

By referencing the closure options for *high-risk* CCR surface impoundments in "subdivision (1)" or N.C. Gen. Stat. § 130A-309.214(a)(1), CAMA allows for closure of a *low-risk* CCR surface impoundment in N.C. Gen. Stat. § 130A-309.214(a)(3) through the same removal scenarios:

- "Convert the coal combustion residuals impoundment to an industrial landfill by removing all coal combustion residuals and contaminated soil from the impoundment temporarily, safely storing the residuals on-site, and complying with the requirements for such landfills." N.C. Gen. Stat. § 130A-309.214(a)(1)a.; or
- "Remove all coal combustion residuals from the impoundment, return the former impoundment to a nonerosive and stable condition and (i) transfer the coal combustion residuals for disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill or (ii) use the coal combustion products in a structural fill or other beneficial use as allowed by law." N.C. Gen. Stat. § 130A-309.214(a)(1)b.

IV. DEQ Election Process

Beginning with a letter to Duke Energy on October 8, 2018, DEQ began planning for a thorough evaluation of the closure options for low-risk CCR surface impoundments before making an election as outlined in Table 1 above. DEQ's objectives were to receive input on closure options from Duke Energy and to engage with community members near low-risk sites. DEQ outlined the following schedule in the October 8, 2018 letter:

- November 15, 2018 – Duke Energy submittal of revised closure option analyses and related information
- January 29, 2019 – DEQ public meeting near Allen
- April 1, 2019 – DEQ evaluation of closure options
- August 1, 2019 – Duke Energy submittal of closure plan
- December 1, 2019 – Duke Energy submittal of updated corrective action plan for all sources at the Allen site that are either CCR surface impoundments or hydrologically connected to CCR surface impoundments

DEQ received the requested information from Duke Energy by November 15, 2018: closure options analysis, groundwater modeling and net environmental benefits assessment. These materials are posted on the DEQ website. Duke Energy provided the following options for consideration: closure in place, full excavation with either an onsite or offsite landfill, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing CCR surface impoundment.

In preparing to make its election of the closure option, DEQ considered environmental data contained in the comprehensive site assessment, permit requirements, ambient monitoring, closure options analysis and groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements. The Allen site has extensive amounts of data that have been collected during the site assessment process, and these data were used as part of the evaluation of closure options. DEQ's evaluation of closure in place and hybrid option based on groundwater monitoring and modeling data is provided in Attachment A. That analysis

demonstrates that the contaminated plume is already beyond the compliance boundary for the site. All of these references are part of the record supporting DEQ's determination.

DEQ conducted a public meeting in Belmont, NC near Allen on January 29, 2019. There were 116 members of the public who attended the meeting. Approximately 1090 comments were received during the comment period, which closed on February 15, 2019. The majority of commenters requested that the coal ash be removed from the CCR surface impoundments and moved to dry lined storage away from waterways and groundwater. Only one commenter specifically requested closure-in-place. No commenters directly addressed the hybrid option. A review and response to comments are included in Attachment B.

V. DEQ Evaluation of Closure Options

DEQ has evaluated the closure options proposed by Duke Energy for the CCR surface impoundments at the Allen facility. The purpose of this evaluation was to determine which closure option or options may be incorporated into an approvable Closure Plan under CAMA.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the Active Ash Basin and the Retired Ash Basin at Allen in accord with N.C. Gen. Stat. § 130A-309.214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from unlined CCR surface impoundments at Allen is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

DEQ does not elect CAMA Option B for the CCR surface impoundments at Allen. In N.C. Gen. Stat. § 130A-309.214(a)(3)b, the General Assembly mandated that "[t]he Department may not approve closure for an impoundment pursuant to [this] sub-subdivision . . . unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment." N.C. Gen. Stat. § 130A-309.214(a)(3)b. In light of these requirements and based on DEQ's review of the information provided by Duke Energy as well as DEQ's independent analysis, DEQ does not believe that Duke Energy can incorporate CAMA Option B into an approvable Closure Plan for Allen.

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether upon full implementation of the closure plan the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary. To address this question, DEQ considered the current state of the groundwater contamination and reviewed the results of the groundwater modeling submitted by Duke Energy. The evaluation is provided in Attachment A. DEQ's overall conclusion is that

based on the current geographic scope and vertical extent of the groundwater contamination plume, and the modeled extent of the plume in the future, DEQ does not believe these two closure options can meet the requirements of CAMA Option B for the CCR surface impoundments at Allen.

DEQ does not elect CAMA Option C (i.e., closure under the federal CCR Rules found in 40 CFR Part 257) for the CCR surface impoundments at Allen. DEQ has determined that:

a. Under the facts and circumstances here, CAMA Option C is less stringent than CAMA Option A. Specifically, DEQ's election of Option A would also require Duke Energy to meet the requirements of the federal CCR Rule (i.e., CAMA Option C) but election of CAMA Option C would not require implementation of CAMA Option A.
b. Because CAMA Option A adds additional requirements or performance criteria beyond Option C, it advances DEQ's duty to protect the environment (see N.C. Gen. Stat. §§ 279B-2 & 143-211) and the General Assembly's mandate under CAMA that DEQ ensure that any Closure Plan, which must incorporate an approvable closure option, is protective of public health, safety, and welfare, the environment, and natural resources (see N.C. Gen. Stat. § 130A-309.214(b) & (c)).
c. For the CCR surface impoundments for which the closure option(s) must be determined, CAMA Option A provides a better CAMA mechanism for ensuring State regulatory oversight of the closure process than Option C, as well as greater transparency and accountability.
d. While the federal CCR Rule was written to provide national minimum criteria for CCR surface impoundments across the country, CAMA was written specifically to address the CCR surface impoundments in North Carolina.
e. While the federal CCR Rule allows CCR surface impoundment owners to select closure either by removal and decontamination (clean closure) or with a final cover system (cap in place), EPA anticipates that most owners will select closure through the less protective method of cap in place.
f. There is considerable uncertainty regarding the status and proper interpretation of relevant provisions of the federal CCR Rule. For instance, EPA is reconsidering portions of the federal CCR Rule. Also, the performance standards in 40 CFR 257.102(d) for cap in place closure are the subject of conflicting interpretations (and possible litigation) among industry and state authorities.

VI. Conclusion

The final closure plan is due on August 1, 2019 in accordance with this determination. Based on DEQ's evaluation of the options submitted by Duke Energy, DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the Active Ash Basin and the Retired Ash Basin at Allen in accord with N.C. Gen. Stat. § 130A-309.214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

While beneficiation is not a requirement of the closure plan, DEQ encourages Duke Energy to consider opportunities for beneficiation of coal ash that would convert coal combustion residuals into a useful and safe product.

ATTACHMENT A

DEQ EVALUATION OF CLOSURE IN PLACE AND HYBRID OPTIONS BASED ON GROUNDWATER MONITORING AND MODELING DATA

DEQ EVALUATION OF CLOSURE IN PLACE AND HYBRID OPTIONS BASED ON GROUNDWATER MONITORING AND MODELING DATA

I. Groundwater Monitoring Summary

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary upon full implementation of the closure plan. Significantly, the contaminated groundwater plume has already extended beyond the compliance boundary in a portion of the CCR surface impoundment. The inferred general extent of groundwater impacts above applicable Background Threshold Values or 2L Standards are shown on Figure ES-1. Additional monitoring and hydrogeological data is available in the Allen Steam Station January 2018 CSA Update Report (available on the DEQ website).

Based on review of data submitted to date in various reports, both soil and groundwater have been impacted by CCR handling activities at the site. Groundwater within the area of the impoundment generally flows from west to east and discharges to the Catawba River (Lake Wylie). Boron concentrations above 2L Standards approximates the leading edge of the CCR plume at the site. Almost all constituents of interest (COIs) are present in the shallow flow layer. The horizontal extent of those COIs are generally within the footprint of the boron plume.

The vertical extent of most COIs is within the shallow and transition flow layers. However, data suggests the bedrock flow layer has been impacted by CCR handling activities at the site. Manganese and strontium concentrations are fairly widespread in the bedrock flow layer. There are isolated occurrences of boron, cobalt, iron, and molybdenum within and downgradient of the ash basins.

DEQ concludes that the contaminated groundwater plume has extended beyond the compliance boundary along the eastern edge of the property on the shore of Lake Wylie. Based on Figure ES-1, this plume extends along the entire length of the RAB and AAB.

II. Groundwater Cross-section Modeling

DEQ evaluated cross-sections of the groundwater modeling results provided by Duke Energy to determine whether Duke Energy's final closure *Option 1: Closure-in-Place* and *Option 2: Hybrid* would meet the criteria of CAMA Option B. DEQ considered whether the proposed closure option would prevent any post closure exceedances of the 2L groundwater quality standards at the compliance boundary upon full closure implementation. Cross sections A-A' and B-B' were evaluated and can be seen in the figures below. These cross sections represent where the boron concentration above the 2L standard of 700 µg/L has crossed the compliance boundary based on groundwater monitoring and modeling.

Next, the model results were evaluated based on the following model simulations:

- current conditions in 2017 when the model was calibrated based on raw field data
- upon completion of the final closure-in-place cover system at t=0 years
- closure-in-place option at t=120 years
- upon completion of the hybrid option at t=0 years
- hybrid option at t=120 years

The tables below summarize the results from the model simulations. The boron concentrations depicted in each table represent the maximum boron concentration in any layer (ash, saprolite, transition zone, and bedrock) of the model. The 4,300-foot wide contamination plume depicted in the table spans the entire length of both ash basins, the retired ash basin and active ash basin. The cross sections are cut along the active ash basin dam (A-A' along the northern portion and B-B' along the southern portion).

Allen Modeling Results for Cross-Section A-A'			
Model Simulation	Maximum Concentration of Boron Above 2L (ug/L) Beyond Compliance Boundary	Depth of GW Contamination Above 2L (feet bgs) Beyond Compliance Boundary	Width of Contamination Plume (feet) Beyond Compliance Boundary
Current Conditions	700-4,000	120	4300
Completion of Final Cover (t=0 yrs)	700-4,000	20	4300
Final Cover (t=120 yrs)	700-4,000	70	2000
Completion of Hybrid (t=0 yrs)	700-4,000	140	4300
Hybrid (t=120 yrs)	700-4,000	95	2400

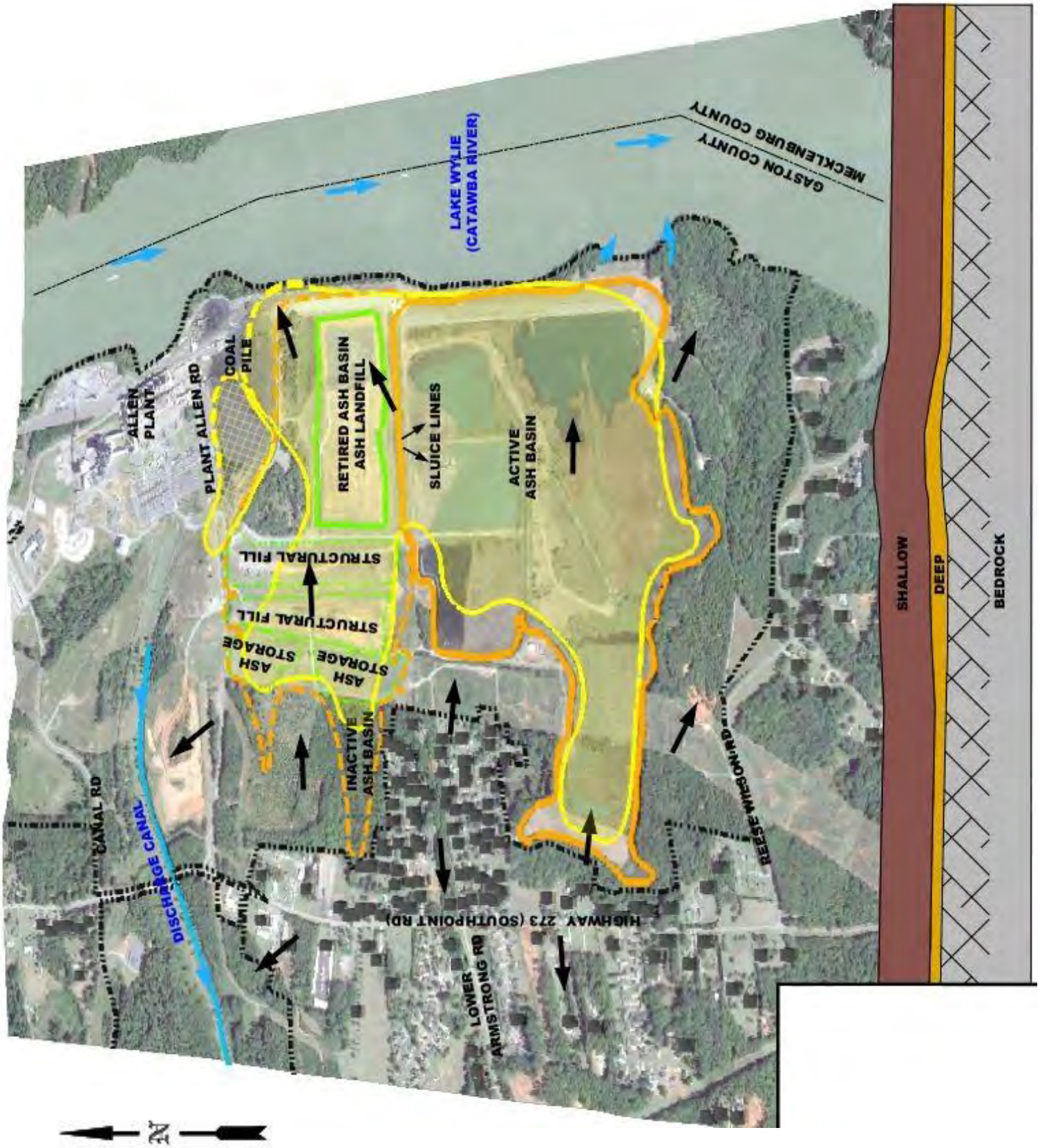
bgs – below ground surface

Allen Modeling Results for Cross-Section B-B'			
Model Simulation	Concentration of Boron Above 2L (ug/L) Beyond Compliance Boundary	Depth of GW Contamination Above 2L (feet bgs) Beyond Compliance Boundary	Width of Contamination Plume (feet) Beyond Compliance Boundary
Current Conditions	700-4,000	95	4300
Completion of Final Cover (t=0 yrs)	700-4,000	100	4300
Final Cover (t=120 yrs)	700-4,000	85	250
Completion of Hybrid (t=0 yrs)	700-4,000	155	4300
Hybrid (t=120 yrs)	700-4,000	85	2400

These data illustrate that after completion of closure with the final cover or hybrid option, the groundwater plume still extends beyond the compliance boundary above the 2L groundwater standard and the area of the plume requiring remediation is immense. Even 120 years beyond completion of closure, the area of the plume requiring remediation remains extensive.

DEQ recognizes that there are no groundwater remediation corrective actions included in the groundwater modeling simulations submitted to DEQ as part of Duke Energy's closure options analysis documentation. However, based on the current geographic scope, vertical extent of the groundwater contamination plume, and future modeled extent of the plume, DEQ does not believe these two closure options can meet the requirements of CAMA Option B.

Figure ES-1: Allen Steam Station January 2018 CSA Update Report



LEGEND

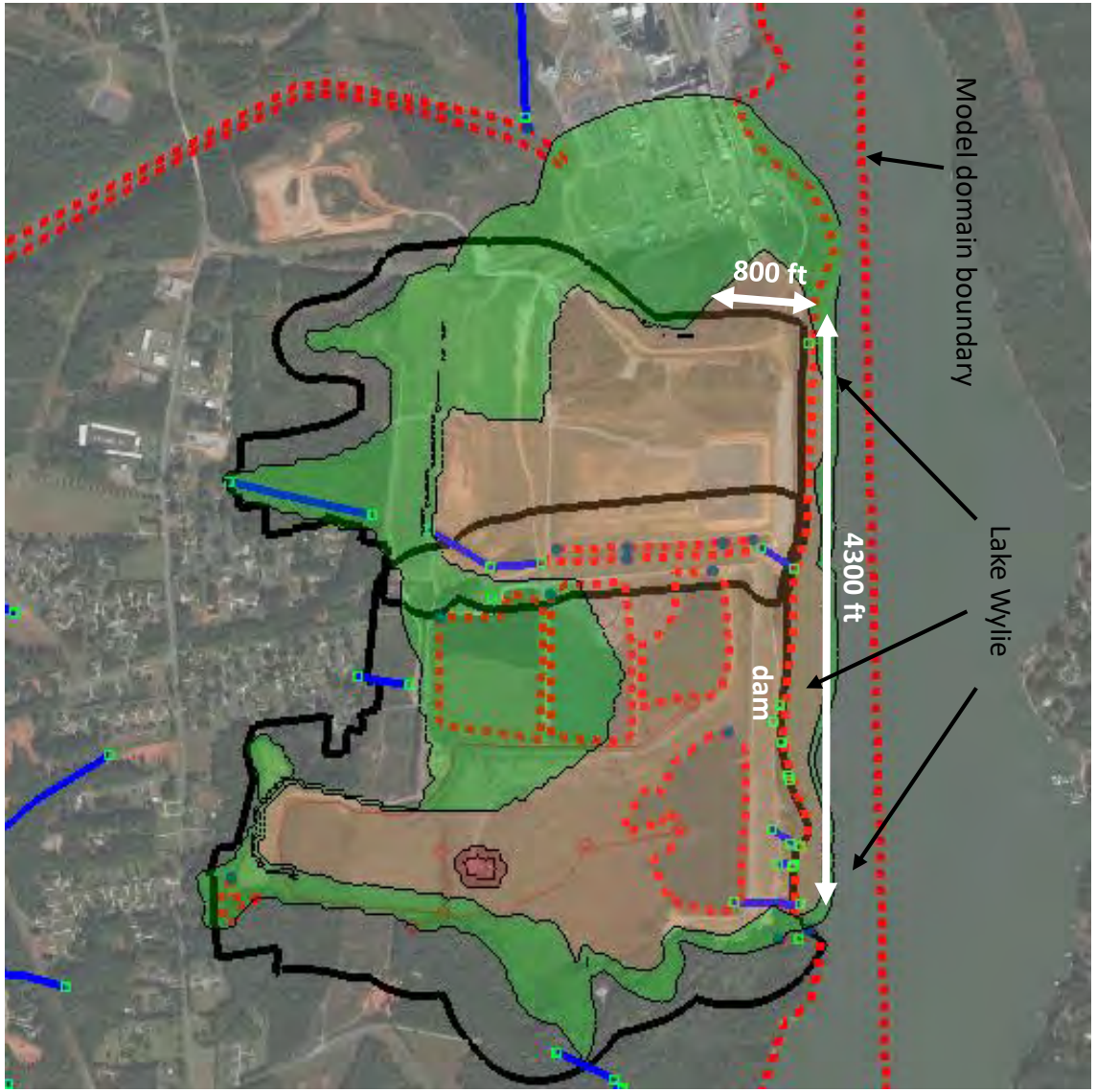
- AREA OF CONCENTRATION IN GROUNDWATER ABOVE NC2L (SEE NOTE 5)
- AREA OF CONCENTRATION IN GROUNDWATER ABOVE NC2L POTENTIALLY ATTRIBUTABLE TO THE COAL PILE (SEE NOTE 6)
- ASH BASIN WASTE BOUNDARY
- APPROXIMATE LANDFILL WASTE BOUNDARY
- GENERALIZED GROUNDWATER FLOW DIRECTION
- WATER SUPPLY WELL LOCATION
- STREAM WITH FLOW DIRECTION
- DUKE ENERGY PROPERTY BOUNDARY

NOTE:

1. OCTOBER, 2016 AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON DECEMBER 7, 2017. AERIAL DATED OCTOBER 8, 2016.
2. STREAMS OBTAINED FROM AMEC FOSTER WHEELER NRTR, MAY 2015.
3. GENERALIZED GROUNDWATER FLOW DIRECTION BASED ON SEPTEMBER 11, 2017 WATER LEVEL DATA.
4. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY.
5. GENERALIZED AREAL EXTENT OF MIGRATION REPRESENTED BY NCAC 02L EXCEEDANCES OF MULTIPLE CONSTITUENTS (BORON AND ARSENIC) IN MULTIPLE FLOW ZONES.
6. GENERALIZED AREAL EXTENT OF MIGRATION REPRESENTED BY NCAC 02L EXCEEDANCES OF MULTIPLE CONSTITUENTS (BERYLLIUM, NICKEL, SULFATE, AND THALLIUM) IN MULTIPLE FLOW ZONES. A SEPARATE ASSESSMENT IS PLANNED FOR THE COAL PILE AREA.

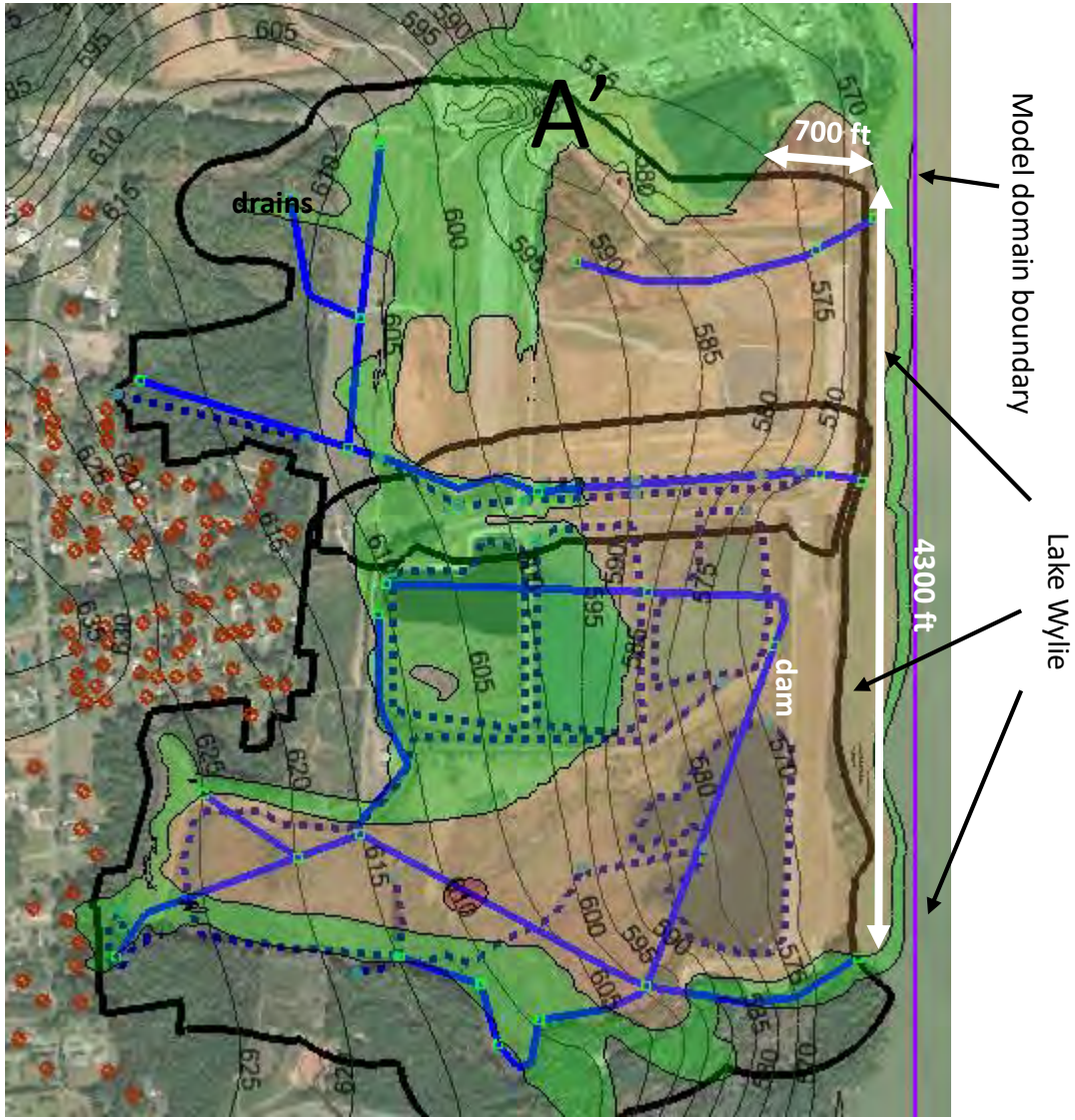
ALLEN **CURRENT CONDITIONS IN 2018**

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



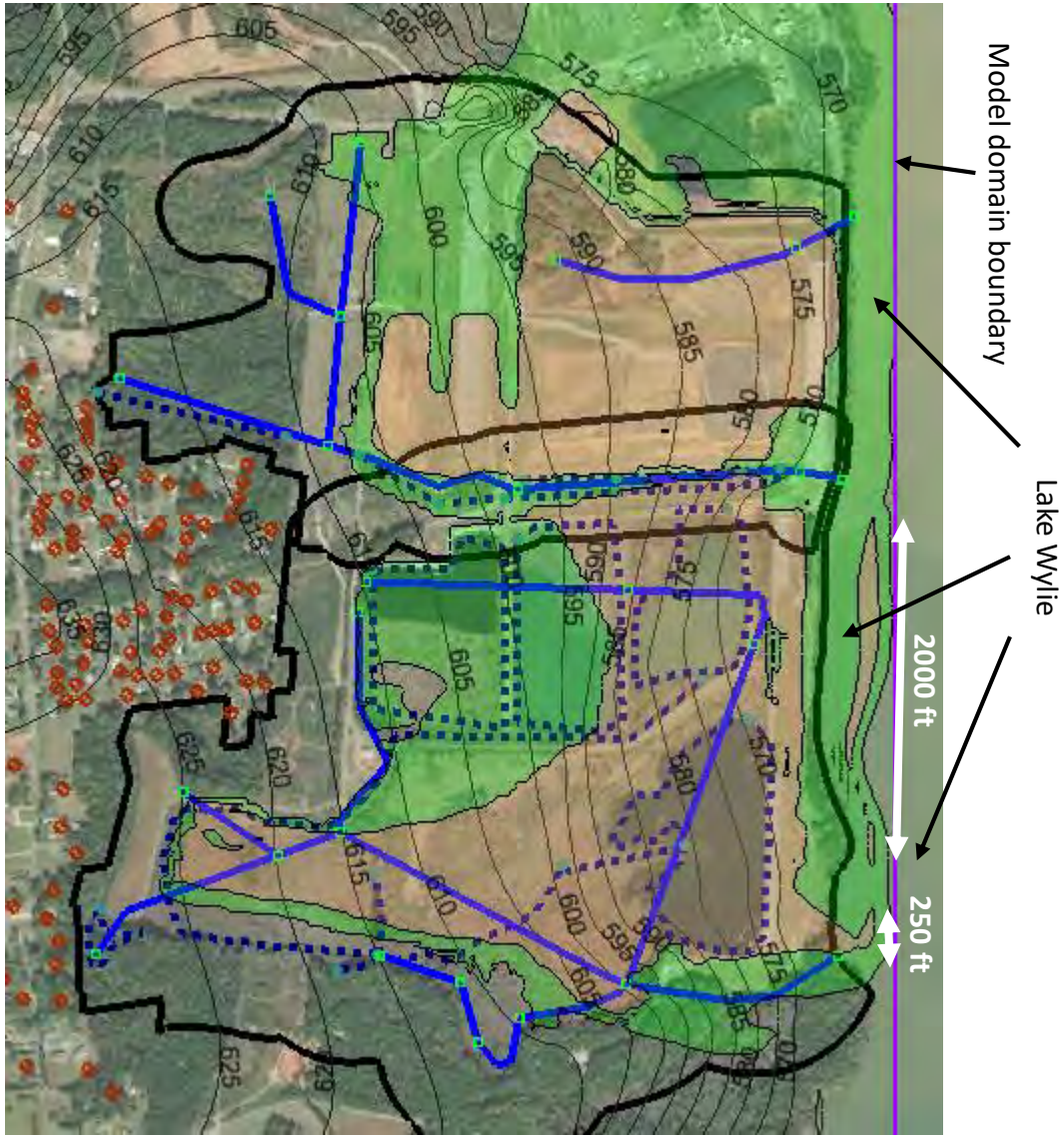
ALLEN **UPON COMPLETION OF FINAL COVER IN 2030, t = 0**

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



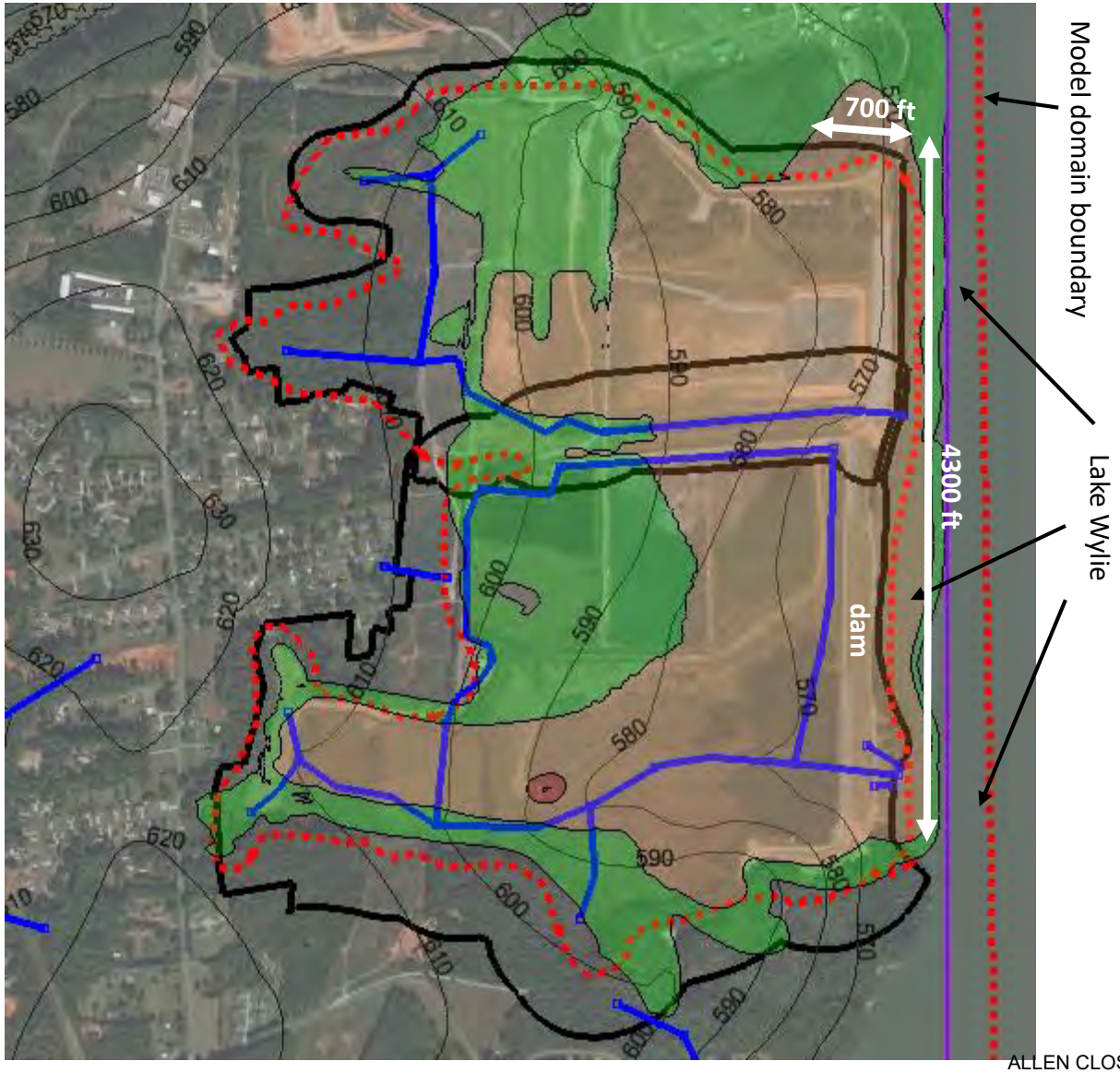
ALLEN **FINAL COVER IN 2150, t = 120 years**

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



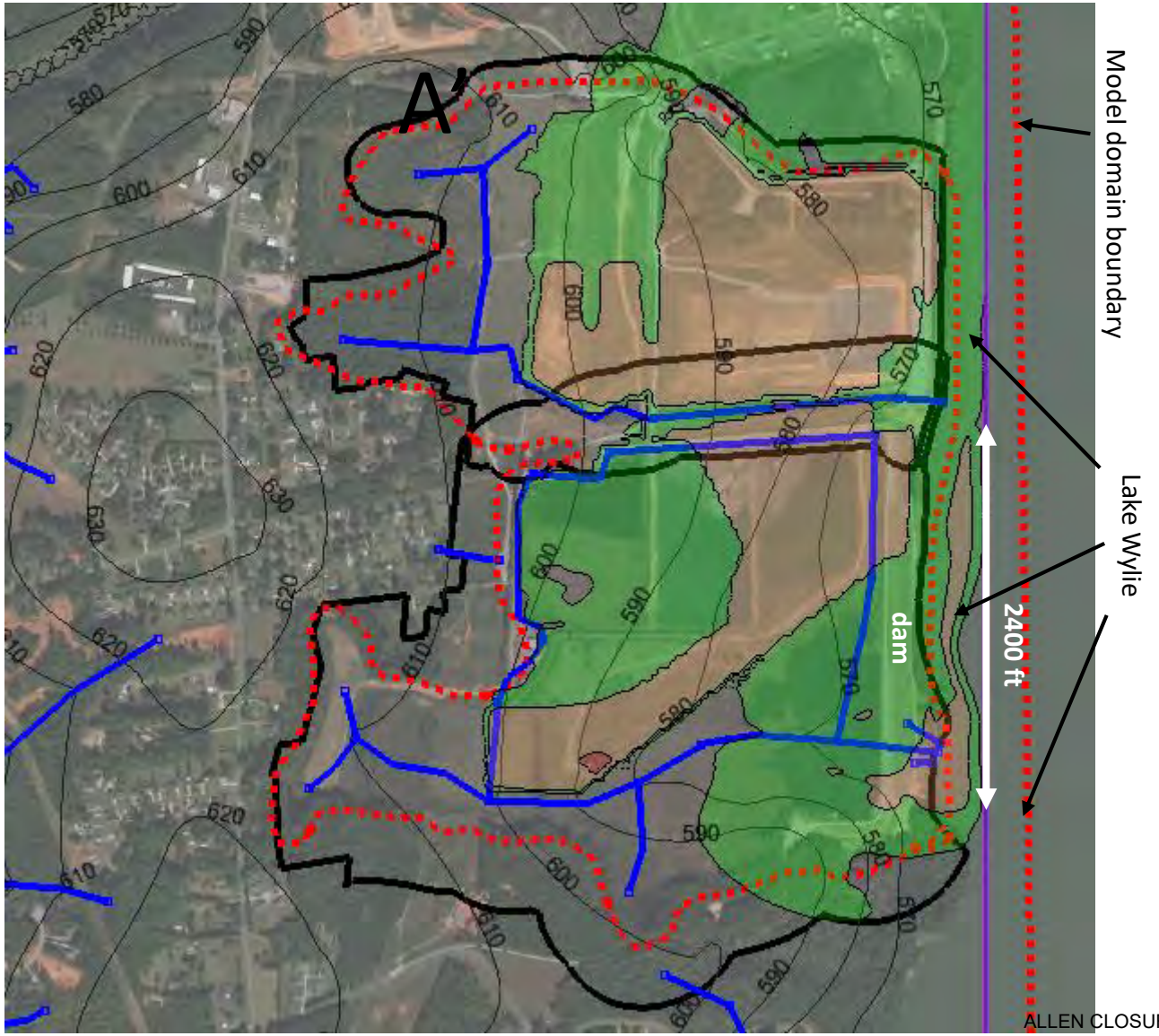
ALLEN **UPON COMPLETION OF HYBRID IN 2030, t = 0**

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



ALLEN **HYBRID IN 2150, t = 120 years**

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



ALLEN **CURRENT CONDITIONS IN 2018**

CROSS SECTION A-A' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

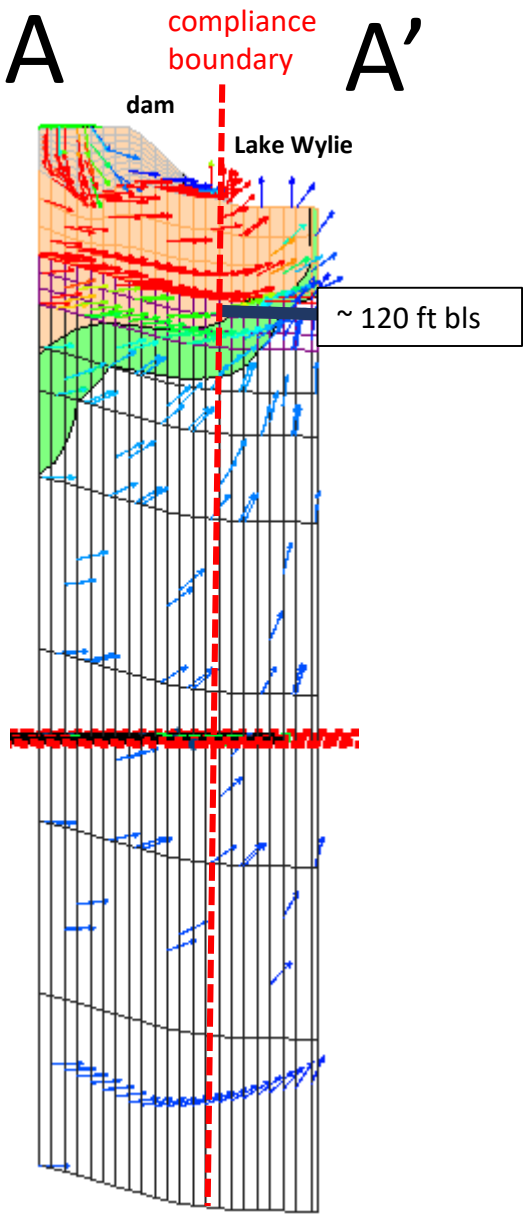
Ash 1-11

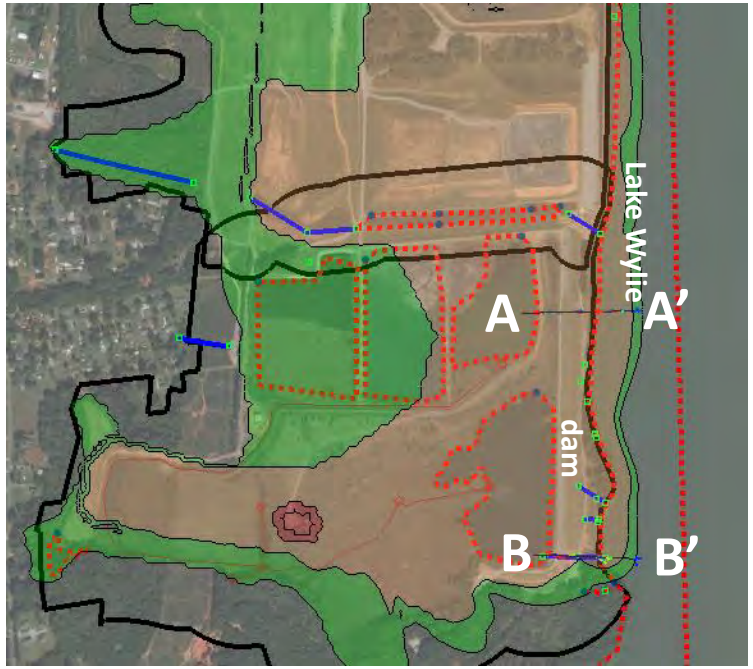
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ALLEN **UPON COMPLETION OF FINAL COVER IN 2030, t = 0**

CROSS SECTION A-A' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

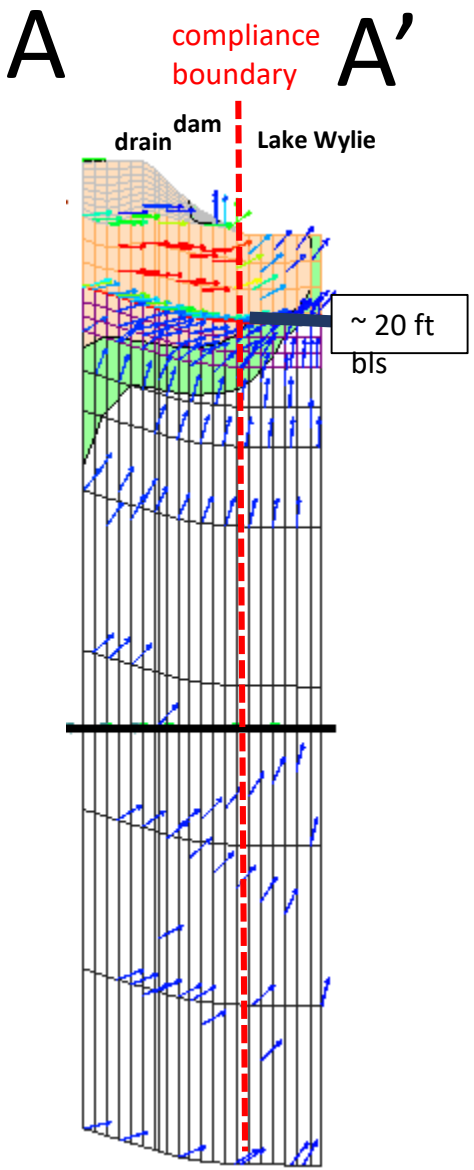
Ash 1-11

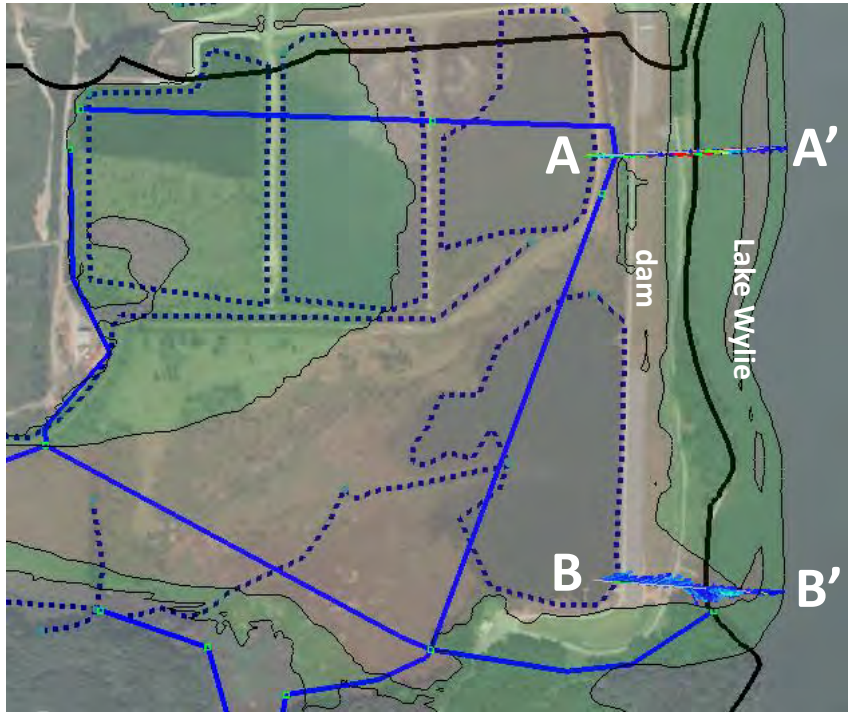
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ALLEN **FINAL COVER IN 2150, t = 120 years**

CROSS SECTION A-A' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

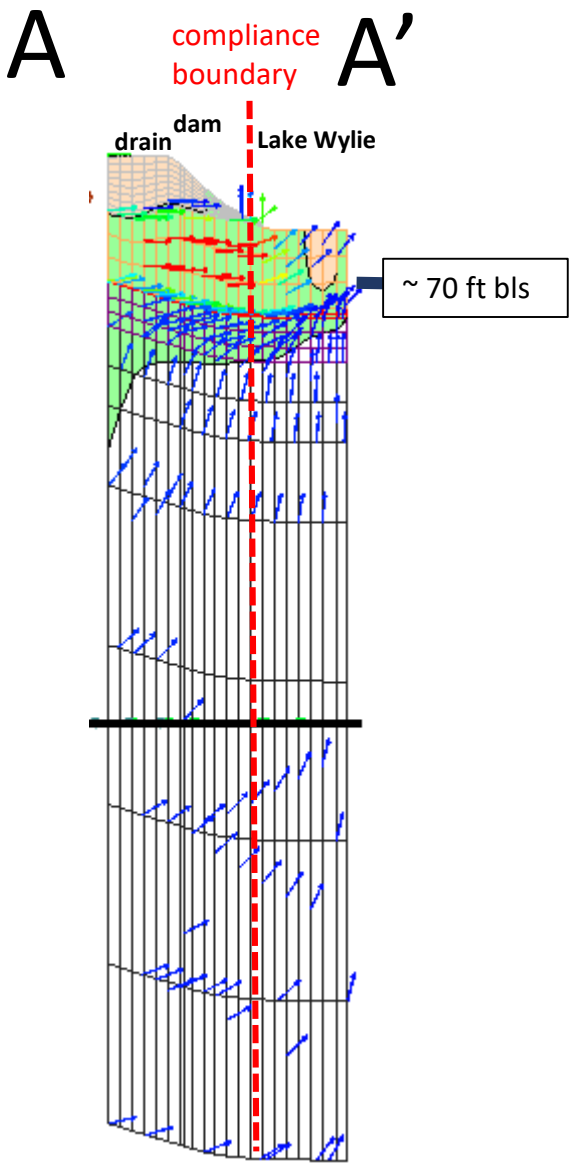
Ash 1-11

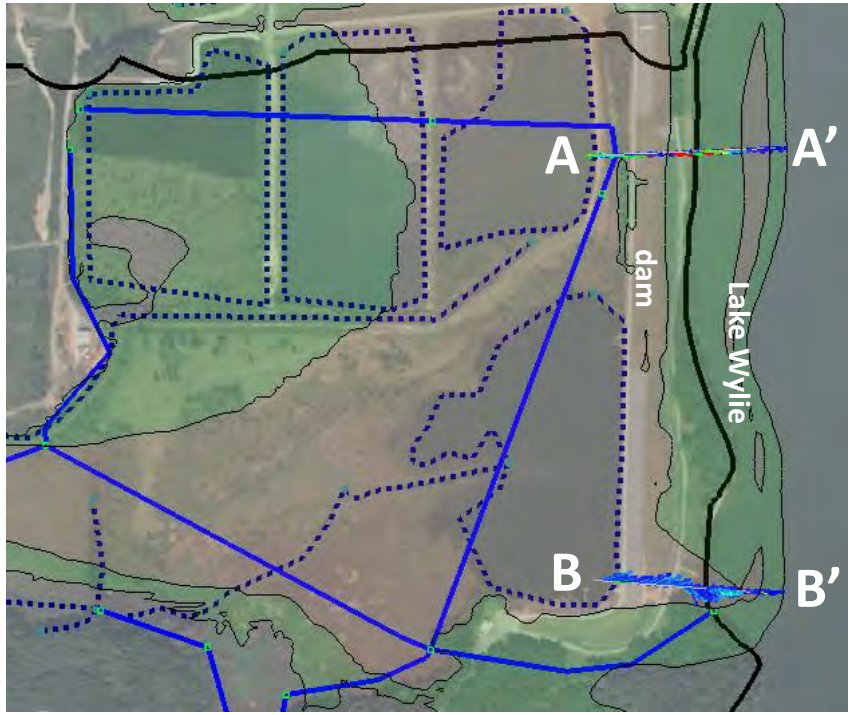
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ALLEN **UPON COMPLETION OF HYBRID COVER IN 2030, t = 0**

CROSS SECTION A-A' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

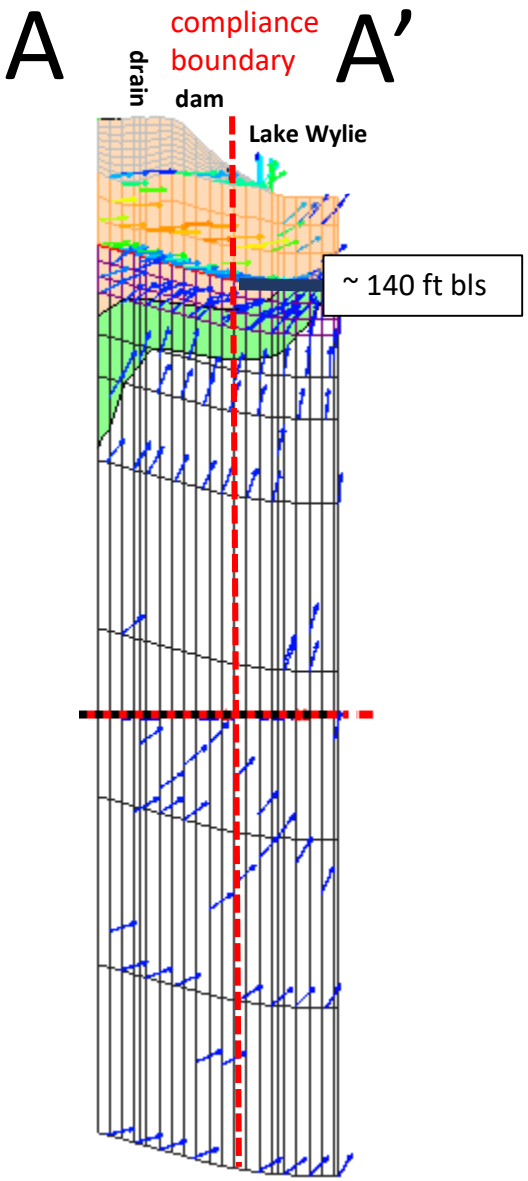
Ash 1-11

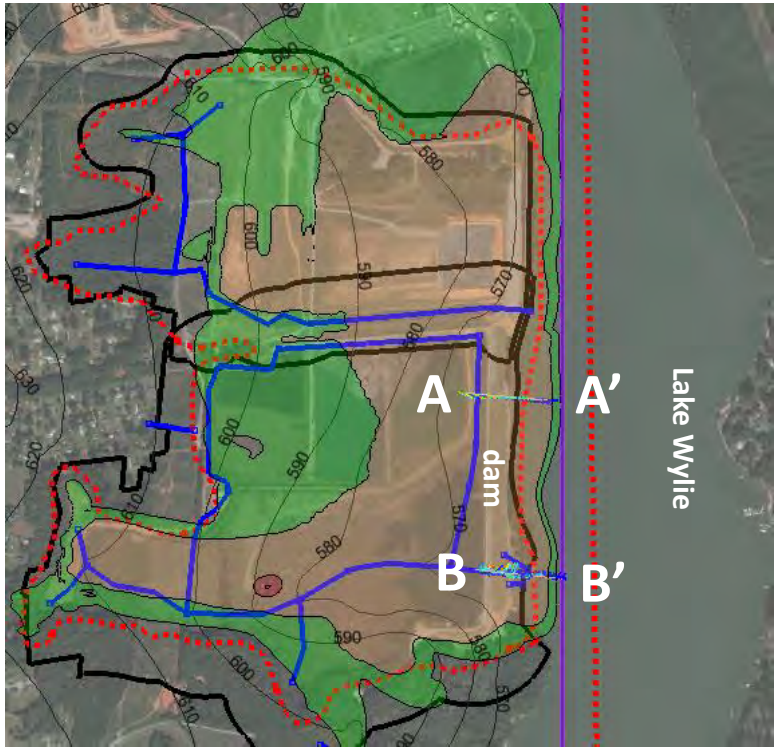
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ALLEN **HYBRID IN 2150, t = 120 years**

CROSS SECTION A-A' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

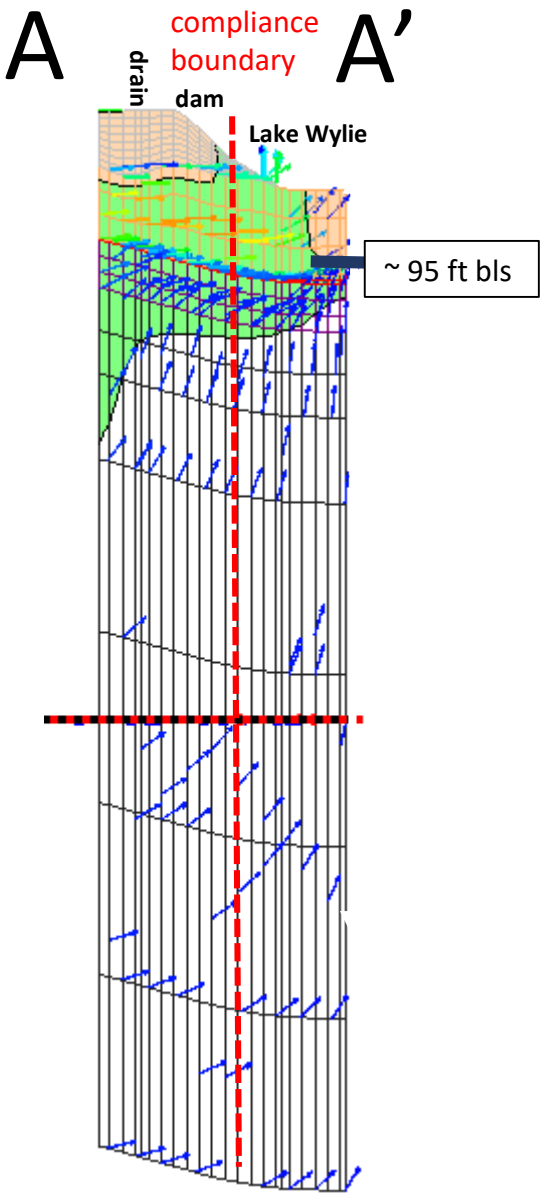
Ash 1-11

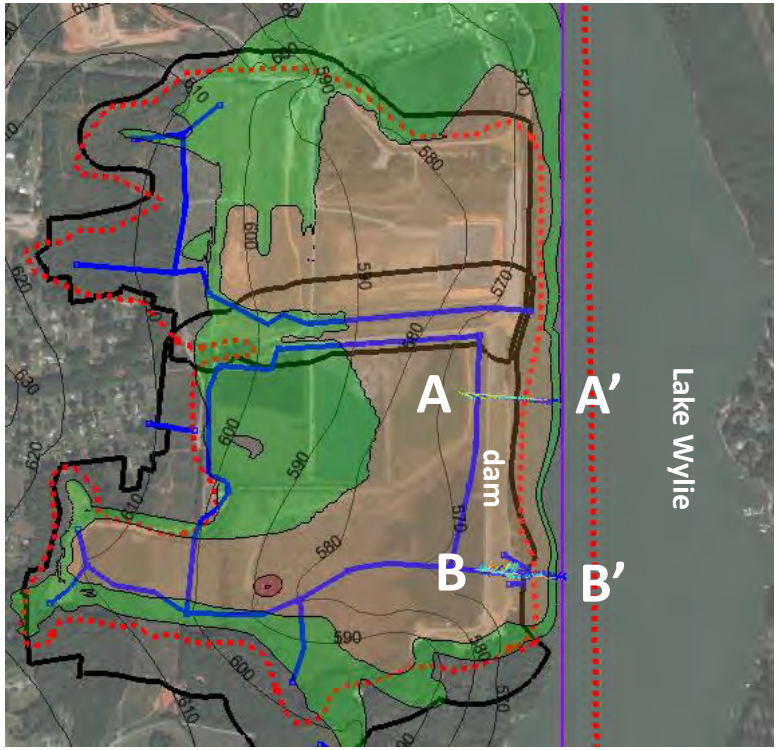
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ALLEN **CURRENT CONDITIONS IN 2018**

CROSS SECTION B-B' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

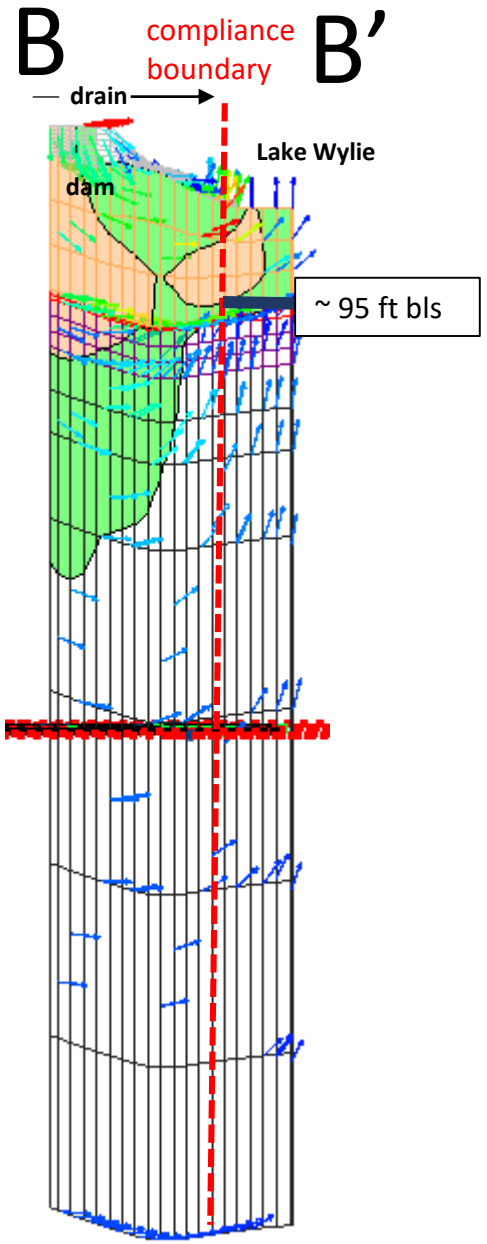
Ash 1-11

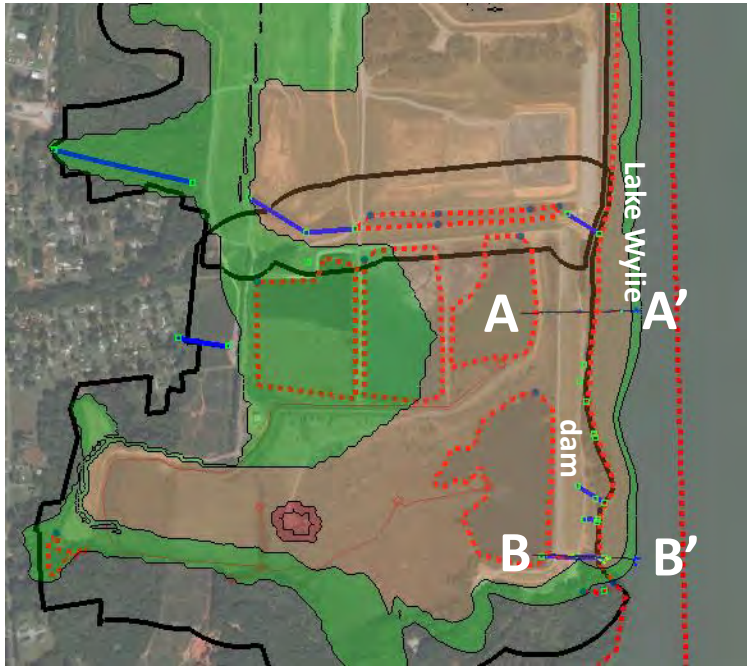
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ALLEN **UPON COMPLETION OF FINAL COVER IN 2030, t = 0**

CROSS SECTION B-B' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

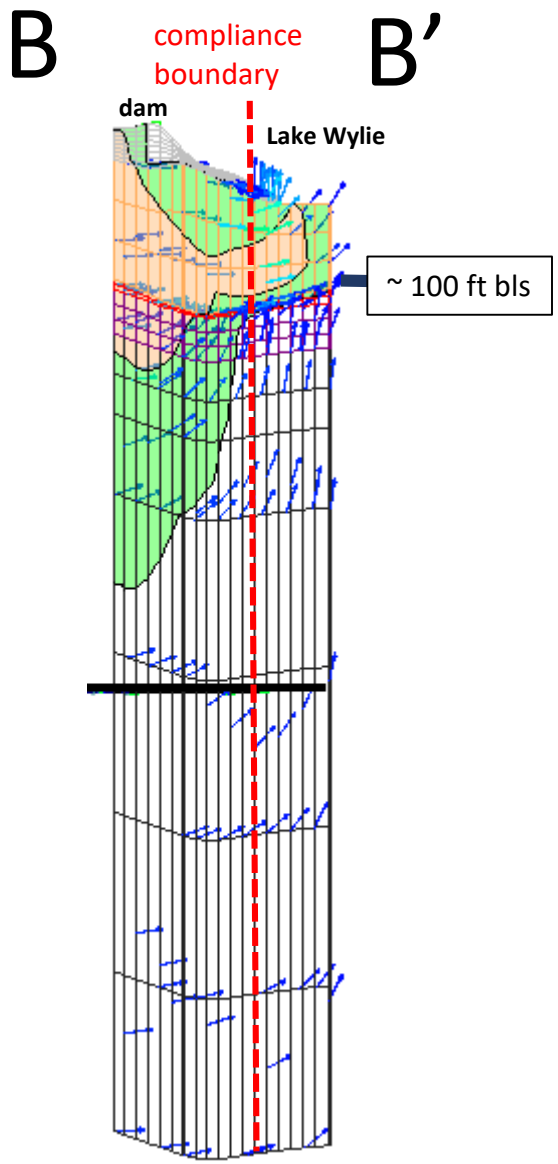
Ash 1-11

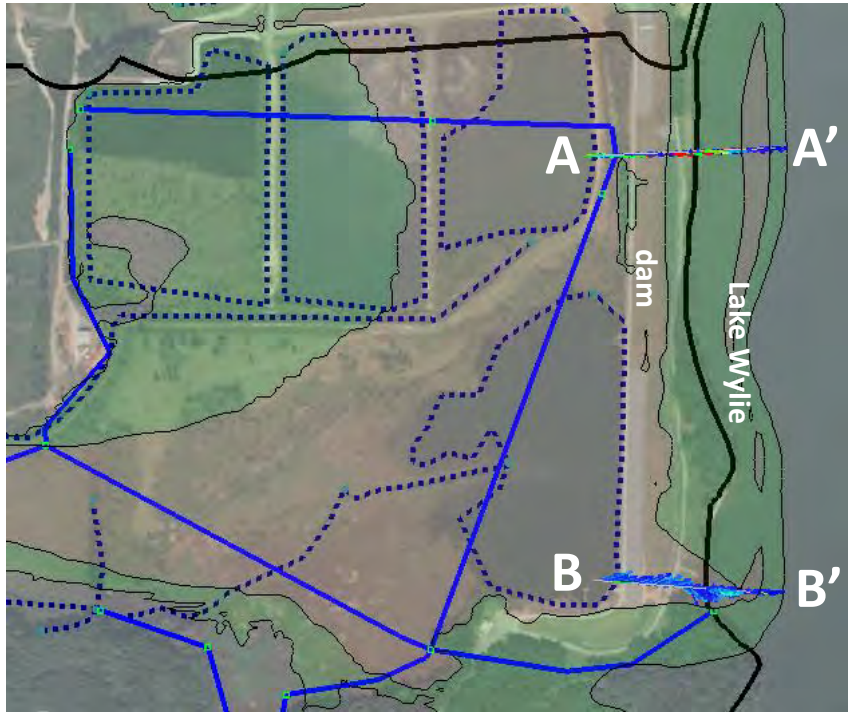
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ALLEN **FINAL COVER IN 2150, t = 100 years**

CROSS SECTION B-B' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

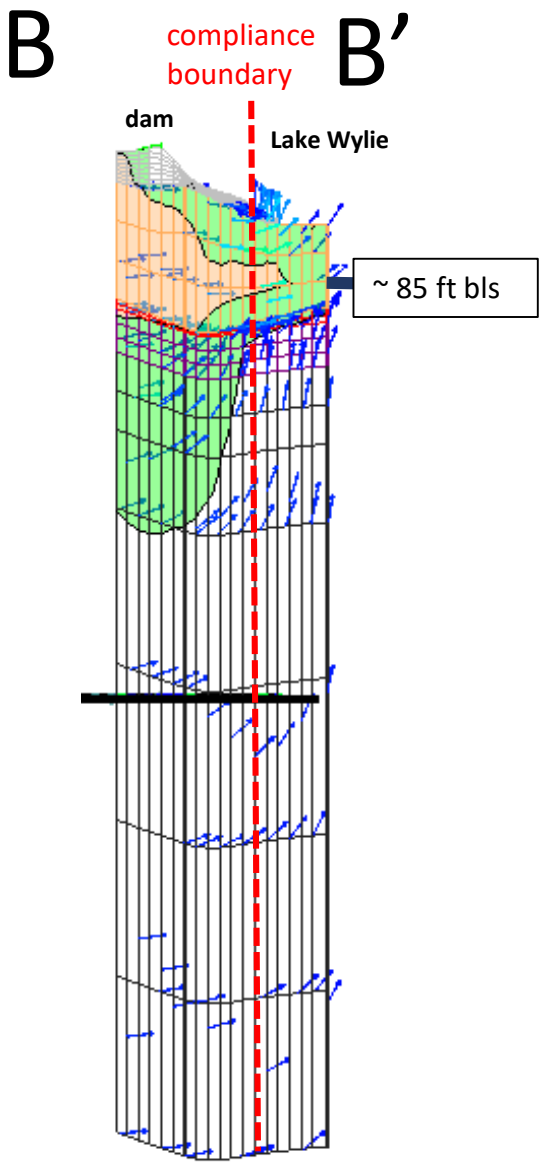
Ash 1-11

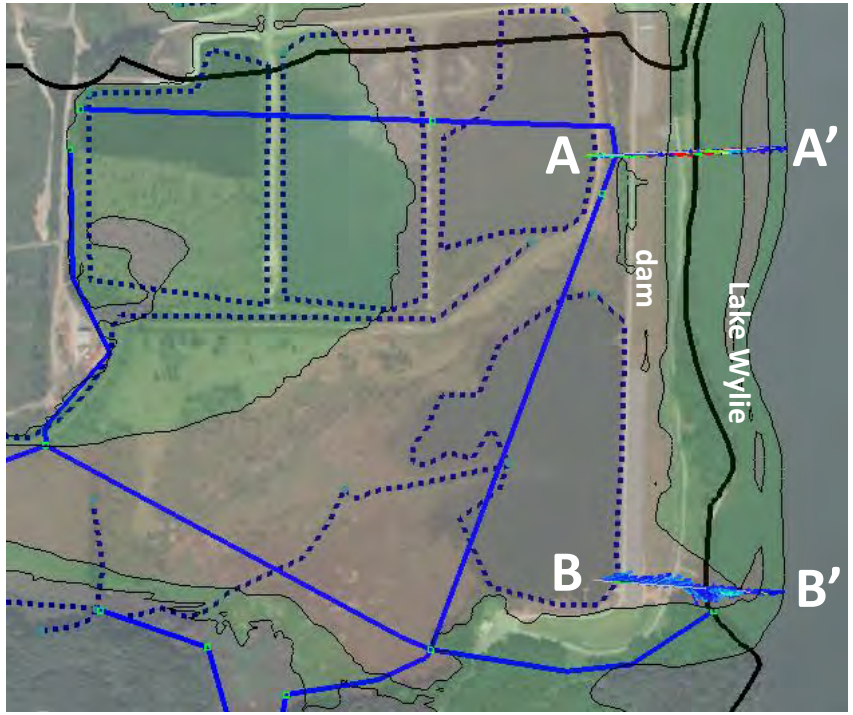
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ALLEN **UPON COMPLETION OF HYBRID COVER IN 2030, t = 0**

CROSS SECTION A-A' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

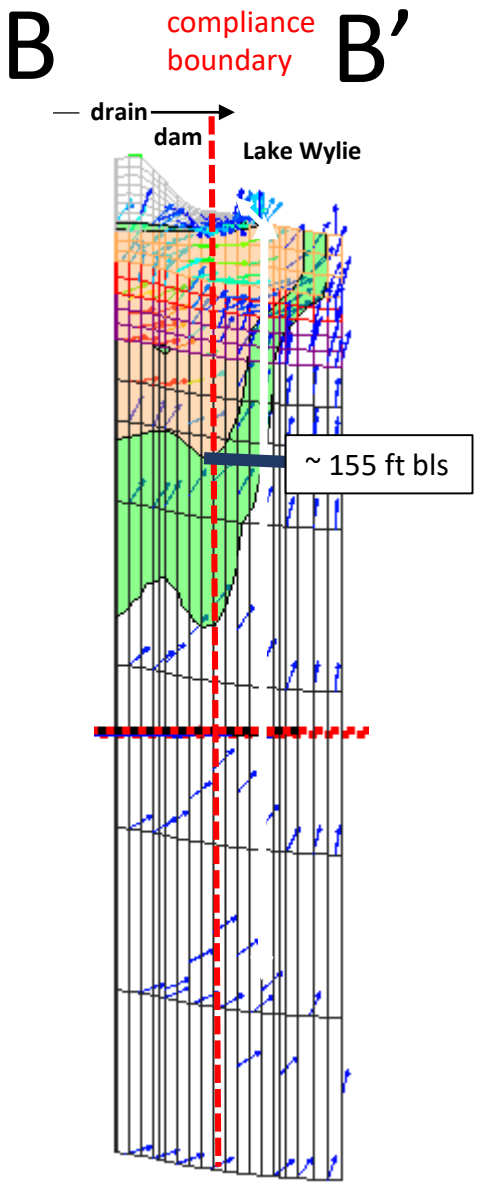
Ash 1-11

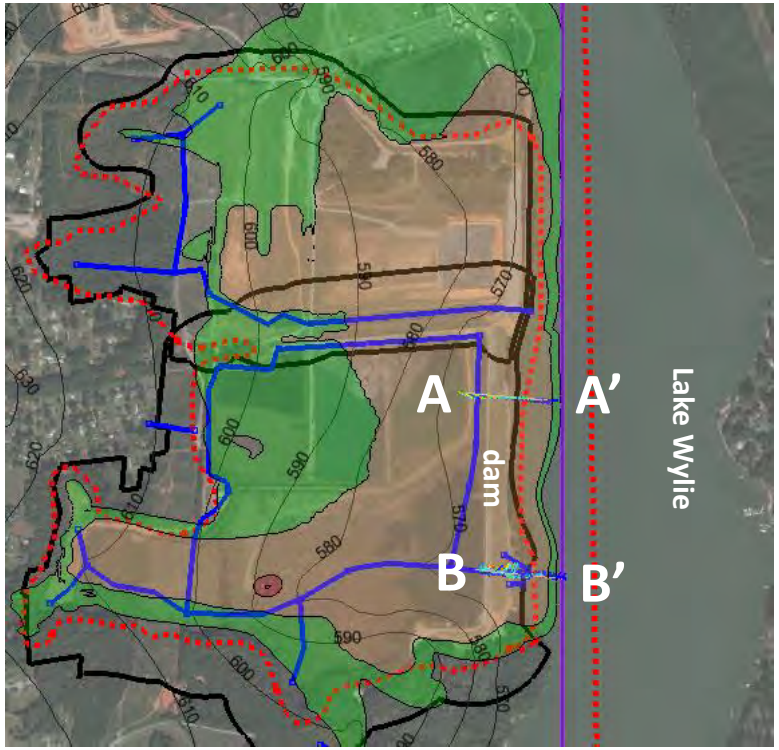
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ALLEN **HYBRID IN 2150, t = 120 years**

CROSS SECTION A-A' (VIEWED FROM SOUTH SIDE OF CROSS SECTION LOOKING NORTH)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Allen model layers:

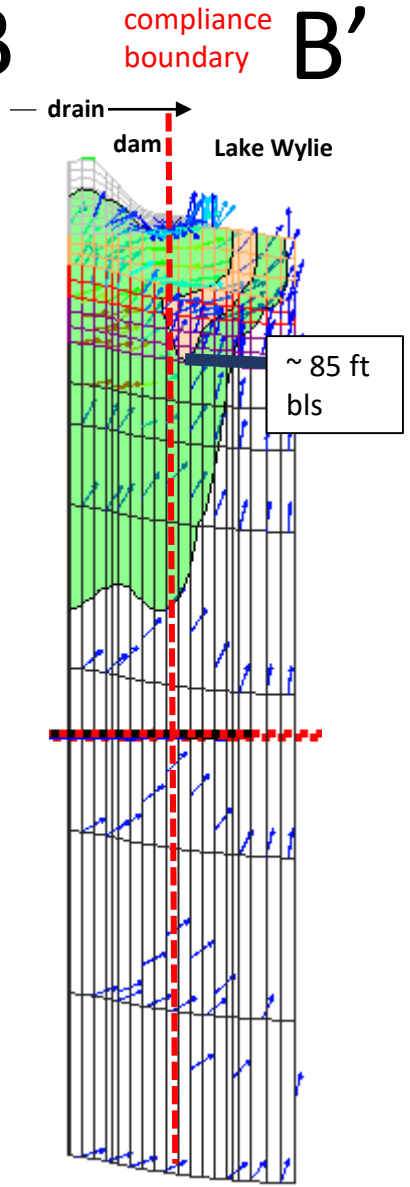
Ash 1-11

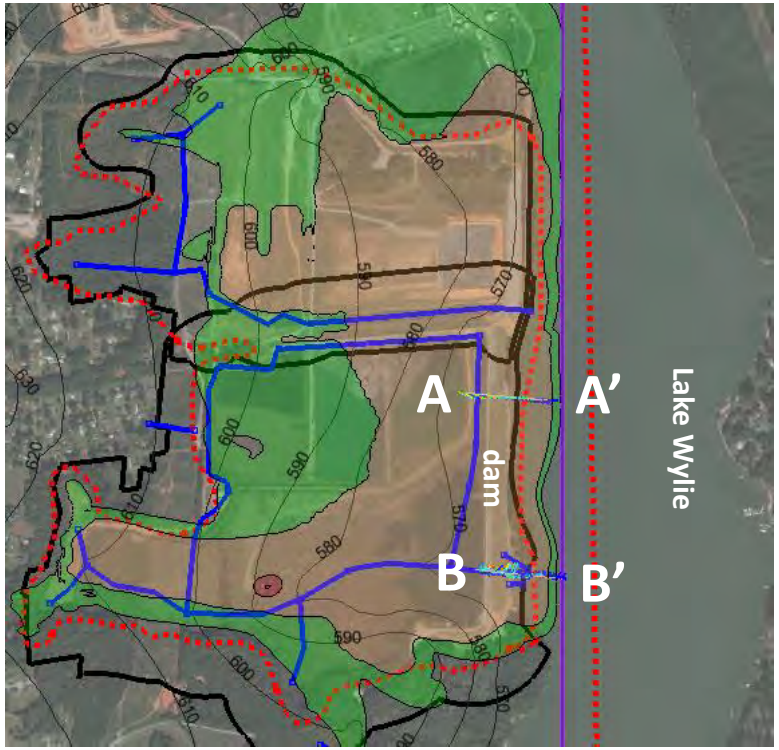
Saprolite 12-14

TZ 15-16

Bedrock 17-26

Vertical exaggeration X 3





A-A' ~820 ft

B-B' ~730 ft

ATTACHMENT B

RESPONSE TO COMMENTS

RESPONSE TO COMMENTS

I. Summary of Responses to Comments

DEQ received approximately 1,090 comments regarding the four Allen closure options. The overwhelming majority of comments (approximately 960) were submitted via a form email that supported closure by excavation and removal to a new onsite landfill or, alternatively, excavation and removal to an offsite landfill. The email commenters requested that the coal ash be removed from leaking, unlined pits and moved to dry lined storage away from waterways and groundwater. The commenters, however, did not specifically distinguish between moving the coal ash to a new onsite landfill or removal to an offsite landfill. Two other commenters specifically recommended moving the coal ash to a new onsite, lined landfill. Only one commenter specifically requested closure-in-place. A discussion of these and other related comments follows.

II. Detailed Responses to Comments

A. Closure-in-place.

Comment: Only one commenter supported the closure-in-place option. The concern with excavation involved potential dump truck traffic along South Point Road associated with removal activities.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

B. Hybrid

There were no comments that directly addressed the hybrid option.

C. Closure by removal to new onsite landfill.

Comment: As referenced in the "Summary of Responses to Comments" section above, the overwhelming majority of commenters stated in a form email that they were supportive of a closure option which could conceivably include either closure option four or five - closure by removal to a new onsite landfill or, alternatively, removal to an offsite landfill. The comment language in that form email states the following:

"*Dear Coal Ash Comment Administrator North Carolina DEQ: Allen,*

The North Carolina Department of Environmental Quality (DEQ) should require Duke Energy to remove its coal ash from its leaking, unlined pits and move it to dry lined storage away from our waterways and out of our groundwater. Duke Energy plans to leave its coal ash sitting in the groundwater at six sites in North Carolina, where it will keep polluting our groundwater, lakes, and rivers.

Recent monitoring shows Duke Energy is polluting the groundwater at its coal ash ponds in North Carolina with toxic and radioactive materials. We need cleanup—not coverup!

The communities around the coal ash ponds have come out time after time over the last several years, making clear that we're concerned about pollution from Duke Energy's coal ash and want Duke Energy to get its coal ash out of its unlined, leaking pits. It is long past time for DEQ and Duke Energy to listen to the communities.

Duke Energy is already required to remove its coal ash at eight other sites in North Carolina and all of its sites in South Carolina—our families and our community deserve the same protections."

Response: DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the impoundment at Allen in accord with N.C. Gen. Stat. § 130A-309-214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

Comment: A commenter urged that the most cautious approach to coal ash management "means complete removal and placement in a lined facility as near as possible to its current location." The commenter further pointed out that the other options all leave at least some ash in place - a continuation of the original problem which has uncertainty as a long-term viable option. The commenter suggested that evaluation of the potential re-uses of ash such as in roadbeds and an aggressive program of marketing re-use to other jurisdictions.

Response: DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

Comment: Two commenters from the River Lakes neighborhood next to Camp Lakes believed that contaminated water is currently flowing into their home and that they deserve access to clean city water. The commenters suggested a four-lane extension of N.C. Highway 273 across the Catawba River which would save both Duke Power and the North Carolina Department of Transportation (NCDOT) considerable amount of money and time in accessing the site. The commenter suggested an onsite temporary concrete plant that could be utilized to encapsulate coal ash into construction resulting in a large reduction in trucking costs versus moving all coal ash offsite. The commenter further suggested there would be significant material savings to NCDOT using ash as road fill material. The commenters also suggested the possibility of shared construction costs to allow partial disposal using construction and partial entombing of the remaining waste in the lined concrete base of the elevated structure.

Response: DEQ agrees that Duke Energy should evaluate the potential of coal ash for other approved product uses as described in the response to comment ii. above.

D. Closure by removal to an offsite landfill.

Comment: The overwhelming majority of commenters stated in a form email that they were supportive of a closure option which could conceivably include either closure option four or five - closure by removal to a new onsite landfill or, alternatively, removal to an offsite landfill. Reference is made to the specific comment language in paragraph 4i. above.

Response: DEQ agrees and references the response to the comment in paragraph 4i. above.

Comment: One commenter who attended the January 17, 2018, Sherrill's Ford Elementary School meeting stated that Duke Energy needs to remove the coal ash completely from its leaking, unlined pits.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: Another commenter, citing to a recent New York Times article ["Data collected by the federal Environmental Protection Agency found that 95 percent of them (unlined coal ash ponds) had leaked, seeping into rivers and groundwater supplies"] rejected the capping proposal and indicated that Duke Energy needed to remedy its own mistakes and remove the coal ash from its current unlined locations, then relocate it to lined landfills.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: A commenter stated the saltstone method of disposal would isolate this hazardous waste for safe and permanent storage. Moreover, Duke Energy should store the coal ash on their own property, and not be allowed to move it across our state as they have in the Moncure area. The commenter also added that coal ash should not be capped in place.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C. The saltstone method of disposal, utilized by the U.S. Department of Energy for isolating hazardous and radioactive waste at a defense nuclear facility in South Carolina, is not permissible under CAMA.

Comment: A commenter who attended the public hearing at Stuart Cramer High School, in rejecting the closure-in-place option, believed that the only acceptable option for dealing with this waste involved excavating all coal ash at the Allen site and moving it to lined containers.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: A researcher who witnessed the aftermath of the largest coal ash spill in the country in 2008 insisted that NCDEQ should require Duke Energy to remove its coal ash from its leaking, unlined impoundments and move it to dry lined storage. There were also concerns for protecting the Catawba River and downs stream rivers.

Response: Potential coal ash releases are a significant concern for DEQ and underscore the decision to require Duke Energy to excavate and remove all coal ash from impoundments at the Allen site.

Comment: A commenter stated coal ash stored at the Allen Stream Station should be completely removed and safely stored away from a major water source that thousands drink from.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: Another commenter expressed serious concern regarding the closure-in-place option and provided lengthy commentary on why this option was not viable:

"Cap-in-place is unacceptable for any of the coal ash sites in North Carolina. Any 'solutions' proposed by Duke Energy that do not excavate and move ash to fully lined, scientifically designed systems that fully encapsulate coal ash must be rejected. Without multiple, sealed bottom, side, and top liners, North Carolina's groundwater will always be at risk. Due to increases in extreme weather, more frequent hurricanes and massive rainstorms, groundwater models of 100 or 500-year floodplain are obsolete. Given the unpredictable fluctuations in the water tables and groundwater flows, there is no way that surface capping without properly engineered underlying bottom liners can protect groundwater in the coming decades."

The commenter continued by stating: "DEQ should require Duke Energy's new landfills to go beyond the minimal mandatory protections provided by current regulations. DEQ must carry out independent studies and obtain recommendations for the best liner technologies, redundant liners, and with multiple long-term safeguards. Scientifically based placements for baseline and ongoing groundwater monitoring wells should be established. These must be thoroughly and constantly monitored – with full, public, transparent, internet accessible, easily available data from the monitoring results. Ground water and surface monitoring should be ongoing for a minimum of 50 years . . . While transporting existing coal ash dumps away from rivers and floodplains is essential, every effort should be taken by DEQ to ensure that the distances coal ash is moved is minimized and that the coal ash destinations are always kept on Duke Energy's property.

The commenter concluded: "Once constructed, these new lined landfills should represent the best technologies and materials available – not materials that create short-term financial savings. The original existing dumps were disasters for public health, for NC communities, and for our state's waters. We have this one chance to remediate some of the damages and most importantly, to safeguard future generations from heavy metal coal ash contamination. Our state-wide re-design of storage systems for millions of tons of coal ash must be done right this time."

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: One commenter, who could not attend one of the Allen site meetings, submitted a comment stating that ground water seepage from cap in place along with potential for natural disasters make the existing locations of coal ash pits a disaster waiting to happen. The commenter continued by stating that best practices are known and have been implemented in

other states by removing the ash to a secure, lined location, where natural disasters can be withstood and implemented quickly before the next spill occurs.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: Another commenter, in requesting that all ash lagoons in North Carolina be relocated to 60-millimeter plastic lined landfills, joined in rebuffing closure-in-place: "There are plenty of technical points that argue against your cap in place plan. The most significant to me are that the ponds have been built over stream beds. Even if capped, erosion from the stream flow that travels under the lagoons will continue to carry toxic metals into the river. The site is 60 years old, it's already leaking, Allen's dams have failed before and over 114,000 people rely on drinking water intakes immediately downstream. With the ash stacked 75 feet high on the banks of the river I'm worried about a hurricane, earthquake, or 100-year flood that could lead to dam failure."

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: A commenter opined that Duke Energy should be required to move the coal ash to a safe storage facility off of the Allen Plant location - capping and storing the coal ash at Allen in place and in an unlined basin is not a viable solution because this option will not protect the ground water table and Lake Wylie from the heavy metals that are leaching out of the existing coal ash basins.

Response: DEQ agrees with this comment that coal ash must be excavated and removed from the Allen site impoundments under CAMA Option A requiring movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure.

Comment: One commenter who attended the public hearing at Cramer High School believes that any solution other than excavation and removal of coal ash stored on the property of the Allen steam station is unacceptable. The commenter, focusing on the toxicity and health effects of coal ash, concluded by stating that Duke Energy must excavate and remove the coal ash to an area where it will minimally affect human health and environmental safety.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: Another commenter who spent many years researching coal ash contamination stated that unlined ash pits pose threats to public health and environmental quality, even when water is drained and the basin is capped in place. The concern is that toxic metals and other compounds associated with coal ash would still be present without any liner after the basin is drained, and could therefore still leach into the nearby aquifer, affecting well water and surface water nearby. The commenter urged not to allow capping in place of ash at this or any other site in North Carolina.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: Similarly, another commenter expressed support for the full excavation of both the Allen and Marshall sites by Duke Energy. The commenter felt that capping the ash in place will continue to contaminate the groundwater and discharge pollutants into Lake Norman and Lake Wylie - with the only safe solution a complete excavation and either recycling or storage in lined landfills.

Response: DEQ agrees that the coal ash must be excavated and removed from the Allen site impoundments.

Comment: A related comment from the Cramer High School meeting echoed those sentiments – the commenter stated that the pits should be excavated as soon as possible to the maximum safe extent with at least twenty-five (25) percent recycled through encasement in cement bricks, concrete and other methods. The remainder of excavated ash should be moved into double-lined landfills away from rivers, lakes and aquifers with monitored leak detection systems. The double-lining would include 2' of clay on the exterior with a durable lining impervious to water.

Response: DEQ agrees with this comment that coal ash must be excavated and removed from the Allen site impoundment under CAMA Option A requiring movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure.

Comment: A small number of other commenters also suggested the material should be recycled into concrete.

Response: DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

Comment: Another commenter suggested using coal ash for construction materials to build or improve South Point Road and/or Parkway Bridge to I-485.

Response: DEQ agrees that Duke Energy could evaluate the potential of coal ash for other approved product uses.

Comment: DEQ received multiple comments opposing capping in place that stated general support for closure by excavation [removal] to dry, offsite lined landfills on property owned by Duke to keep coal ash away from drinking water and recreational water uses near the Catawba, Wateree, Santee and Cooper Rivers and associated chain of lakes including Lake Wylie and the Lake Norman area.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: A former federal wildlife biologist provided extensive commentary concerning excavation and removal: "I respectfully request that The North Carolina Department of Environmental Quality (NCDEQ) require Duke Energy to remove its coal ash from the existing unlined storage pits at the Allen Steam Station location. The excavated coal ash should then be moved to a dry, lined storage-landfill on Duke Energy property, as detailed in *Option #5* of their Allen Steam Station Ash Basin Closure Options Analysis. The existing Allen Ash Basins location is directly adjacent to the Catawba River/Lake Wylie waterways, where groundwaters must be transporting coal ash pollutants (arsenic, beryllium, cadmium, cobalt, lithium, thallium, etc.) directly into those waters . . . I am concerned about the potential for existing water quality degradation and the lack of existing surface water monitoring efforts by NCDEQ in the Allen Steam Station vicinity to document such degradation. Concentrations of coal-ash-related chemicals are known to have negative health impacts on both humans and fish/wildlife residents exposed to them. Removal of those coal ash health hazards from the Allen Ash Basins facility is essential to those residents' health and well-being and is a solution supported by historical, national clean-up efforts (Superfund sites, etc.)." The commenter also raised several questions regarding ground and surface water pollution and suggested additional testing and monitoring activities.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: One commenter suggested use of a coal train to expedite the removal process and limit the amount of trucking needed to lessen impact on roads.

Response: The Duke Energy Allen site closure plan will likely assess the viability of the various transport options for coal ash excavated from the Allen impoundments.

Comment: Some commentators also suggested that Duke Energy intentionally overestimated trucking traffic concerns related to removal to support a closure-in-place solution.

Response: DEQ takes no position with the suggestion that Duke Energy intentionally overestimated trucking traffic concerns.

Comment: A commenter representing the Catawba Riverkeeper Foundation, MountainTrue, and Waterkeeper Alliance submitted extensive written comments urging DEQ to require the Allen coal ash basins to be excavated to a lined landfill to protect the environment and human health.

The commenter claimed coal ash impoundments at Allen are not eligible for closure-in-place under CAMA. The commenter alleged that closure-in-place violates the North Carolina groundwater rule. The commenter sets out several arguments it believes supports that claim: 1) Duke Energy's modelling demonstrates it will not meet groundwater standards if it chooses closure-in-place; 2) Duke Energy's modelling underestimates the extent of contamination; 3) Duke Energy tested groundwater compliance at the wrong location; 4) the groundwater rule prohibits closure-in-place because the coal ash will contribute to violations of the groundwater standard for centuries; and 5) closure-in-place is unavailable because it will not restore groundwater to the legal standard.

The commenter next claimed that coal ash impoundments at Allen are not eligible for closure-in-place under the Coal Combustion Residuals (CCR) rule. The commenter alleged that: 1) the CCR rules' performance standards require separating ash from the groundwater and precluding its future impoundment; and 2) the CCR rules' corrective action requirements preclude closure-in-place.

The commenter continues by asserting that DEQ must base its closure determination on effectiveness and not cost to the polluter. The commenter further maintains that DEQ should reject Duke Energy's "Community Impact Analysis." The commenter claims that Duke's Energy's report downplays well-established pollution risks and exaggerates the impact on communities of excavating and trucking material to offsite landfills. Further, they claim that diesel emissions do not meaningfully distinguish between closure methods and that the report's habitat analysis is flawed. The commenter concludes by questioning the validity of Duke Energy's closure options scoring system - and offers its own analysis to demonstrate why it believes Duke Energy manipulated scores to suit a desired outcome.

Response: DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the impoundment at Allen in accord with N.C. Gen. Stat. § 130A-309.214(a)(3).

Comment: The same commenter requested that DEQ ignore a Duke Energy report on estimated greenhouse gas emissions associated with various closure options for the six unresolved coals ash sites (including the Allen site). The commenter claimed DEQ should disregard this submission because it was made after DEQ's deadline for Duke Energy to submit its materials and outside the public comment period, thereby denying the public an opportunity to respond to it. DEQ should also disregard this submission because it is irrelevant to the decision facing DEQ, which is to select a closure method that stops the ongoing pollution and continuing threat to our water resources posed by Duke Energy's leaking coal ash basins.

Response: DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the impoundment at Allen in accord with N.C. Gen. Stat. § 130A-309.214(a)(3).

Comment: A commenter from DEQ's Environmental Justice and Equity Board rejected the closure-in-place option in support of excavation and movement into lined landfills: "There is no way to safeguard the health of North Carolinians while leaving harmful toxins to leach into our ground and water. Furthermore, the long-term costs of leaving toxic coal ash in pits alongside our lakes and rivers under a 'cap in place' option, would far outweigh the cost of scientifically sound excavation to lined landfills on Duke's property. This includes maintenance costs, future liability costs, and the too often non-considered cost of human capital when disasters, such as the 2014 Dan River spill, occur."

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: A variety of comments were received in the form of YouTube testimonials following DEQ's Environmental Justice Advisory Board meeting in Wilmington, NC, and from

other entities and individuals regarding the impact of coal ash spills. Links to each these testimonials follow:

Caroline Armijo - ACT Member https://youtu.be/cJag3oPI4qU
Johnny Hairston - resident in harm's way of basin failure https://youtu.be/6iK1sbVOO58
Rev. Gregory Hairston – leader/resident in close proximity https://youtu.be/IV9crtEyTJY
John Wagner - ACT Member https://youtu.be/IV9crtEyTJY
Frank Holleman - lead attorney of SELC https://youtu.be/eIwPWPYb3Uc
At What Cost (2014) https://youtu.be/rraUoadqr8o
Danielle Bailey-Lash on CNN https://youtu.be/OCTU-CUoQzQ
A Time to Sing (Abridged) (August 2018) https://youtu.be/HQFYKBaf4NQ
A Day of Prayer (February 2019) https://youtu.be/agRzScT_BEs

Response: DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the impoundment at Allen in accord with N.C. Gen. Stat. § 130A-309.214(a)(3).

Comment: A commenter who also serves as an elected official stated that sites containing coal ash should not be capped where they are, since groundwater is invaded by the toxins requiring maintenance and monitoring – toxins that would ultimately end up in surface waters through seepage or breaches. The commenter opined that coal ash be stored in lined landfills which meet federal guidelines. The commenter also had concerns regarding leaching from concrete if the coal ash is mixed into any building materials.

Response: DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the impoundment at Allen in accord with N.C. Gen. Stat. § 130A-309.214(a)(3).

Comment: A former North Carolina state legislator submitted comments stating that Duke Energy has investigated numerous options for the safe disposal of coal ash as highlighted in the Duke Energy Coal Combustion Product Management Study Phase 3 (May 2016). The commenter believed that Section 2-4 ("Masonry Units") of the study can be applied at the Allen Plant and that Duke Energy has investigated all the options in this report. The commenter referenced direction from the General Assembly in the form of CAMA III or CAMA IV. The commenter points out that a company, Nu-Rock, has a long history of using coal ash in cement products and that Nu-Rock's domestic headquarters is in Charlotte. The commenter believes this is a viable option that has been investigated by both the University of North Carolina (Charlotte) and Virginia Tech University.

Response: DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the impoundment at Allen in accord with N.C. Gen. Stat. § 130A-309.214(a)(3).

Comment: Several dozen South Carolina residents submitted comments. Many live in the Catawba-Wateree waterway chain. The overwhelming consensus from these comments is to remove coal ash from unlined pits at Allen and move the ash to an area that is safer that will not impact water drawn or used in the Catawba-Wateree chain.

Response: DEQ agrees that coal ash at Allen should be removed from impoundments and placed in a lined landfill. DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

Comment: Two commenters responded by telephone voice message. One commenter was concerned that NCDEQ would chose the least expensive option of capping-in-place. The commenter stated that full evacuation of all coal ash sites, the most protective option, should be chosen for all sites. The second commenter, who lives in Gaston County, stated that there is arsenic and hexavalent chromium (and other contaminants) in the well water and that NCDEQ should fully excavate the coal ash since it can sell to concrete companies to make concrete.

Response: DEQ agrees that coal ash at Allen should be removed from impoundments and placed in a lined landfill. DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination

Belews Creek Steam Station

April 1, 2019

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination

Belews Creek Steam Station

Executive Summary

The Coal Ash Management Act (CAMA) establishes criteria for the closure of coal combustion residuals (CCR) surface impoundments. The CCR surface impoundment located at Duke Energy Carolinas, LLC's (Duke Energy) Belews Creek Steam Station (Belews Creek) in Stokes County, NC has received a low-risk classification. Therefore, according to N.C. Gen. Stat. § 130A-309.214(a)(3), the closure option for CCR surface impoundments is at the election of the North Carolina Department of Environmental Quality (DEQ). CAMA provides three principal closure pathways: (a) closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill [CAMA Option A]; (b) closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill [CAMA Option B]; or (c) closure in accordance with the federal CCR rule adopted by EPA [CAMA Option C].

In preparing to make its election, DEQ requested information from Duke Energy related to closure options. By November 15, 2018, Duke Energy provided the following options for consideration: closure in place, full excavation, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing CCR surface impoundments. DEQ held a public information session on January 10, 2019 in Walnut Cove, NC where the community near Belews Creek had the opportunity to learn about options for closing coal ash CCR surface impoundments and to express their views about proposed criteria to guide DEQ's coal ash closure decision making process. To evaluate the closure options, the Department considered environmental data gathered as part of the site investigation, permit requirements, ambient monitoring, groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the CCR surface impoundment at the Belews Creek facility in accord with N.C. Gen. Stat. § 130A-309-214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from unlined CCR surface impoundments at Belews Creek is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

Duke Energy will be required to submit a final Closure Plan for the CCR surface impoundment at Belews Creek by August 1, 2019. The Closure Plan must conform to this election by DEQ.

I. Introduction

DEQ has evaluated the closure options submitted by Duke Energy for the CCR surface impoundment at the Belews Creek Steam Station. This document describes the CAMA requirements for closure of coal ash impoundments, the DEQ evaluation process to make an election under CAMA for the subject impoundment at the Belews Creek site, and the election by DEQ for the final closure option.

II. Site History

Duke Energy owns and operates the Belews Creek Steam Station which is located on Belews Lake Reservoir in Belews Creek, Stokes County, North Carolina. Belews Creek is a two-unit 2,240-megawatts coal-fired generating facility that began commercial operation in 1974. Prior to 1984, Belews Creek wet sluiced coal combustion residuals into one surface impoundment located on the property. The surface impoundment is known as the Active Ash Basin (AAB) and is impounded by dam STOKE-116.

In 1984, Belews Creek replaced its fly ash wet sluicing operation with a dry ash handling system and began placing dry fly ash into one of three permitted landfills located on the property: Pine Hall Road Landfill (8503-INDUS-1984, closed), Craig Road Landfill (8504-INUDS, active), and FGD Landfill (8505-INUDS, active). However, the ability to wet sluice to the AAB was still available but limited to certain situations: unit startup/shutdown, equipment maintenance, and service. Currently, a 100% dry ash handling system is being used onsite and no CCR is being sluiced to the AAB. A Flue Gas Desulfurization (FGD) scrubber system is active at Belews Creek where the FGD residuals are beneficially reused for the production wallboard.

III. CAMA Closure Requirements

CAMA establishes closure requirements for CCR surface impoundments. The General Assembly has mandated that DEQ "shall review a proposed Coal Combustion Residuals Surface Impoundment Closure Plan for consistency with the minimum requirements set forth in subsection (a) of this section and whether the proposed Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part." N.C. Gen. Stat. § 130A-309.214(b). Similarly, the General Assembly has required that DEQ "shall disapprove a proposed Coal Combustion Residuals Surface Impoundment Closure Plan unless the Department finds that the Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and other complies with the requirements of this Part." N.C. Gen. Stat. § 130A-309.214(c).

CAMA requires DEQ to review any proposed Closure Plan for consistency with the requirements of N.C. Gen. Stat. § 130A-309.214(a). See N.C. Gen. Stat. § 130A-309.214(b). DEQ must disapprove any proposed Closure Plan that DEQ finds does not meet these requirements. See N.C. Gen. Stat. § 130A-309.214(c). Therefore, an approvable Closure Plan must, at a minimum, meet the requirements of N.C. Gen. Stat. § 130A-309.214(a).

Pursuant to N.C. Gen. Stat. § 130A-309.213(d)(1), DEQ has classified the CCR surface impoundment at Belews Creek as low-risk. The relevant closure requirements for low-risk impoundments are in N.C. Gen. Stat. § 130A-309.214(a)(3), which states the following:

- Low-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2029;
- A proposed closure plan for a low-risk impoundment must be submitted as soon as practicable, but no later than December 31, 2019; and
- At a minimum, impoundments located in whole above the seasonal high groundwater table shall be dewatered and impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable.

In addition, N.C. Gen. Stat. § 130A-309.214(a)(3) requires compliance with specific closure criteria set forth verbatim below in Table 1. The statute provides three principal closure pathways: (a) closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill [CAMA Option A]; (b) closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill [CAMA Option B]; or (c) closure in accordance with the federal CCR rule adopted by EPA [CAMA Option C]. For each low-risk impoundment, the choice of the closure pathway in CAMA is at the "election of the Department."

Table 1: CAMA Closure Options for Low-Risk CCR Impoundments
N.C. Gen. Stat. § 130A-309.214(a)(3)

At the election of the Department, the owner of an impoundment shall either:

a. Close in any manner allowed pursuant to subdivision (1) of this subsection; [CAMA Option A]

b. Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall install and maintain a cap system that is designed to minimize infiltration and erosion in conformance with the requirements of Section .1624 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, and, at a minimum, shall be designed and constructed to (i) have a permeability no greater than 1 x 10-5 centimeters per second; (ii) minimize infiltration by the use of a low-permeability barrier that contains a minimum 18 inches of earthen material; and (iii) minimize erosion of the cap system and protect the low-permeability barrier from root penetration by use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth. In addition, the owner of an impoundment shall (i) install and maintain a groundwater monitoring system; (ii) establish financial assurance that will ensure that sufficient funds are available for closure pursuant to this subdivision, post-closure maintenance and monitoring, any corrective action that the Department may require, and satisfy any potential liability for sudden and nonsudden accidental occurrences arising from the impoundment and subsequent costs incurred by the Department in response to an incident, even if the owner becomes insolvent or ceases to reside, be incorporated, do business, or maintain assets in the State; and (iii) conduct post-closure care for a period of 30 years, which period may be increased by the Department upon a determination that a longer period is necessary to protect public health, safety, welfare; the environment; and natural resources, or decreased upon a determination that a shorter period is sufficient to protect public health, safety, welfare; the environment; and natural resources. The Department may require implementation of any other measure it deems necessary to protect public health, safety, and welfare; the environment; and natural resources, including imposition of institutional controls that are sufficient to protect public health, safety, and welfare; the environment; and natural resources. The Department may not approve closure for an impoundment pursuant to sub-subdivision b. of subdivision (3) of this subsection unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment; [CAMA Option B] or

c. Comply with the closure requirements established by the United States Environmental Protection Agency as provided in 40 CFR Parts 257 and 261, "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities." [CAMA Option C]

By referencing the closure options for *high-risk* impoundments in "subdivision (1)" or N.C. Gen. Stat. § 130A-309.214(a)(1), CAMA allows for closure of a *low-risk* CCR impoundment in N.C. Gen. Stat. § 130A-309.214(a)(3) through the same removal scenarios:

- "Convert the coal combustion residuals impoundment to an industrial landfill by removing all coal combustion residuals and contaminated soil from the impoundment temporarily, safely storing the residuals on-site, and complying with the requirements for such landfills." N.C. Gen. Stat. § 130A-309.214(a)(1)a.; or
- "Remove all coal combustion residuals from the impoundment, return the former impoundment to a nonerosive and stable condition and (i) transfer the coal combustion residuals for disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill or (ii) use the coal combustion products in a structural fill or other beneficial use as allowed by law." N.C. Gen. Stat. § 130A-309.214(a)(1)b.

IV. DEQ Election Process

Beginning with a letter to Duke Energy on October 8, 2018, DEQ began planning for a thorough evaluation of the closure options for low-risk impoundments before making an election as outlined in Table 1 above. DEQ's objectives were to receive input on closure options from Duke Energy and to engage with community members near low-risk sites. DEQ outlined the following schedule in the October 8, 2018 letter:

- November 15, 2018 – Duke Energy submittal of revised closure option analyses and related information
- January 10, 2019 – DEQ public meeting near Belews Creek
- April 1, 2019 – DEQ evaluation of closure options
- August 1, 2019 – Duke Energy submittal of closure plan
- December 1, 2019 – Duke Energy submittal of updated corrective action plan for all sources at the Belews Creek site that are either CCR impoundments or hydrologically connected to CCR impoundments

DEQ received the requested information from Duke Energy by November 15, 2018: closure options analysis, groundwater modeling and net environmental benefits assessment. These materials are posted on the DEQ website. Duke Energy provided the following options for consideration: closure in place, full excavation with an onsite landfill, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing impoundment.

In preparing to make its election of the closure option, DEQ considered environmental data contained in the comprehensive site assessment, permit requirements, ambient monitoring, closure options analysis and groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements. The Belews Creek site has extensive amounts of data that have been collected during the site assessment process, and these data were used as part of the evaluation of closure options. DEQ's evaluation of closure in place and hybrid option based on groundwater monitoring and modeling data is provided in Attachment A. That analysis

demonstrates that the contaminated plume is already beyond the compliance boundary for the site. All of these references are part of the record supporting DEQ's determination.

DEQ conducted a public meeting in Walnut Cove, NC near Belews Creek on January 10, 2019. Approximately 98 people attended the meeting. Approximately 1052 comments were received during the comment period, which closed on February 15, 2019. Additionally, 275 people signed an attachment to written comments and an additional 340 people signed an on-line petition. A sizeable minority of commenters specifically recommend excavating coal ash and moving it to a lined onsite landfill. A small minority of commenters want the coal ash moved out of state. No commenters support the hybrid closure or closure-in-place option. Several commenters support recycling coal ash for various commercial product uses. A review and response to comments are included in Attachment B.

V. DEQ Evaluation of Closure Options

DEQ has evaluated the closure options proposed by Duke Energy for the CCR impoundment at the Belews Creek facility. The purpose of this evaluation was to determine which closure option or options may be incorporated into an approvable Closure Plan under CAMA.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the Active Ash Basin at Belews Creek in accord with N.C. Gen. Stat. § 130A-309.214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from unlined impoundment at Belews Creek is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

DEQ does not elect CAMA Option B for the CCR surface impoundment at Belews Creek. In N.C. Gen. Stat. § 130A-309.214(a)(3)b, the General Assembly mandated that "[t]he Department may not approve closure for an impoundment pursuant to [this] sub-subdivision . . . unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment." N.C. Gen. Stat. § 130A-309.214(a)(3)b. In light of these requirements and based on DEQ's review of the information provided by Duke Energy as well as DEQ's independent analysis, DEQ does not believe that Duke Energy can incorporate CAMA Option B into an approvable Closure Plan for Belews Creek.

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether upon full implementation of the closure plan the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary. To address this question, DEQ considered the current state of the groundwater contamination and reviewed the results of the groundwater modeling submitted by Duke Energy. The evaluation is provided in Attachment A. DEQ's overall conclusion is that based on the current geographic scope and vertical extent of the groundwater contamination plume, and future modeled extent of the plume, DEQ does not believe these two closure options can meet the requirements of CAMA Option B for the CCR surface impoundment at Belews Creek.

DEQ does not elect CAMA Option C (i.e., closure under the federal CCR Rules found in 40 CFR Part 257) for the CCR impoundments at Belews Creek. DEQ has determined that:

a. Under the facts and circumstances here, CAMA Option C is less stringent than CAMA Option A. Specifically, DEQ's election of Option A would also require Duke Energy to meet the requirements of the federal CCR Rule (i.e., CAMA Option C) but election of CAMA Option C would not require implementation of CAMA Option A.
b. Because CAMA Option A adds additional requirements or performance criteria beyond Option C, it advances DEQ's duty to protect the environment (see N.C. Gen. Stat. §§ 279B-2 & 143-211) and the General Assembly's mandate under CAMA that DEQ ensure that any Closure Plan, which must incorporate an approvable closure option, is protective of public health, safety, and welfare, the environment, and natural resources (see N.C. Gen. Stat. § 130A-309.214(b) & (c)).
c. For the CCR impoundments for which the closure option(s) must be determined, CAMA Option A provides a better CAMA mechanism for ensuring State regulatory oversight of the closure process than Option C, as well as greater transparency and accountability.
d. While the federal CCR Rule was written to provide national minimum criteria for CCR impoundments across the country, CAMA was written specifically to address the CCR impoundments in North Carolina.
e. While the federal CCR Rule allows CCR impoundment owners to select closure either by removal and decontamination (clean closure) or with a final cover system (cap in place), EPA anticipates that most owners will select closure through the less protective method of cap in place.
f. There is considerable uncertainty regarding the status and proper interpretation of relevant provisions of the federal CCR Rule. For instance, EPA is reconsidering portions of the federal CCR Rule. Also, the performance standards in 40 CFR § 257.102(d) for cap in place closure are the subject of conflicting interpretations (and possible litigation) among industry and state authorities.

VI. Conclusion

The final closure plan is due on August 1, 2019 in accordance with this determination. Based on DEQ's evaluation of the options submitted by Duke Energy, DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the Active Ash Basin at Belews Creek in accord with N.C. Gen. Stat. § 130A-309.214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

While beneficiation is not a requirement of the closure plan, DEQ encourages Duke Energy to consider opportunities for beneficiation of coal ash that would convert coal combustion residuals into a useful and safe product.

ATTACHMENT A

DEQ EVALUATION OF CLOSURE IN PLACE AND HYBRID OPTIONS BASED ON GROUNDWATER MONITORING AND MODELING DATA

I. The Contaminated Plume is Beyond the Compliance Boundary

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary upon full implementation of the closure plan. Significantly, the contaminated groundwater plume has already extended beyond the compliance boundary in a portion of the impoundment. The inferred general extent of groundwater impacts above applicable Background Threshold Values or 2L Standards are shown on Figure ES-1. Additional monitoring and hydrogeological data is available in the Belews Creek Steam Station October 2017 CSA Update Report (available on the DEQ website).

Based on review of data submitted to date in various reports, both soil and groundwater have been impacted by CCR handling activities at the site. Groundwater within the area of the impoundment generally flows north to northwest toward Dan River and south of a topographic ridge that serves as a groundwater divide along Pine Hall Road toward Belews Lake Reservoir. Boron concentrations above 2L Standards approximates the leading edge of the CCR plume at the site. Almost all constituents of interest (COIs) are present in the shallow flow layer. The horizontal extent of those COIs are generally within the footprint of the boron plume.

The vertical extent of most COIs is within the shallow and transition flow layers. However, data suggests the bedrock flow layer has been impacted by CCR handling activities at the site. Manganese is the only COI with a significant exceedance of the 2L standard in the bedrock flow layer.

DEQ concludes that the contaminated groundwater plume above 2L standards has extended beyond the compliance boundary along the northern edge of the property. Based on Figure ES-1, this plume extends along the entire length active ash basin.

Figure ES-1: Belews Creek Steam Station October 2017 CSA Update Report

Figure ES-1 Legend: Belews Creek Steam Station October 2017 CSA Update Report

LEGEND

- AREA OF CONCENTRATION IN GROUNDWATER ABOVE NC2L (SEE NOTE 5)
- ASH BASIN WASTE BOUNDARY
- APPROXIMATE LANDFILL WASTE BOUNDARY
- GENERALIZED GROUNDWATER FLOW DIRECTION
- RESIDENTIAL UNIT
- DESIGNATED EFFLUENT CHANNEL WITH FLOW DIRECTION
- STREAM WITH FLOW DIRECTION
- DUKE ENERGY PROPERTY BOUNDARY

NOTE:

1. OCTOBER, 2016 AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON SEPTEMBER 11, 2017. AERIAL DATED APRIL 8, 2017.
2. STREAM FROM AMEC NRTR REPORT, 2015.
3. GENERALIZED GROUNDWATER FLOW DIRECTION BASED ON APRIL 3, 2017 WATER LEVEL DATA.
4. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY.
5. GENERALIZED AREAL EXTENT OF MIGRATION REPRESENTED BY NCAC 02L EXCEEDANCES OF BORON.

II. Groundwater Cross-section Modeling

DEQ evaluated cross-sections of the groundwater modeling results provided by Duke Energy to determine whether Duke Energy's final closure *Option 1: Closure-in-Place* and *Option 6: Hybrid* would meet the criteria of CAMA Option B. DEQ considered whether the proposed closure option would prevent any post closure exceedances of the 2L groundwater quality standard at the compliance boundary upon full closure implementation. Cross-sections B-B' and C-C' were evaluated and can be seen in the figures below. These cross-sections represent where the boron concentration above the 2L standard of 700 µg/L has crossed the compliance boundary based on groundwater monitoring and modeling.

Next, the model results were evaluated based on the following model simulations:

- current conditions in 2017 when the model was calibrated based on raw field data
- upon completion of the final closure-in-place cover system at t=0 years
- closure-in-place option at t=125 years
- upon completion of the hybrid option at t=0 years and
- hybrid option at t=118 years

The tables below summarize the results from the model simulations. The boron concentrations depicted in each the tables represent the maximum boron concentration in any layer (ash, saprolite, transition zone, and bedrock) of the model.

Belews Creek Modeling Results for Cross-Section B-B'			
Model Simulation	Maximum Concentration of Boron Above 2L Beyond Compliance Boundary (ug/L)	Depth of GW Contamination Above 2L Beyond Compliance Boundary (feet bgs)	Width of Contamination Plume Beyond Compliance Boundary (feet)
Current Conditions	4,000-10,000	140	1200
Completion of Final Cover (t=0 yrs)	4,000-10,000	150	1200
Final Cover (t=125 yrs)	700-4,000	260	700
Completion of Hybrid (t=0 yrs)	4,000-10,000	145	1200
Hybrid (t=118 yrs)	700-4,000	235	900

bgs – below ground surface

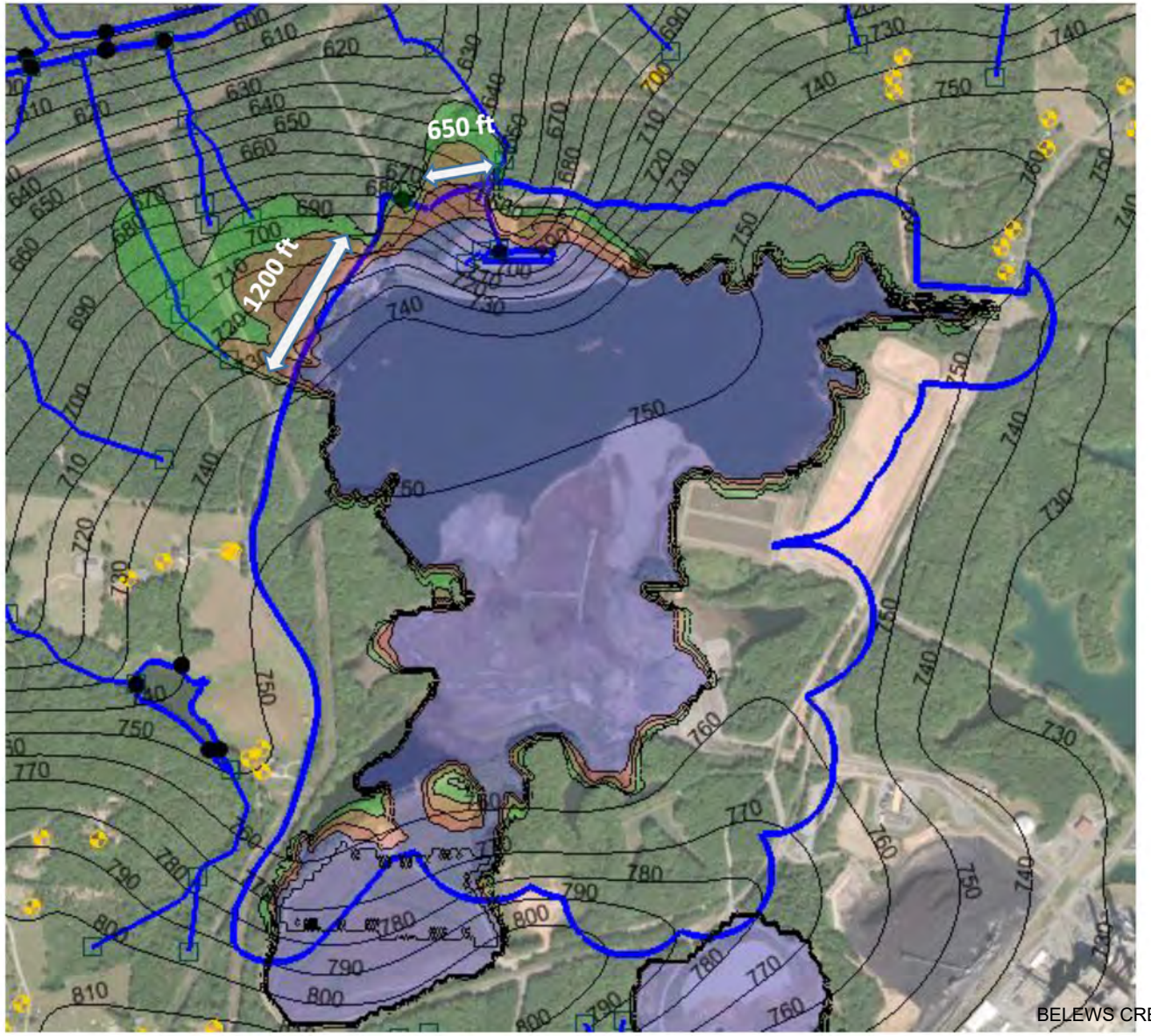
Belews Creek Modeling Results for Cross-Section C-C'			
Model Simulation	Maximum Concentration of Boron Above 2L Beyond Compliance Boundary (ug/L)	Depth of GW Contamination Above 2L Beyond Compliance Boundary (feet bgs)	Width of Contamination Plume Beyond Compliance Boundary (feet)
Current Conditions	4,000-10,000	325	650
Completion of Final Cover (t=0 yrs)	4,000-10,000	330	650
Final Cover (t=125 yrs)	700-4,000	550	700
Completion of Hybrid (t=0 yrs)	4,000-10,000	310	700
Hybrid (t=118 yrs)	700-4,000	440	750

These data illustrate that after completion of closure with the final cover or hybrid option, the groundwater plume still extends beyond the compliance boundary above the 2L groundwater standard and the area of the plume requiring remediation is immense. Even 118 to 125 years beyond completion of closure, the area of the plume requiring remediation remains extensive.

DEQ recognizes that there are no groundwater remediation corrective actions included in the groundwater modeling simulations submitted to DEQ as part of Duke Energy's closure options analysis documentation. However, based on the current geographic scope, vertical extent of the groundwater contamination plume, and future modeled extent of the plume, DEQ does not believe these two closure options can meet the requirements of CAMA Option B.

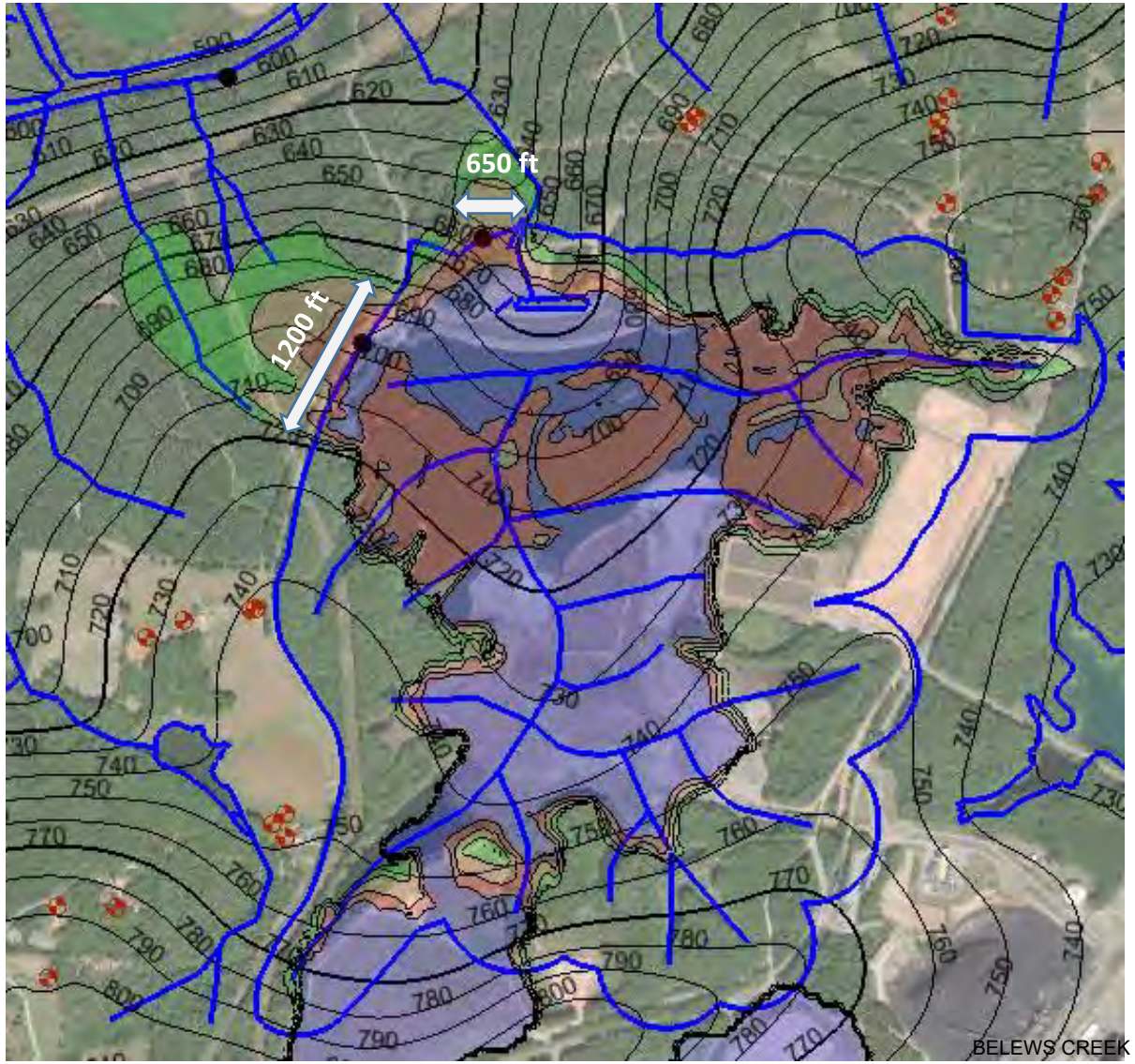
BELEWS CREEK **CURRENT CONDITIONS IN 2017**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



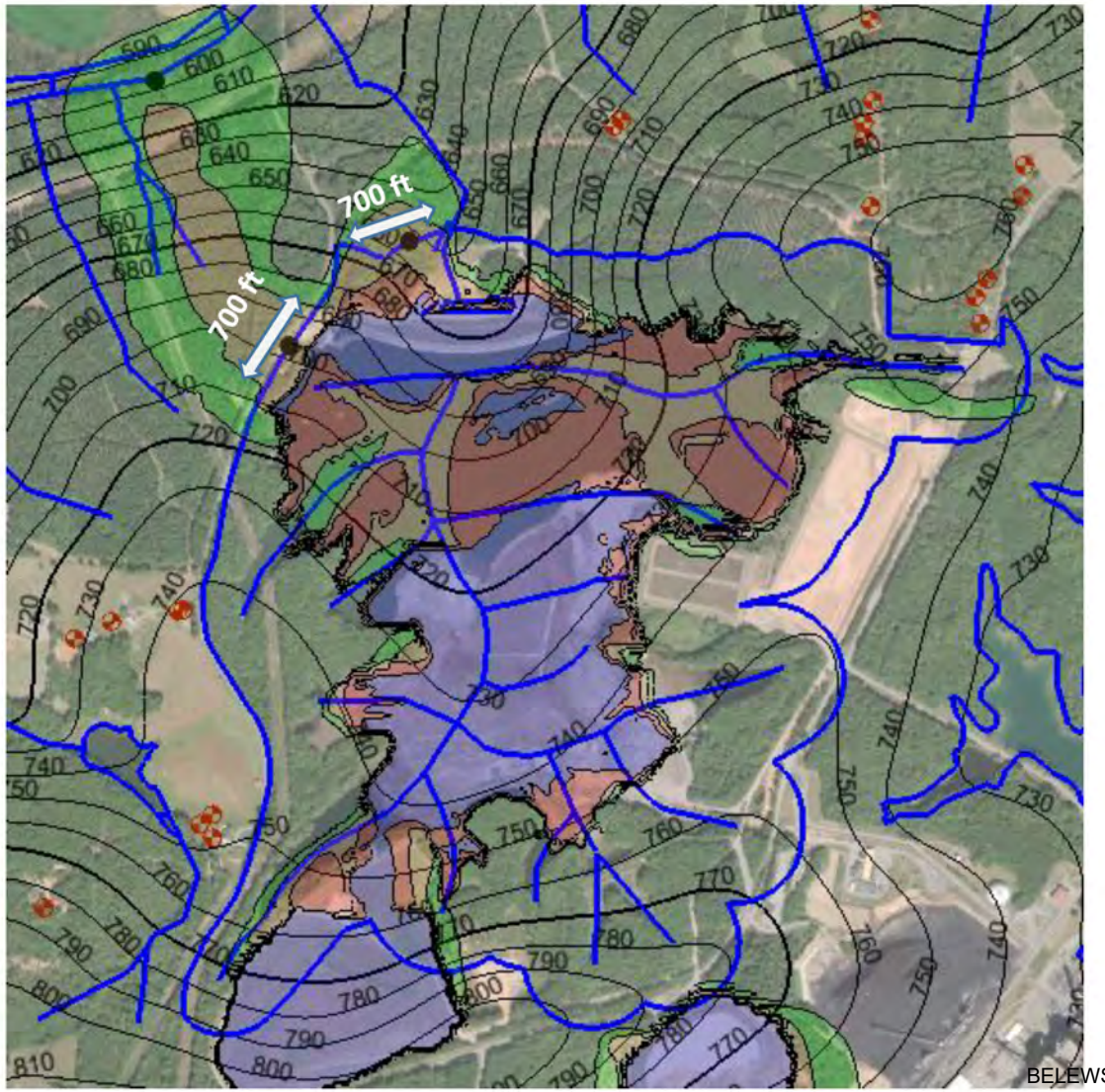
BELEWS CREEK **UPON COMPLETION OF FINAL COVER, 2025 t = 0**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



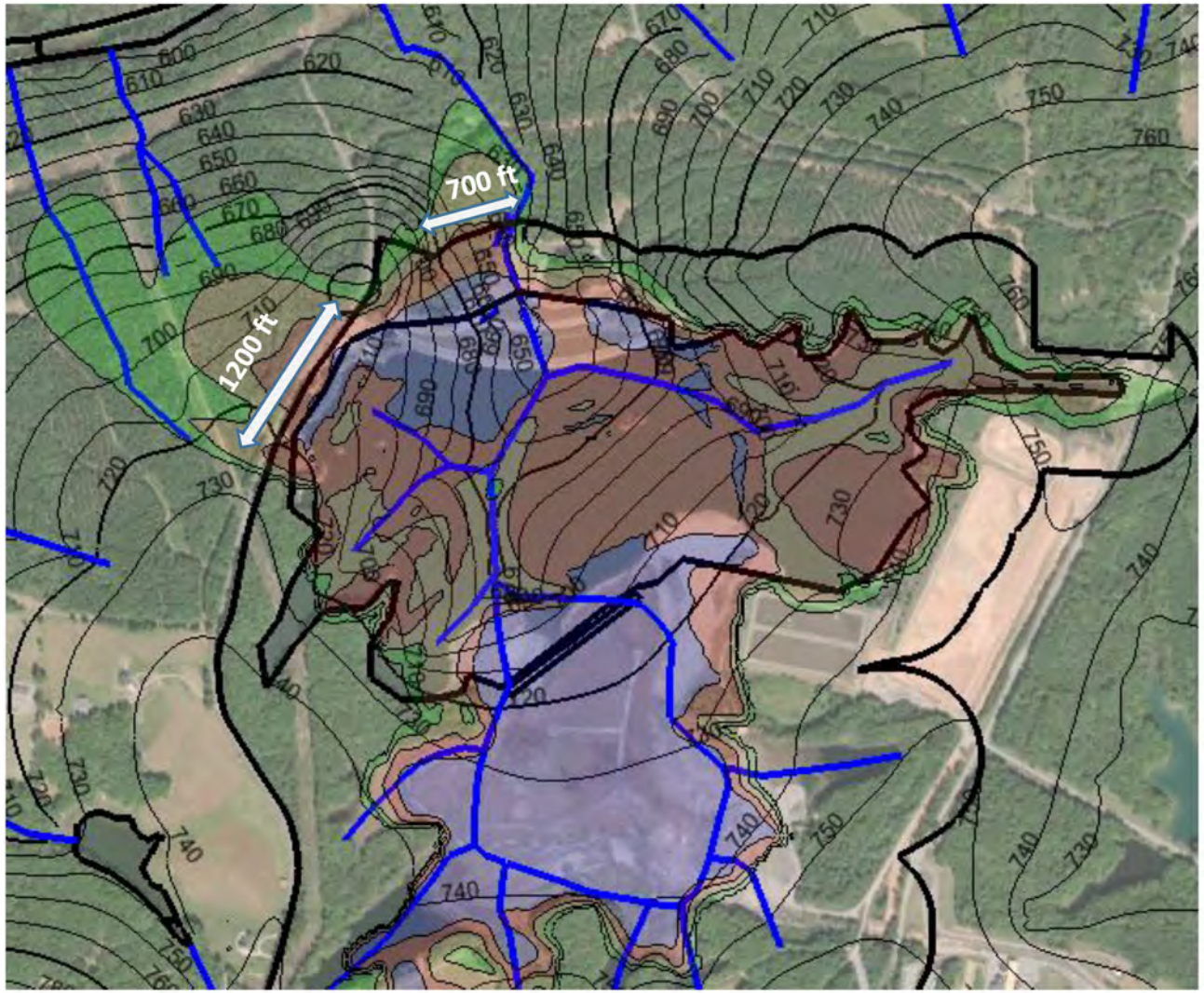
BELEWS CREEK **FINAL COVER, 2150, t = 125 years**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



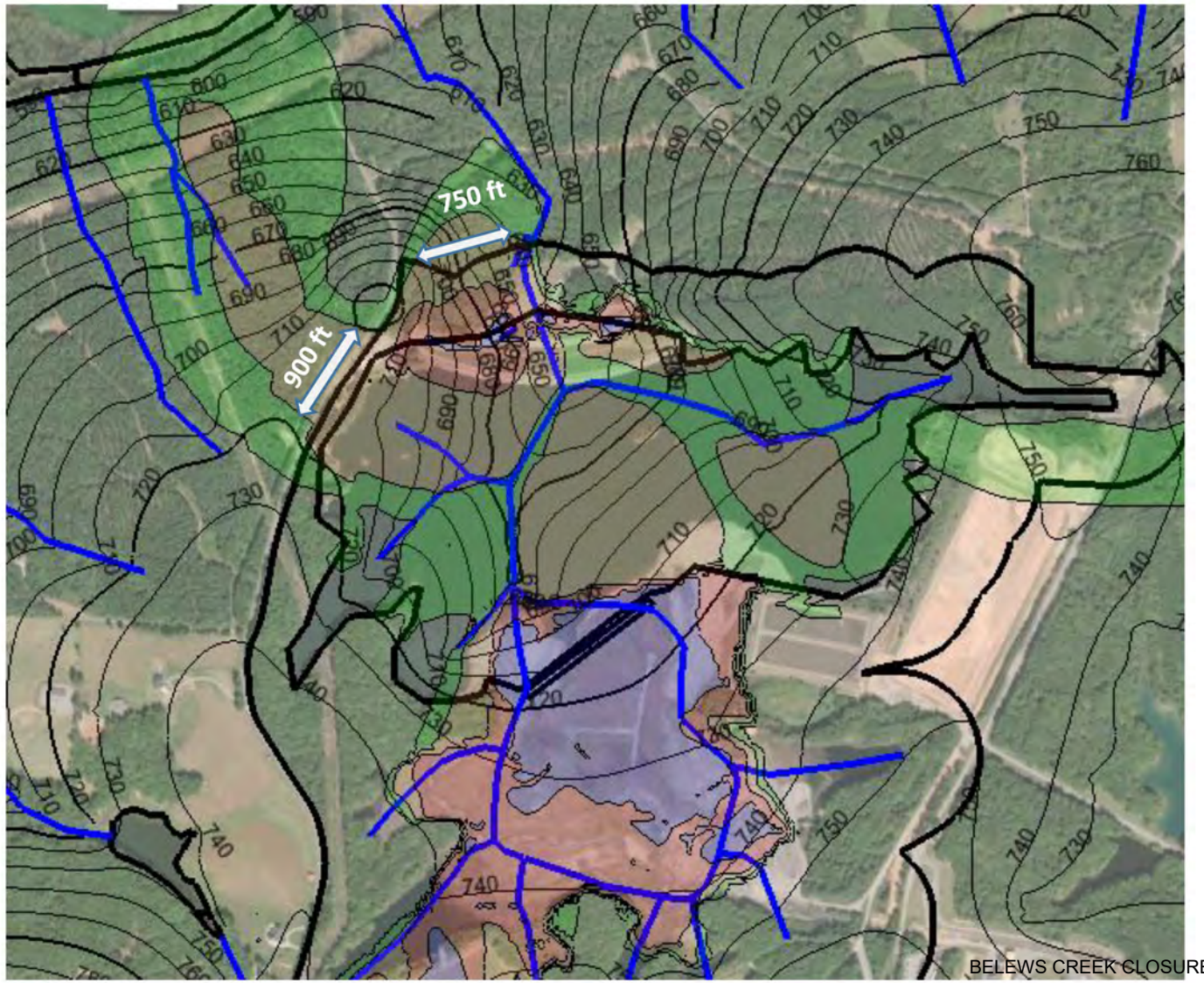
BELEWS CREEK **UPON COMPLETION OF HYBRID IN 2032, t = 0**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



BELEWS CREEK **HYBRID, 2150, t = 118 years**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



BELEWS CREEK **CURRENT CONDITIONS IN 2017**

CROSS SECTION B-B’ (VIEWED FROM DAM LOOKING SW)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

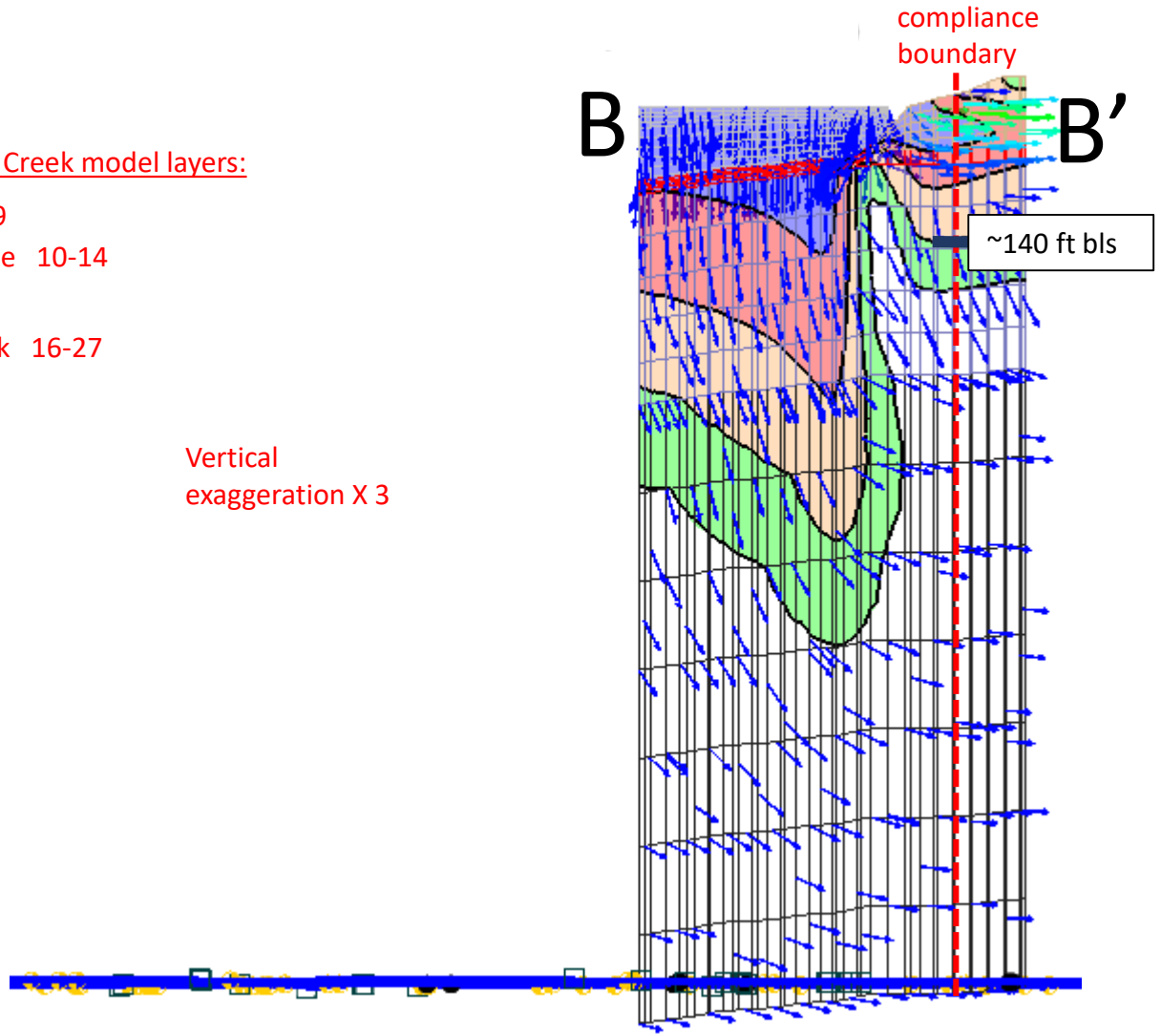
Ash 1-9

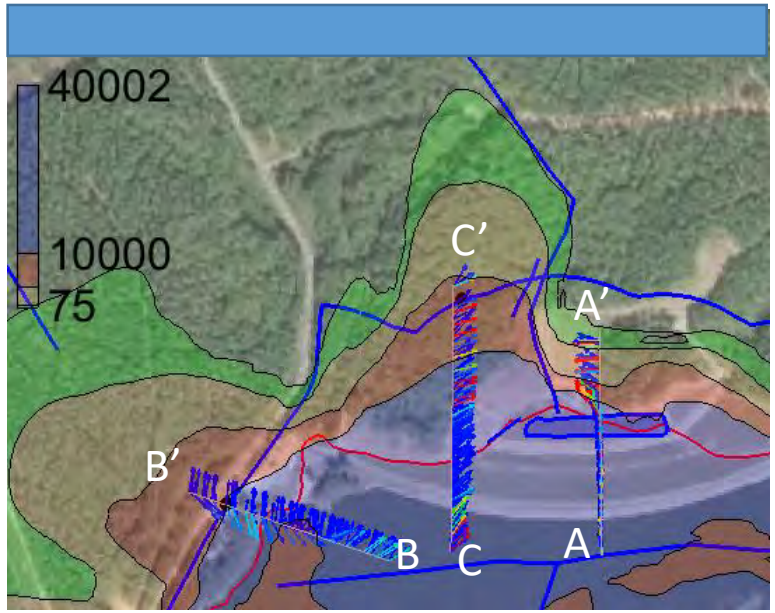
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A’ 850 ft

B-B’ 850 ft

C-C’ 1000 ft

BELEWS CREEK **UPON COMPLETION OF FINAL COVER, t = 0**

CROSS SECTION B-B’ (VIEWED FROM DAM LOOKING SW)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

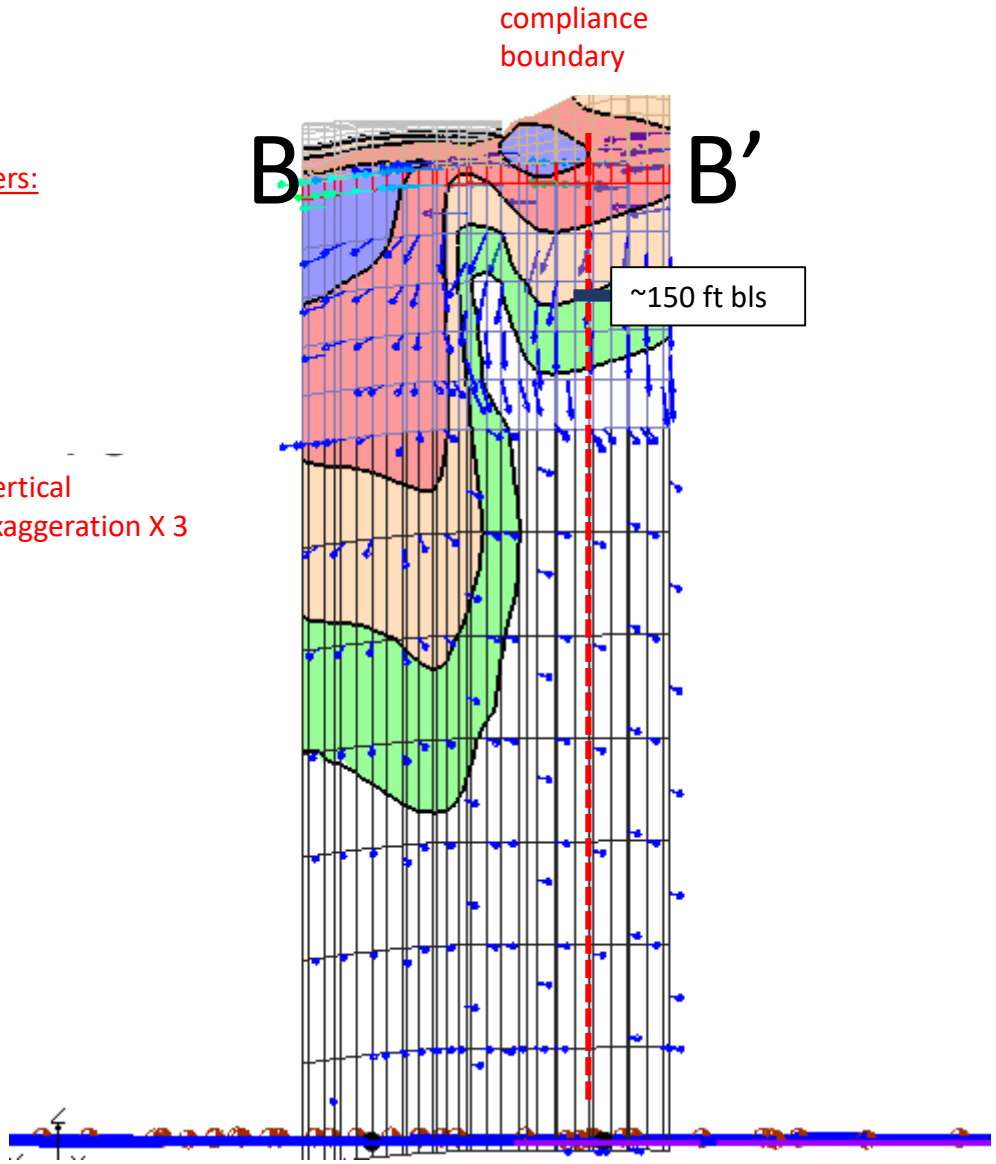
Ash 1-9

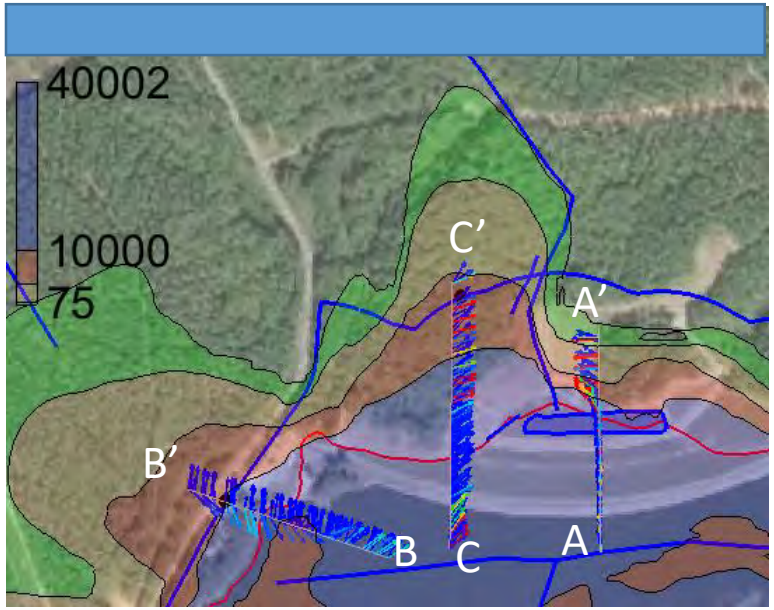
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A’ 850 ft

B-B’ 850 ft

C-C’ 1000 ft

BELEWS CREEK **FINAL COVER, t = 125 years**

CROSS SECTION B-B’ (VIEWED FROM DAM LOOKING SW)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

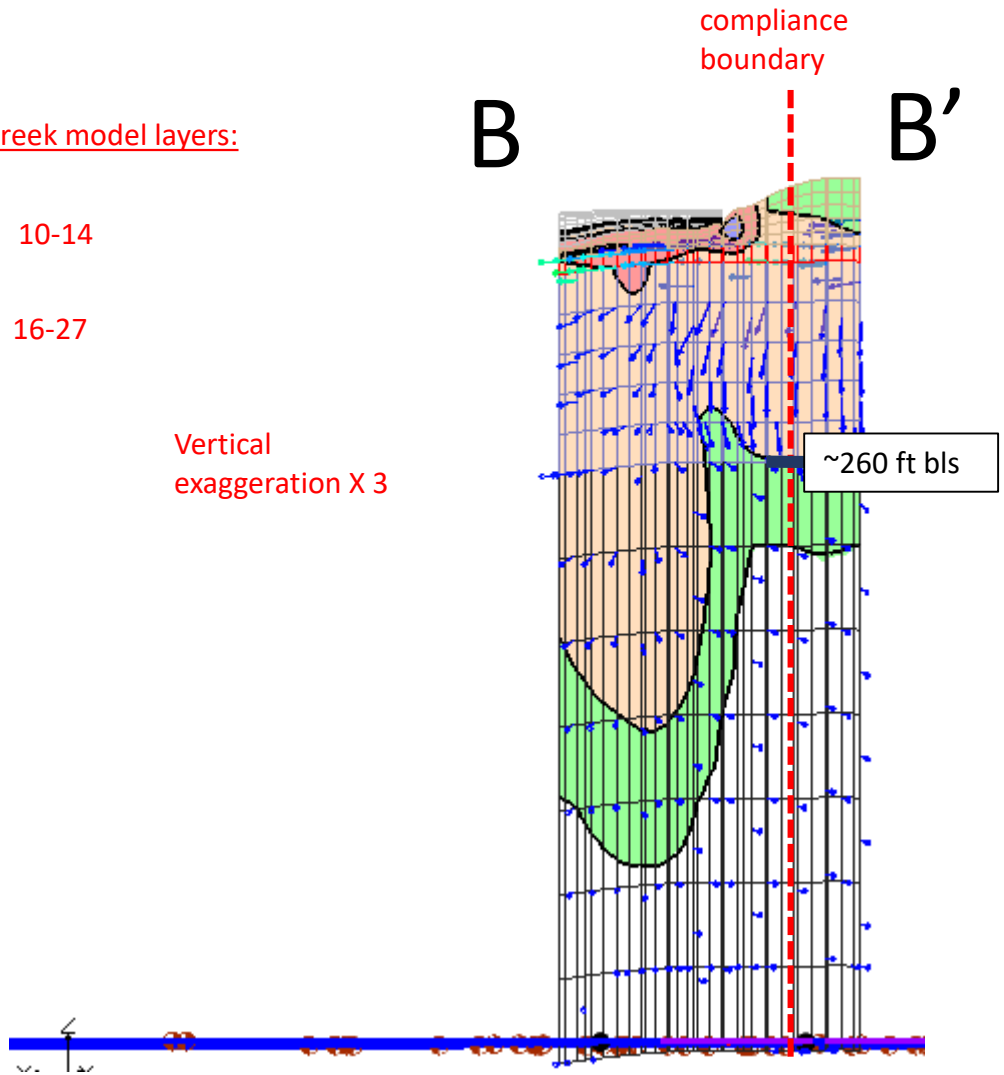
Ash 1-9

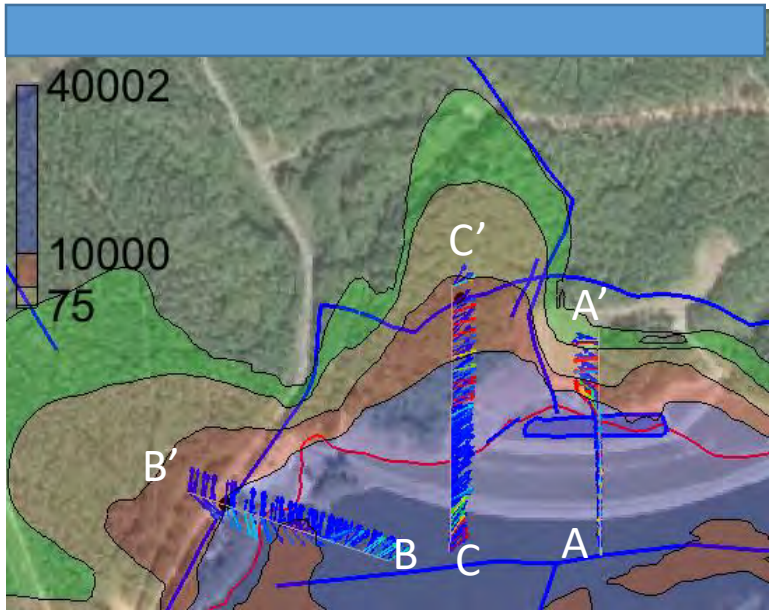
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A’ 850 ft

B-B’ 850 ft

C-C’ 1000 ft

BELEWS CREEK **UPON COMPLETION OF HYBRID, t = 0**

CROSS SECTION B-B' (VIEWED FROM DAM LOOKING SW)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

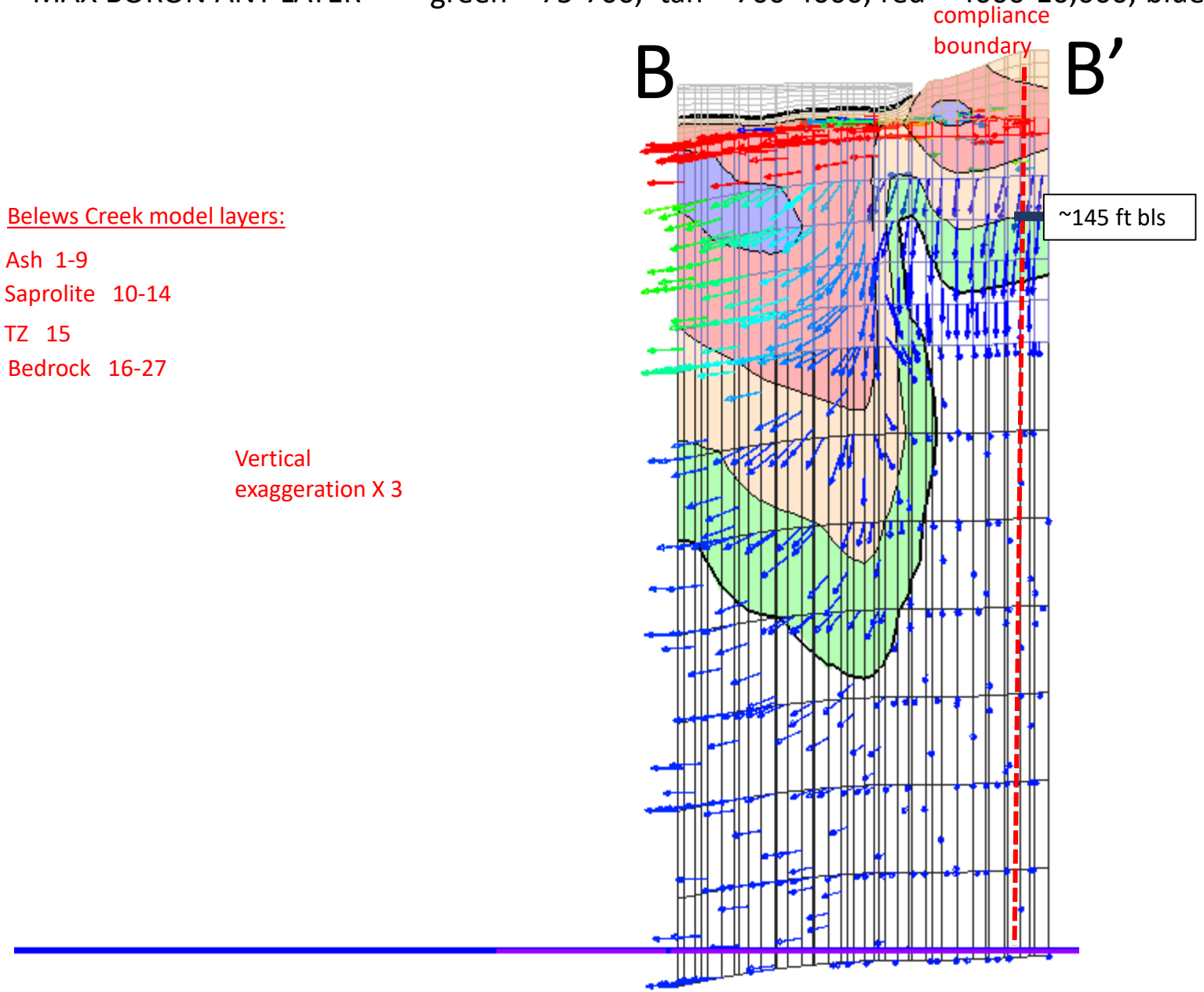
Ash 1-9

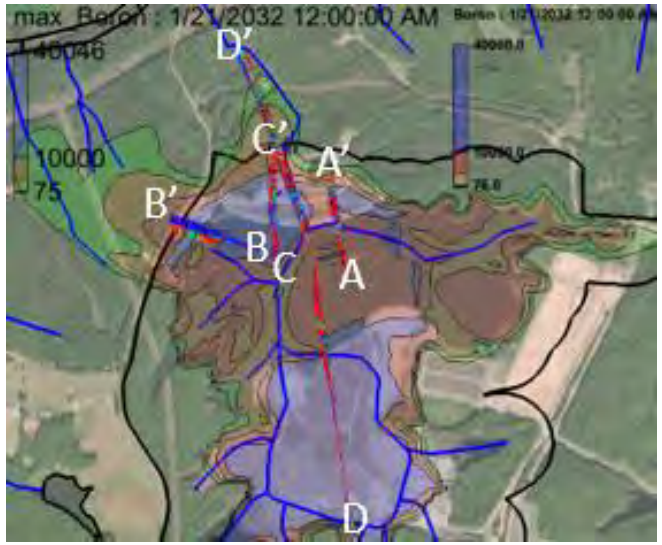
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A' 850 ft

B-B' 850 ft

C-C' 1000 ft

D-D' 6000 ft

BELEWS CREEK **HYBRID, t = 118 years**

CROSS SECTION B-B’ (VIEWED FROM DAM LOOKING SW)

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

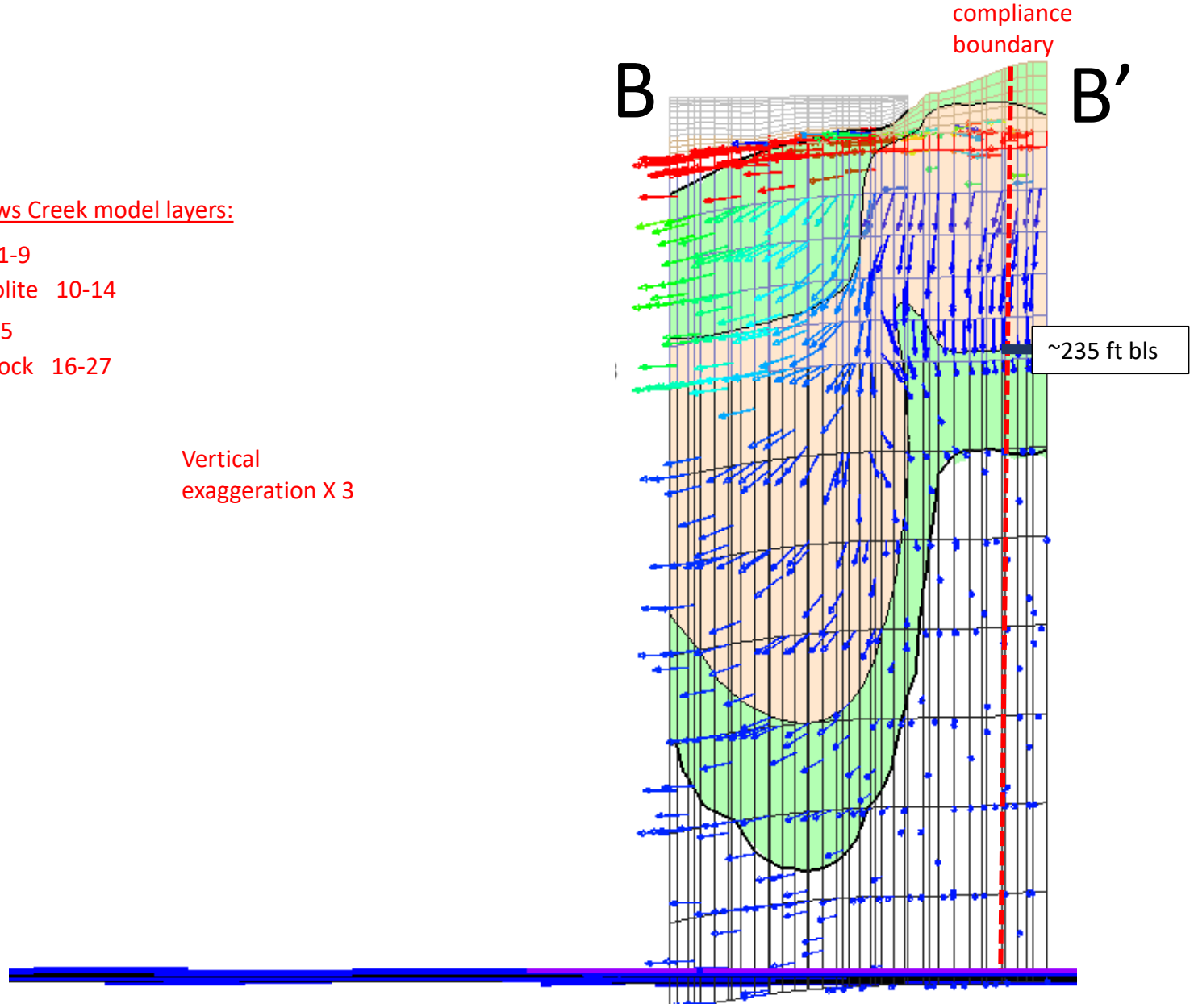
Ash 1-9

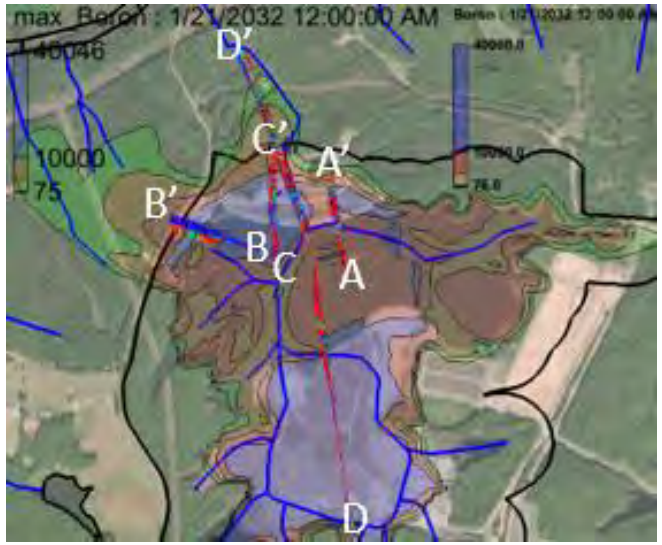
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A’ 850 ft

B-B’ 850 ft

C-C’ 1000 ft

D-D’ 6000 ft

BELEWS CREEK **CURRENT CONDITIONS IN 2017**

CROSS SECTION C-C' (VIEWED FROM E SIDE OF BLANKET DRAIN LOOKING WEST)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

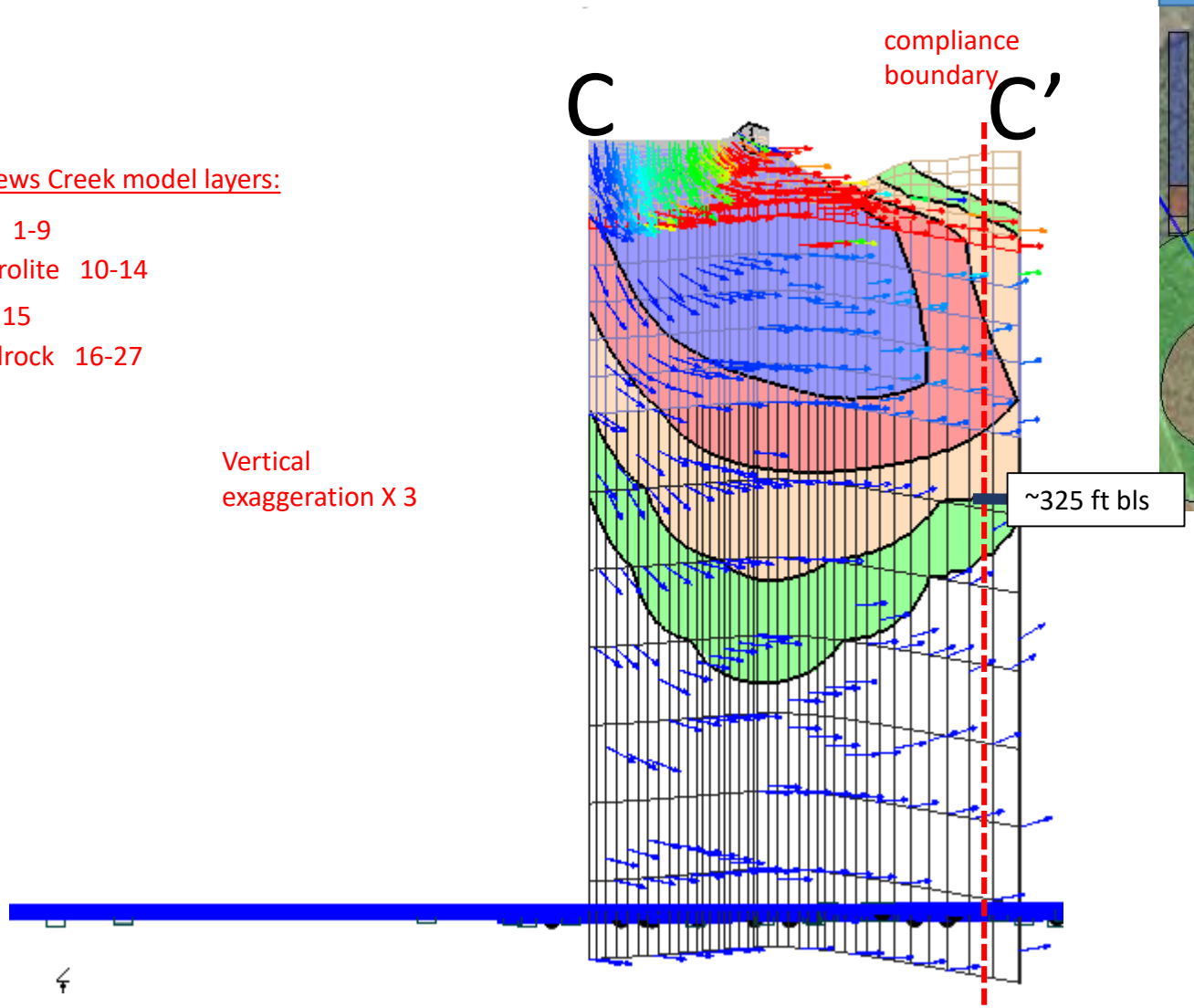
Ash 1-9

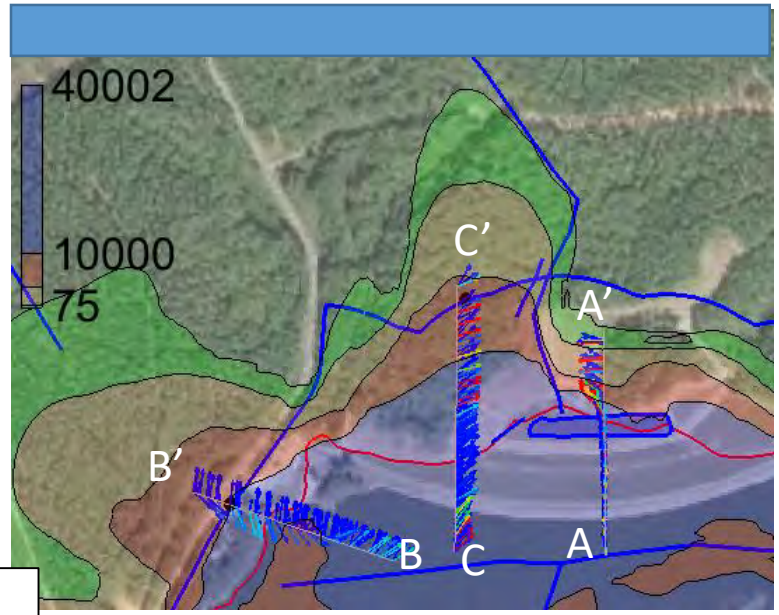
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A' 850 ft

B-B' 850 ft

C-C' 1000 ft

BELEWS CREEK **UPON COMPLETION OF FINAL COVER, t = 0**

CROSS SECTION C-C’ (VIEWED FROM E SIDE OF BLANKET DRAIN LOOKING WEST)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

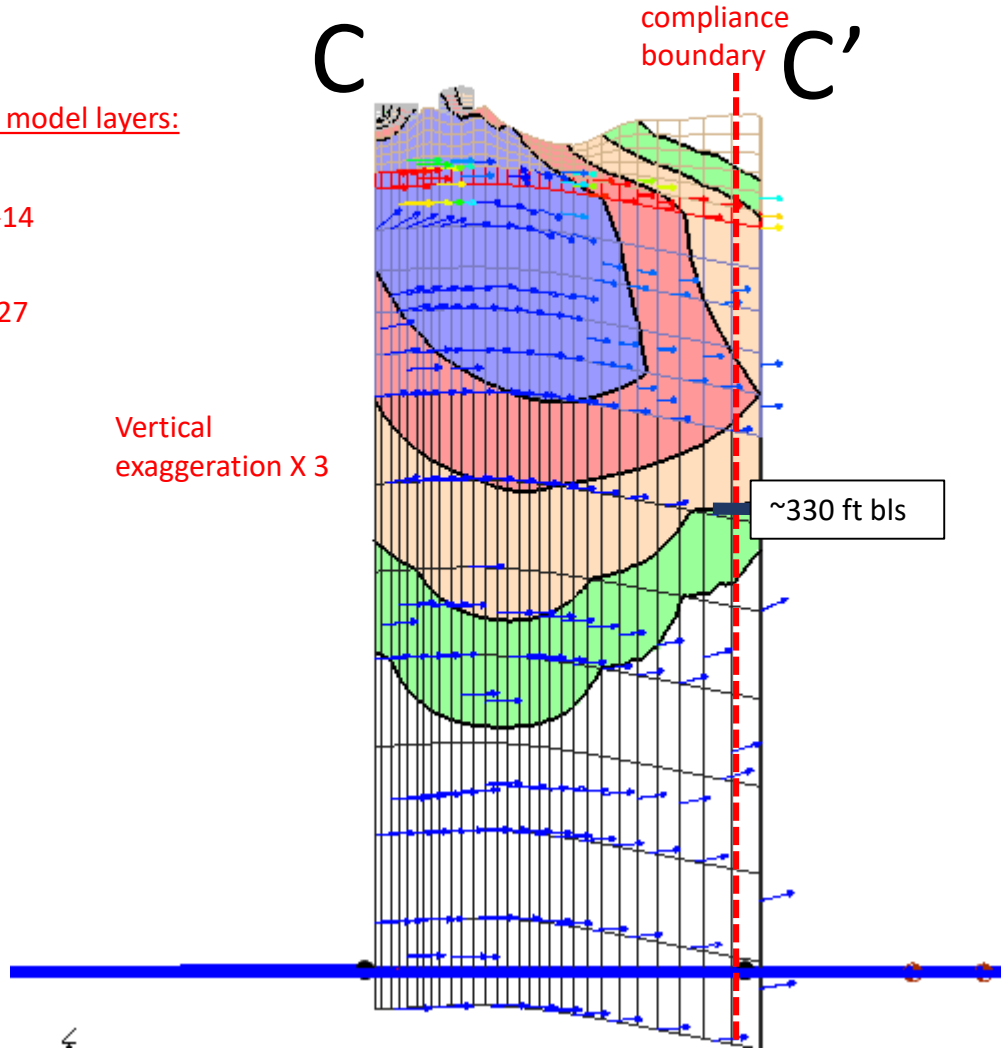
Ash 1-9

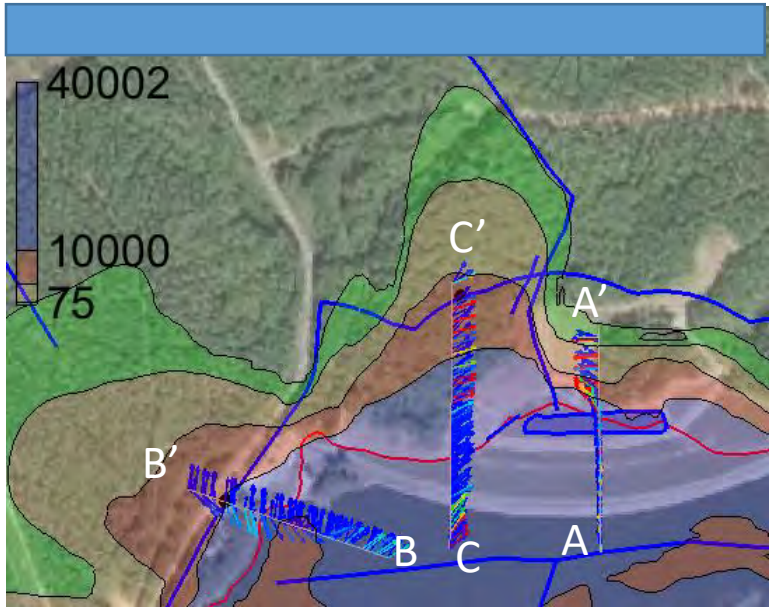
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A’ 850 ft

B-B’ 850 ft

C-C’ 1000 ft

BELEWS CREEK **FINAL COVER, t = 125 years**

CROSS SECTION C-C’ (VIEWED FROM E SIDE OF BLANKET DRAIN LOOKING WEST)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

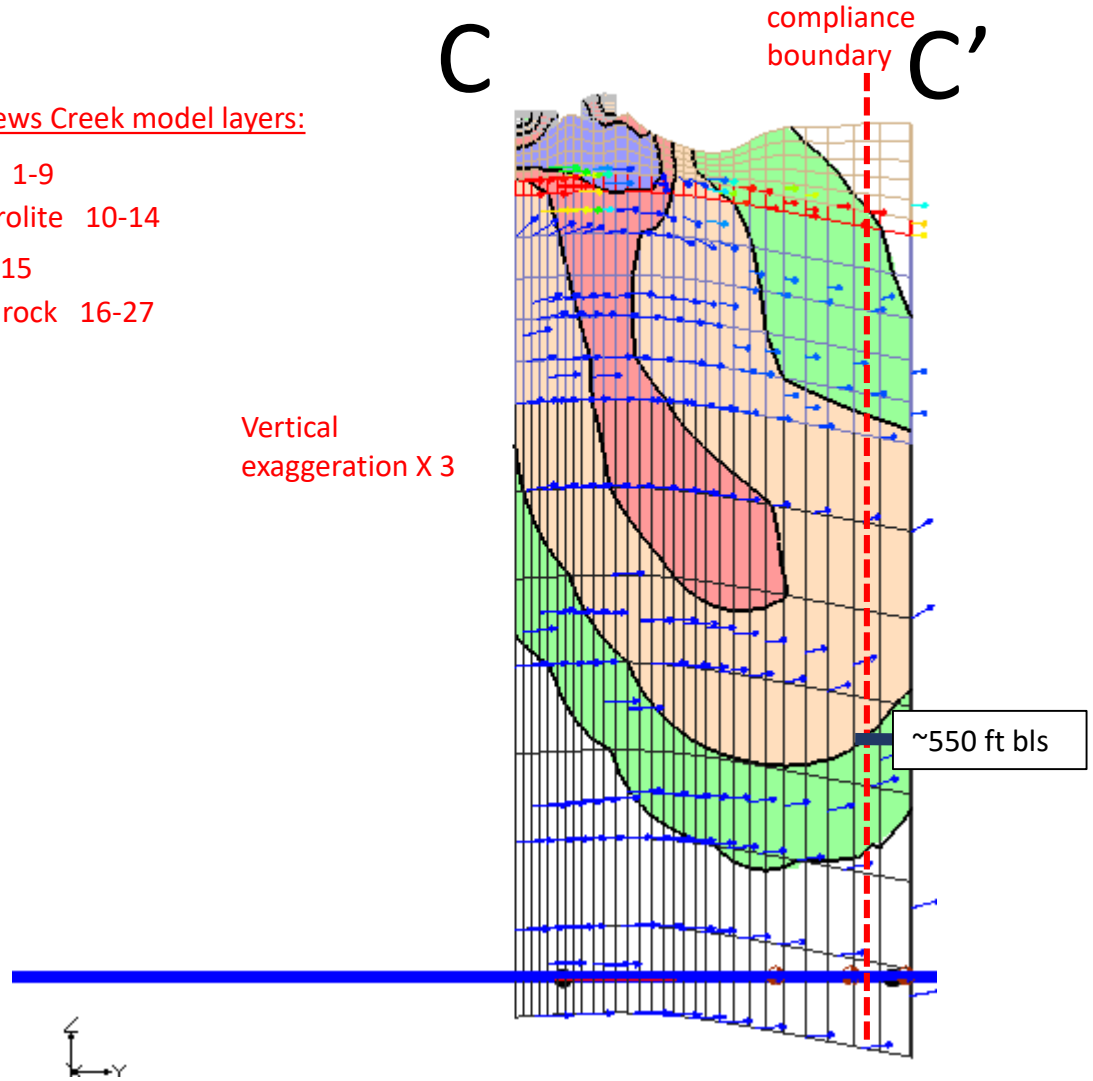
Ash 1-9

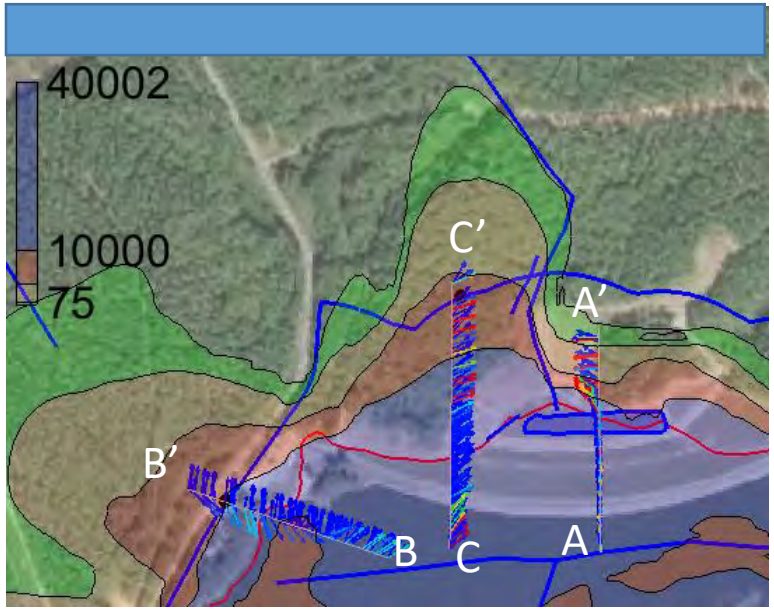
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A’ 850 ft

B-B’ 850 ft

C-C’ 1000 ft

BELEWS CREEK **UPON COMPLETION OF HYBRID, t = 0**

CROSS SECTION C-C’ (VIEWED FROM E SIDE OF BLANKET DRAIN LOOKING WEST)

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

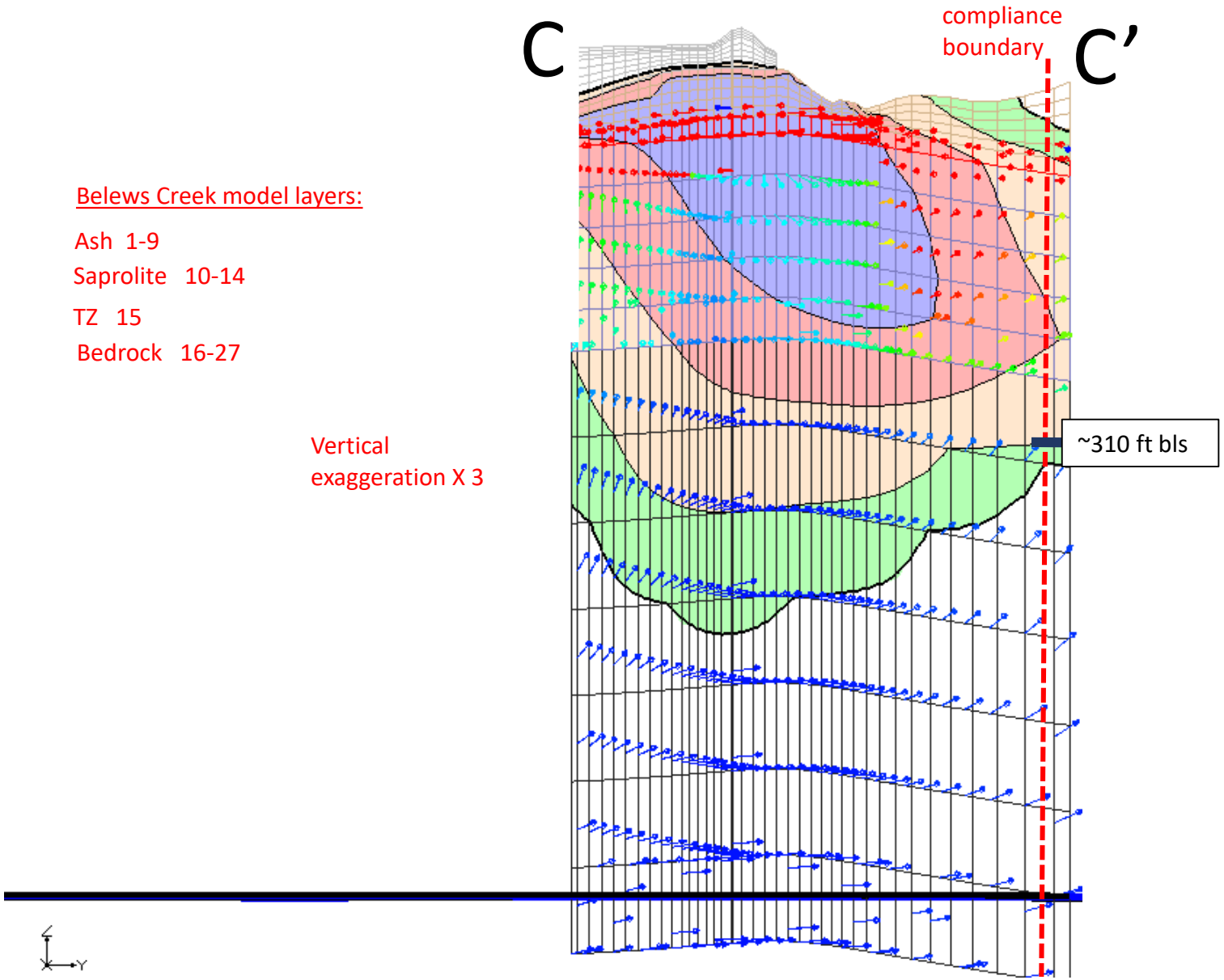
Ash 1-9

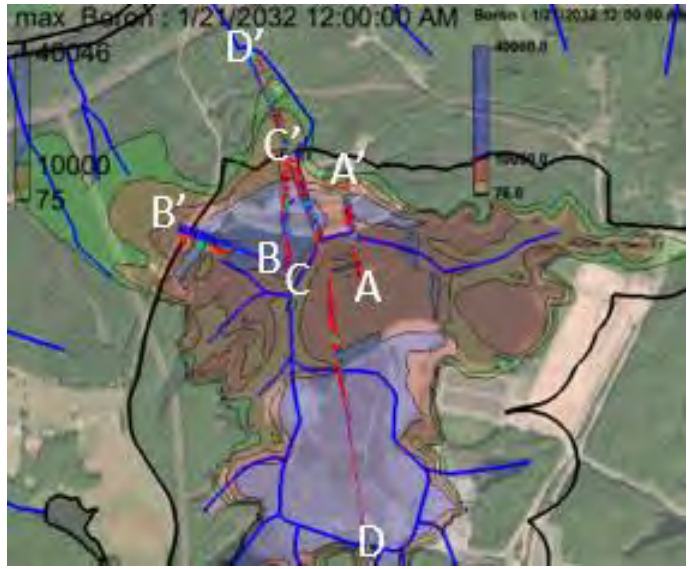
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A’ 850 ft

B-B’ 850 ft

C-C’ 1000 ft

D-D’ 6000 ft

BELEWS CREEK **HYBRID, t = 118 years**

CROSS SECTION C-C’ (VIEWED FROM E SIDE OF BLANKET DRAIN LOOKING WEST)

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Belews Creek model layers:

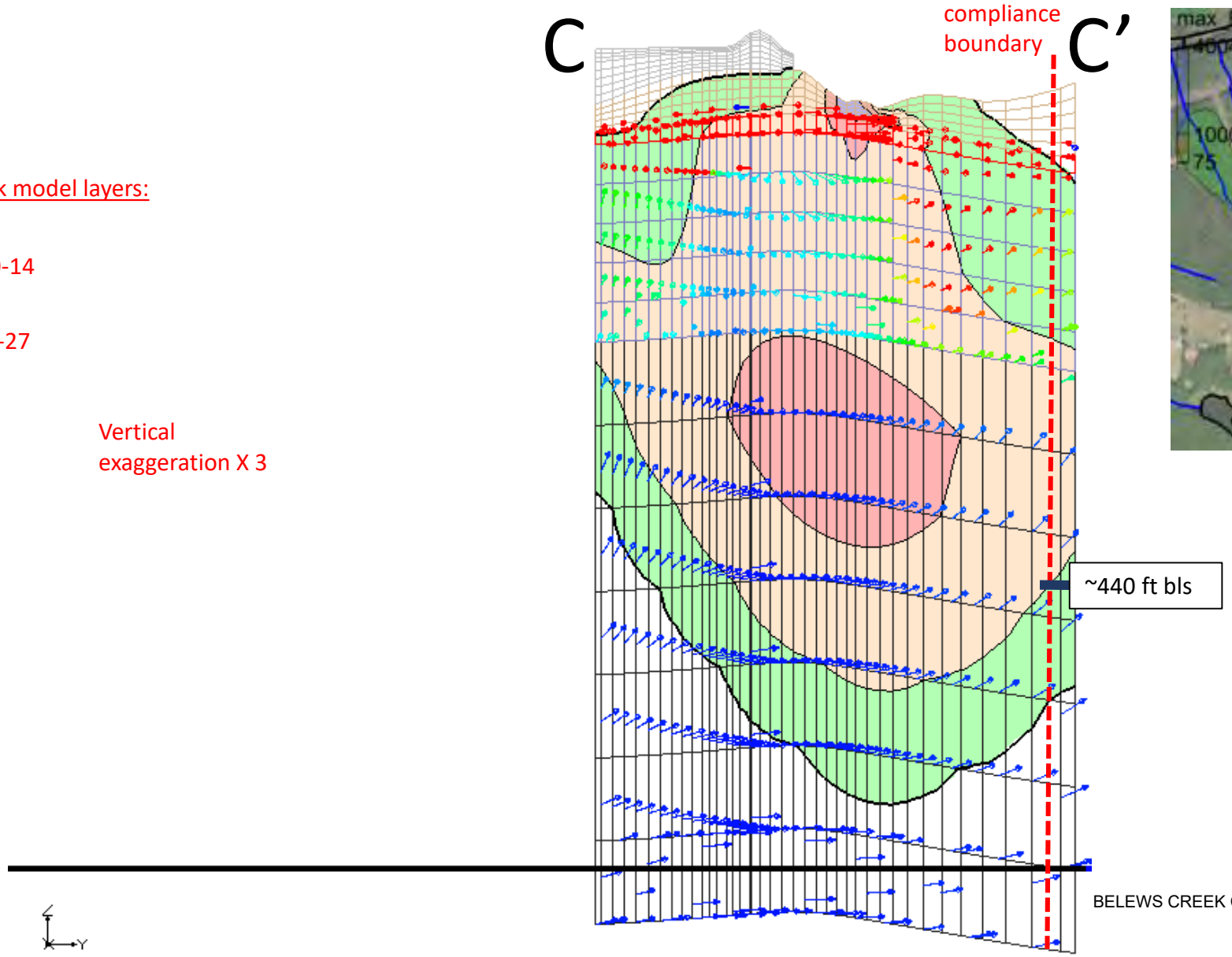
Ash 1-9

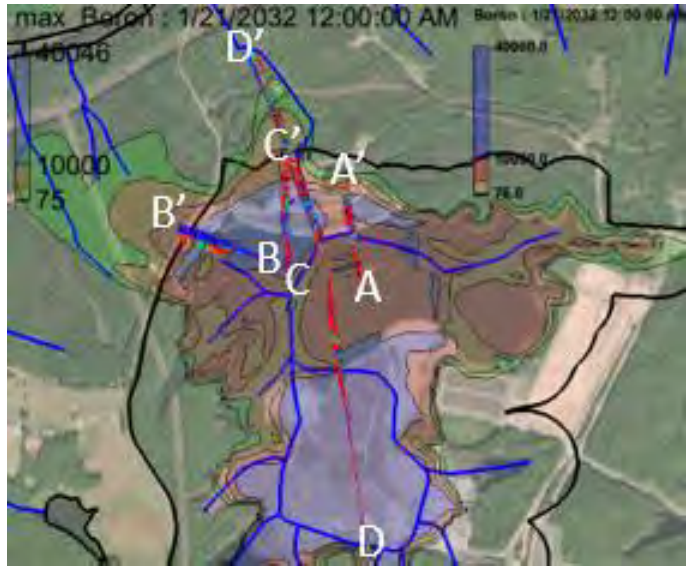
Saprolite 10-14

TZ 15

Bedrock 16-27

Vertical exaggeration X 3





A-A’ 850 ft

B-B’ 850 ft

C-C’ 1000 ft

D-D’ 6000 ft

ATTACHMENT B

RESPONSE TO COMMENTS

RESPONSE TO COMMENTS

I. Summary of Responses to Comments

The North Carolina Department of Environmental Quality (NCDEQ) received approximately 1052 public comments regarding the Belews Creek Steam Station Ash Basin Closure Options. Closure options considered at Belews Creek generally include closure-in-place, closure-by-removal and hybrid closure. Comments received by NCDEQ include emails, letters, two petitions (containing 275 and 340 signatures respectively) and video submissions. All but one of the comments support full excavation of all ash materials from the ash basin.

The majority of the comments support closure by removal to a lined landfill without specifying the location of the landfill. A sizeable minority specifically recommend excavating coal ash and moving it to a lined onsite landfill, although one commenter expressed concern about the onsite clear cutting of trees that may be required at Belews Creek to build the landfill. A small minority of commenters want the coal ash moved out of state. No commenter supports the hybrid closure option. No commenter unequivocally supports closure-in-place. However, one commenter registered qualified support for this option. Several commenters support recycling coal ash for various commercial product uses. A discussion of these and other related comments follow.

II. Detailed Responses to Comments

A. Closure-In-Place

No comments were received which unequivocally favored closure-in-place. Of the approximately 1,052 comments received, all but one expressly opposed closure-in-place. Many commenters stated specific reasons for their opposition. The reasons cited in opposition to closure-in-place include: water quality concerns, including concern that portions of the coal ash basin are located in the groundwater below the water table and that the ash basin was built on top of existing streams; concerns about increased risk of adverse health impacts, including cancer, respiratory and other illnesses; concerns regarding Duke Energy's motives for proposing closure-in-place; concerns regarding Duke Energy's credibility (citing Duke Energy's recent history of criminal violations); concerns about climate-related impacts on coal ash closed in place, including hurricanes and tropical storms; concerns for natural resources impacts, including both plant and animal life; concerns about recreational activities involving natural resources such as boating, swimming and fishing; concerns about fair and equal safety protections from the effects of coal ash for the Belews Creek area, citing coal ash removal and storage in lined landfills in South Carolina, Virginia and at eight other coal ash sites in North Carolina; concerns that closure-in-place both violates state and federal statutes and regulations and also grants Duke Energy arbitrary and capricious preferential treatment in a manner that is not granted to anyone else; concerns over the effectiveness and costs of oversight of long-term monitoring; concerns that closure-in-place sends the wrong message to businesses and persons considering relocation to North Carolina by adversely impacting the reputation of North Carolina nationally, including the negative impact on both property values and the desirability of North Carolina as a place for business relocation; concerns about general impacts to future generations, including "kicking the

problem down the road"; concerns about environmental justice issues and adverse impacts on minorities and the poor; concerns that Duke Energy is avoiding a real financial cost of coal generated electricity such that the market cannot make accurate cost comparisons to other energy sources; concerns about adverse effects on tourism; concerns about the adverse impacts on the fisheries industry; concerns about the health and safety risks associated with dam failure; concerns that the overwhelming majority of public comments opposing closure-in-place must be heard and followed.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

One commenter equivocally supported closure-in-place under certain conditions. That comment is summarized below.

Comment: One commenter indicated that closure-in-place could potentially be a viable option, but did not support the specific proposal for closure-in-place presented by Duke Energy. He commented that the Duke Energy closure-in-place option allows for saturated pond ash deposits to remain, thus creating a "wet cap" closure-in-place. He stated his opinion that additional study, monitoring and safeguards would be needed to see if a different closure-in-place option could comply with applicable regulations and be safely utilized. He recommended a potential closure-in-place that steadily dewaters the coal ash impoundment, monitors the results from the dewatering over several months and uses the collected data to verify or update groundwater modeling at the site. The collected data and modeling would determine if closure-in-place is viable and if not, then closure-by-removal could be employed.

Response: NCDEQ rejects the closure-in-place option and elects excavation under CAMA Option A for Belews Creek. The excavated coal ash will be placed in a lined landfill.

B. Hybrid Option

No comments were received supporting the hybrid option. Several comments expressly opposed the hybrid option for many of the reasons cited in opposition to closure-in-place, including but not limited to health and safety concerns, water quality concerns, concerns about the natural environment and concerns that the problem was being left for future generations.

Response: DEQ elects CAMA Option A (excavation and disposal to a lined landfill). DEQ does not elect closure-in-place under CAMA Option B or C.

C. Closure-By-Removal

1. Closure-by-Removal With No Location Specified

Comment: Approximately 956 commenters stated in a form email that they were supportive of closure-by-removal to a dry lined landfill. The comment in that form email states the following:

"The North Carolina Department of Environmental Quality (DEQ) should require Duke Energy to remove its coal ash from its leaking, unlined pits and move it to dry lined storage away from our waterways and out of our groundwater.

Duke Energy plans to leave its coal ash sitting in the groundwater at six sites in North Carolina, where it will keep polluting our groundwater, lakes, and rivers. Recent monitoring shows Duke Energy is polluting the groundwater at its coal ash ponds in North Carolina with toxic and radioactive materials. We need cleanup—not coverup!

The communities around the coal ash ponds have come out time after time over the last several years, making clear that we're concerned about pollution from Duke Energy's coal ash and want Duke Energy to get its coal ash out of its unlined, leaking pits. It is long past time for DEQ and Duke Energy to listen to the communities.

Duke Energy is already required to remove its coal ash at eight other sites in North Carolina and all of its sites in South Carolina—our families and our community deserve the same protections".

Response: NCDEQ rejects the closure-in-place option and elects excavation under CAMA Option A for Belews Creek.

2. Closure-By-Removal to Lined Onsite Landfill

Comment: Approximately 51 comments were submitted using a second form email. These commenters supported the closure-by-removal of coal ash from unlined pits and placing it in dry, lined storage located on Duke Energy property away from Little Belews Creek and the Dan River:

• DEQ should require Duke Energy to remove its coal ash from its leaking, unlined pits and move it to dry, lined storage on its own property — away from Little Belews Creek and the Dan River.

• Duke Energy plans to leave its coal ash sitting in the groundwater at Belews Creek, where it will keep polluting our groundwater, lakes, streams and rivers. Recent monitoring shows Duke Energy is polluting the groundwater surrounding Belews Creek with toxic materials. We need cleanup—not coverup!

• The community has come out time after time over the last several years, making clear that we're concerned about pollution from Duke Energy's coal ash and want Duke Energy to get its coal ash out of its unlined, leaking pits. It is long past time for DEQ and Duke Energy to remove the ash.

• Duke Energy is already required to remove its coal ash from eight other communities in North Carolina and all of its sites in South Carolina, and the governor of Virginia recently called for all the coal ash to be removed from Dominion's unlined sites—our families and our community deserve the same protections.

• Duke Energy can dispose all the ash from its leaking ponds onsite in a safe, lined landfill. Ash need not travel through the community or to other communities.

• Duke Energy cannot exaggerate traffic concerns while downplaying the community's real concern: Duke Energy's water pollution. Excavation will not significantly increase offsite trucking if Duke Energy uses an onsite landfill, and only excavation will remove the source of the water pollution.

• Duke Energy's own experts know that even cap-in-place will involve trucking construction materials to the site—just like any other construction project. But even under their estimates, the additional trucking impacts would be minimal. Duke Energy's consultant estimates that 110 trucks currently travel near Belews Creek on community roads every day. Excavation to onsite storage would add only two more trucks on community roads each day, compared to six more trucks on community roads for the duration of the cap-in-place scenario.

• It is past time for DEQ to listen to the community—not Duke Energy's consultants—about what our community needs. We need Duke to clean up its coal ash and stop the water pollution.

Response: NCDEQ has determined that closure-by-removal is the best closure option for Belews Creek. The excavated coal ash will be placed in a lined landfill. The location of the lined landfill will be determined at a later date; landfill location should be addressed in the proposed closure plan which must be submitted by August 1, 2019.

D. Other Comments

1. Comment Addressing Fairness and Consistency

Comment: Many commenters, in form emails, individualized emails, submitted petitions and video submissions, voiced their concern that persons in the Belews Creek area be treated fairly and consistently with other persons both in the state and in the region regarding the risks of coal ash. They noted that coal ash is being removed at eight other sites in North Carolina, all Duke Energy sites in South Carolina and that coal ash is being removed in Virginia. The commenters assert that their community deserves the same protections with respect to the treatment of coal ash.

Response: NCDEQ has determined that closure-by-removal is the best closure option for Belews Creek. The excavated coal ash will be placed in a lined landfill.

2. Comment Addressing Cost and Accountability

Comment: Several commenters stated that Duke Energy should have to pay for all costs associated with the removal and storage of coal ash in dry lined landfill. Commenters pointed to Duke Energy's recent criminal record and Duke Energy's decision to create the situation in the first place. Several commenters stated that Duke Energy created the mess and Duke Energy should clean up the mess. Some commenters supported sharing the costs with taxpayers. Other

commenters emphasized that the coal ash must be removed and that the responsibility for costs was a secondary issue.

Response: NCDEQ has not been granted statutory authority to determine who will pay the costs associated with closure-by-removal at Belews Creek, including costs associated with storage of excavated coal ash in a lined landfill.

3. Comment Addressing the Recycling of Coal Ash

Comment: Several commenters proposed the recycling of coal ash. They proposed various means by which recycling could occur, including encasing in cement bricks, concrete, placing in wall board and other proposed uses. One commenter stated that Duke Energy could extract the usable portion of coal ash, fly ash, and put it to productive use instead of disposing of it. Another commenter stated that Duke Energy's failure to process ash such that it could be recycled has resulted in ash being imported from other countries for use in products in the United States. Another commenter emphasized the importance of researching and developing new uses for recycled ash. One commenter proposed the ash be stored in a lined basin in a manner such that the ash could be accessed for recycling in the future.

Response: The proposed closure plan, which must be submitted not later than August 1, 2019, may provide additional information on several issues involved with closure-by-removal, including whether Duke Energy plans to recycle coal ash excavated at Belews Creek. Pursuant to the requirements of the Coal Ash Management Act, the public will receive notice of the proposed closure plan and given the opportunity to comment.

4. Comments Addressing Landfill Design, Groundwater Monitoring and Safety of Workers Engaged In Removal of Ash and Construction of Lined Landfill

Comment: Several commenters expressed the need for the protection of worker safety during the removal of the coal ash, the construction of a dry lined landfill and during the placement of ash into the new landfill. Commenters proposed that appropriate particulate masks should be worn, removal precautions should be taken, OSHA inspections should be performed and protective suits should be worn as necessary.

Response: Duke Energy will be required to meet all applicable legal statutes and regulations addressing worker safety at Belews Creek. Generally, the statutory authority to regulate worker safety laws is vested in state and federal agencies other than NCDEQ.

Comment: Several commenters emphasized the importance of careful, independent research and analysis of the best options for long term storage, including emphasis on the use of best technologies and not focusing on short term savings. The landfills should be built above minimum standards with long-term safeguards, use of best liner technologies, the inclusion of redundant liners and the placement of the landfill should be based on best science after investigation and ongoing monitoring of groundwater, away from rivers, lakes and aquifers. One commenter proposed double lining to include two feet of clay on the exterior with durable lining impervious to water.

Response: The proposed closure plan, which must be submitted not later than August 1, 2019, may provide additional information on several issues involved with closure-by-removal,

including whether Duke Energy plans to recycle coal ash excavated at Belews Creek. Pursuant to the requirements of the Coal Ash Management Act, the public will receive notice of the proposed closure plan and given the opportunity to comment.

Comment: Several commenters emphasized the importance of ongoing monitoring of groundwater and voiced skepticism regarding the reliability of monitoring by Duke Energy. One commenter proposed that monitoring results should be full, public and transparent, with results accessible by internet and in other ways easy for the public to access. Another commenter proposed independent third-party verification in some instances of data produced by Duke Energy. One commenter proposed that Duke Energy be required to monitor all necessary data without "cherry picking" what to monitor in order to avoid liability.

Response: The proposed closure plan, which must be submitted not later than August 1, 2019, may provide additional information on several issues involved with closure-by-removal, including whether Duke Energy plans to recycle coal ash excavated at Belews Creek. Pursuant to the requirements of the Coal Ash Management Act, the public will receive notice of the proposed closure plan and given the opportunity to comment.

5. Comments Addressing Environmental Justice

Comment: Several commenters raised concerns regarding environmental justice issues. They were concerned that minorities and poor communities bear a disproportionate amount of the negative health and economic consequences resulting from coal ash. They expressed concern that these negative impacts affect a portion of the population that has the least voice to respond.

Response: NCDEQ has determined that closure-by-removal is the best closure option for Belews Creek. The excavated coal ash will be placed in a lined landfill.

6. Comments Addressing Health, Safety And Natural Resources Damage Associated With Potential Dam Failure At The Belews Creek Ash Basin

Comment: Several commenters expressed concern about the potentially catastrophic health and safety risks associated with dam failure at the Belews Creek ash basin. Commenters expressed concern about the potential loss of human life, destruction of property and the destruction of water quality and natural resources (including both plant and animal life).

Response: The excavated coal ash will be placed in a lined landfill. The proposed closure plan for Belews Creek, which must be submitted not later than August 1, 2019, should provide specific information relevant to this comment, including Duke Energy's plans to address the Belews Creek ash basin dam. Pursuant to the requirements of the Coal Ash Management Act, the public will receive notice of the proposed closure plan and given the opportunity to comment.

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination

Rogers Energy Complex/Cliffside Steam Station

April 1, 2019

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination

Rogers Energy Complex/Cliffside Steam Station

Executive Summary

The Coal Ash Management Act (CAMA) establishes criteria for the closure of coal combustion residuals (CCR) surface impoundments. The CCR surface impoundments located at Duke Energy Carolinas, LLC's (Duke Energy) Rogers Energy Complex/formerly Cliffside Steam Station (Rogers Energy/Cliffside) in Stokes County, NC have received a low-risk classification. Therefore, according to N.C. Gen. Stat. § 130A-309.214(a)(3), the closure option for CCR surface impoundments is at the election of the North Carolina Department of Environmental Quality (DEQ or Department). CAMA provides three principal closure pathways: (a) closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill [CAMA Option A]; (b) closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill [CAMA Option B]; or (c) closure in accordance with the federal CCR rule adopted by EPA [CAMA Option C].

In preparing to make its election, DEQ requested information from Duke Energy related to closure options. By November 15, 2018, Duke Energy provided the following options for consideration: closure in place, full excavation, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing CCR surface impoundments. DEQ held a public information session on January 22, 2019 in Forest City, NC where the community near Rogers Energy/Cliffside had the opportunity to learn about options for closing CCR surface impoundments and to express their views about proposed criteria to guide DEQ's coal ash closure decision making process. To evaluate the closure options, the Department considered environmental data gathered as part of the site investigation, permit requirements, ambient monitoring, groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the CCR surface impoundments at the Rogers Energy/Cliffside facility in accord with N.C. Gen. Stat. § 130A-309-214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from unlined CCR surface impoundments at Rogers Energy/Cliffside is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

Duke Energy will be required to submit a final Closure Plan for the CCR surface impoundments at Rogers Energy/Cliffside by August 1, 2019. The Closure Plan must conform to this election by DEQ.

I. Introduction

DEQ has evaluated the closure options submitted by Duke Energy for the two CCR surface impoundments at Rogers Energy/Cliffside. This document describes the CAMA requirements for closure of CCR surface impoundments, the DEQ evaluation process to make an election under CAMA for the subject CCR surface impoundments at the Rogers Energy/Cliffside site, and the election by DEQ for the final closure option.

II. Site History

Duke Energy owns and operates the Rogers Energy/Cliffside station, which consists of approximately 1,000 acres in Mooresboro, Rutherford and Cleveland Counties, North Carolina. Rogers Energy/Cliffside began operation in 1940 and has a current capacity of 1,381 megawatts.

CCR coal ash residuals and other liquid discharges from coal combustion processes at the site have historically been managed in ash basins, which consist of the Active Ash basin, the Units 1-4 Inactive Ash Basin, and the Unit 5 Inactive Ash Basin. The Units 1-4 Inactive Ash Basin is located immediately east of the retired Units 1-4. It was constructed in 1957 and began operations the same year. The Units 1-4 Ash Basin was retired in 1977 once it reached capacity. However, stormwater ponds were constructed on top of the retired basin and continued to operate until the basin was excavated.

The Unit 5 Inactive Ash Basin is located on the western portion of the site, west and southwest of Units 5 and 6. The Unit 5 Inactive Ash Basin is currently used as a laydown yard for the station. This ash basin was constructed in 1970 (in advance of Unit 5 operations) and received sluiced ash from Unit 5 starting in 1972 until it was retired in 1980 when it reached full capacity. It is currently covered with a layer of topsoil and is stable with vegetation. The Active Ash Basin is located on the eastern portion of the site, east and southeast of Units 5 and 6. Construction of the Active Ash Basin occurred in 1975, and it began receiving sluiced ash from Unit 5. The Active Ash Basin expanded in 1980 to its current footprint and continues to receive sluiced bottom ash from Unit 5 in addition to other waste streams.

There are two CCR surface impoundments at the site: the Active Ash Basin and Unit 5 Inactive Ash Basin. The Units 1-4 Inactive Ash Basin was excavated and is no longer considered a CCR surface impoundment. The Active Ash Basin and the Unit 5 Inactive Ash Basin are approximately 132 acres in size and contain approximately 7,390,000 tons of CCR. The Active Ash Basin and Unit 5 Inactive Ash Basin are subject to the requirements of General Statute § 130A-309.214(a)(3).

III. CAMA Closure Requirements

CAMA establishes closure requirements for CCR surface impoundments. The General Assembly has mandated that DEQ "shall review a proposed Coal Combustion Residuals Surface Impoundment Closure Plan for consistency with the minimum requirements set forth in subsection (a) of this section and whether the proposed Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part." N.C. Gen. Stat. § 130A-309.214(b). Similarly, the General Assembly has required that DEQ "shall disapprove a proposed Coal Combustion Residuals Surface Impoundment Closure Plan unless the Department finds that the Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and other complies with the requirements of this Part." N.C. Gen. Stat. § 130A-309.214(c).

CAMA requires DEQ to review any proposed Closure Plan for consistency with the requirements of N.C. Gen. Stat. § 130A-309.214(a). See N.C. Gen. Stat. § 130A-309.214(b). DEQ must disapprove any proposed Closure Plan that DEQ finds does not meet these requirements. See N.C. Gen. Stat. § 130A-309.214(c). Therefore, an approvable Closure Plan must, at a minimum, meet the requirements of N.C. Gen. Stat. § 130A-309.214(a).

Pursuant to N.C. Gen. Stat. § 130A-309.213(d)(1), DEQ has classified the CCR surface impoundment at Rogers Energy/Cliffside station as low-risk. The relevant closure requirements for low-risk impoundments are in N.C. Gen. Stat. § 130A-309.214(a)(3), which states the following:

- Low-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2029;
- A proposed closure plan for a low-risk impoundment must be submitted as soon as practicable, but no later than December 31, 2019; and
- At a minimum, impoundments located in whole above the seasonal high groundwater table shall be dewatered and impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable.

In addition, N.C. Gen. Stat. § 130A-309.214(a)(3) requires compliance with specific closure criteria set forth verbatim below in Table 1. The statute provides three principal closure pathways: (a) closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill [CAMA Option A]; (b) closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill [CAMA Option B]; or (c) closure in accordance with the federal CCR rule adopted by EPA [CAMA Option C]. For each low-risk impoundment, the choice of the closure pathway in CAMA is at the "election of the Department."

Table 1: CAMA Closure Options for Low-Risk CCR Surface Impoundments
N.C. Gen. Stat. § 130A-309.214(a)(3)

At the election of the Department, the owner of an impoundment shall either:

a. Close in any manner allowed pursuant to subdivision (1) of this subsection; [CAMA Option A]

b. Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall install and maintain a cap system that is designed to minimize infiltration and erosion in conformance with the requirements of Section .1624 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, and, at a minimum, shall be designed and constructed to (i) have a permeability no greater than 1 x 10-5 centimeters per second; (ii) minimize infiltration by the use of a low-permeability barrier that contains a minimum 18 inches of earthen material; and (iii) minimize erosion of the cap system and protect the low-permeability barrier from root penetration by use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth. In addition, the owner of an impoundment shall (i) install and maintain a groundwater monitoring system; (ii) establish financial assurance that will ensure that sufficient funds are available for closure pursuant to this subdivision, post-closure maintenance and monitoring, any corrective action that the Department may require, and satisfy any potential liability for sudden and nonsudden accidental occurrences arising from the impoundment and subsequent costs incurred by the Department in response to an incident, even if the owner becomes insolvent or ceases to reside, be incorporated, do business, or maintain assets in the State; and (iii) conduct post-closure care for a period of 30 years, which period may be increased by the Department upon a determination that a longer period is necessary to protect public health, safety, welfare; the environment; and natural resources, or decreased upon a determination that a shorter period is sufficient to protect public health, safety, welfare; the environment; and natural resources. The Department may require implementation of any other measure it deems necessary to protect public health, safety, and welfare; the environment; and natural resources, including imposition of institutional controls that are sufficient to protect public health, safety, and welfare; the environment; and natural resources. The Department may not approve closure for an impoundment pursuant to sub-subdivision b. of subdivision (3) of this subsection unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment; [CAMA Option B] or

c. Comply with the closure requirements established by the United States Environmental Protection Agency as provided in 40 CFR Parts 257 and 261, "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities." [CAMA Option C]

By referencing the closure options for *high-risk* CCR surface impoundments in "subdivision (1)" or N.C. Gen. Stat. § 130A-309.214(a)(1), CAMA allows for closure of a *low-risk* CCR impoundment in N.C. Gen. Stat. § 130A-309.214(a)(3) through the same removal scenarios:

- "Convert the coal combustion residuals impoundment to an industrial landfill by removing all coal combustion residuals and contaminated soil from the impoundment temporarily, safely storing the residuals on-site, and complying with the requirements for such landfills." N.C. Gen. Stat. § 130A-309.214(a)(1)a.; or
- "Remove all coal combustion residuals from the impoundment, return the former impoundment to a nonerosive and stable condition and (i) transfer the coal combustion residuals for disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill or (ii) use the coal combustion products in a structural fill or other beneficial use as allowed by law." N.C. Gen. Stat. § 130A-309.214(a)(1)b.

IV. DEQ Election Process

Beginning with a letter to Duke Energy on October 8, 2018, DEQ began planning for a thorough evaluation of the closure options for low-risk CCR surface impoundments before making an election as outlined in Table 1 above. DEQ's objectives were to receive input on closure options from Duke Energy and to engage with community members near low-risk sites. DEQ outlined the following schedule in the October 8, 2018 letter:

- November 15, 2018 – Duke Energy submittal of revised closure option analyses and related information
- January 22, 2019 – DEQ public meeting near Rogers Energy/Cliffside
- April 1, 2019 – DEQ evaluation of closure options
- August 1, 2019 – Duke Energy submittal of closure plan
- December 1, 2019 – Duke Energy submittal of updated corrective action plan for all sources at the Rogers Energy/Cliffside site that are either CCR surface impoundments or hydrologically connected to CCR surface impoundments

DEQ received the requested information from Duke Energy by November 15, 2018: closure options analysis, groundwater modeling and net environmental benefits assessment. These materials are posted on the DEQ website. Duke Energy provided the following options for consideration: closure in place, full excavation with an onsite landfill, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing impoundment for the Active Ash Basin. Duke Energy proposed closure in place and full excavation with an onsite landfill for the Unit 5 Inactive Ash Basin.

In preparing to make its election of the closure option, DEQ considered environmental data contained in the comprehensive site assessment, permit requirements, ambient monitoring, closure options analysis and groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements. The Rogers Energy/Cliffside site has extensive amounts of data that have been collected during the site assessment process, and these data were used as

part of the evaluation of closure options. DEQ's evaluation of the closure in place and hybrid option based on groundwater monitoring and modeling data is provided in Attachment A. That analysis demonstrates that the contaminated plume is already beyond the compliance boundary for the site. All of these references are part of the record supporting DEQ's determination.

DEQ conducted a public meeting in Forest City, NC near Rogers Energy/Cliffside on January 22, 2019. There were 28 people who attended the meeting. Approximately 1207 comments were received during the comment period, which closed on February 15, 2019. The majority of the comments supported closure by removal to a lined landfill. A review and response to comments are included in Attachment B.

V. DEQ Evaluation of Closure Options

DEQ has evaluated the closure options proposed by Duke Energy for the CCR surface impoundments at the Rogers Energy/Cliffside facility. The purpose of this evaluation was to determine which closure option or options may be incorporated into an approvable Closure Plan under CAMA.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the Active Ash Basin and Unit 5 Inactive Ash Basin at Rogers Energy/Cliffside in accord with N.C. Gen. Stat. § 130A-309.214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from the two unlined impoundments at Rogers Energy/Cliffside is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

DEQ does not elect CAMA Option B for the CCR surface impoundments at Rogers Energy/Cliffside. In N.C. Gen. Stat. § 130A-309.214(a)(3)b, the General Assembly mandated that "[t]he Department may not approve closure for an impoundment pursuant to [this] sub-subdivision . . . unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment." N.C. Gen. Stat. § 130A-309.214(a)(3)b. In light of these requirements and based on DEQ's review of the information provided by Duke Energy as well as DEQ's independent analysis, DEQ does not believe that Duke Energy can incorporate CAMA Option B into an approvable Closure Plan for Rogers Energy/Cliffside.

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B.

Specifically, DEQ attempted to determine whether upon full implementation of the closure plan the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary. To address this question, DEQ considered the current state of the groundwater contamination and reviewed the results of the groundwater modeling submitted by Duke Energy. The evaluation is provided in Attachment A. DEQ's overall conclusion is that based on the current geographic scope and vertical extent of the groundwater contamination plume, and the modeled extent of the plume in the future, DEQ does not believe these two closure options can meet the requirements of CAMA Option B for the CCR surface impoundments at Rogers Energy/Cliffside.

DEQ does not elect CAMA Option C (i.e., closure under the federal CCR Rules found in 40 CFR Part 257) for the CCR surface impoundments at Rogers Energy/Cliffside. DEQ has determined that:

a. Under the facts and circumstances here, CAMA Option C is less stringent than CAMA Option A. Specifically, DEQ's election of Option A would also require Duke Energy to meet the requirements of the federal CCR Rule (i.e., CAMA Option C) but election of CAMA Option C would not require implementation of CAMA Option A.
b. Because CAMA Option A adds additional requirements or performance criteria beyond Option C, it advances DEQ's duty to protect the environment (see N.C. Gen. Stat. §§ 279B-2 & 143-211) and the General Assembly's mandate under CAMA that DEQ ensure that any Closure Plan, which must incorporate an approvable closure option, is protective of public health, safety, and welfare, the environment, and natural resources (see N.C. Gen. Stat. § 130A-309.214(b) & (c)).
c. For the CCR surface impoundments for which the closure option(s) must be determined, CAMA Option A provides a better CAMA mechanism for ensuring State regulatory oversight of the closure process than Option C, as well as greater transparency and accountability.
d. While the federal CCR Rule was written to provide national minimum criteria for CCR surface impoundments across the country, CAMA was written specifically to address the CCR surface impoundments in North Carolina.
e. While the federal CCR Rule allows CCR surface impoundment owners to select closure either by removal and decontamination (clean closure) or with a final cover system (cap in place), EPA anticipates that most owners will select closure through the less protective method of cap in place.
f. There is considerable uncertainty regarding the status and proper interpretation of relevant provisions of the federal CCR Rule. For instance, EPA is reconsidering portions of the federal CCR Rule. Also, the performance standards in 40 CFR § 257.102(d) for cap in place closure are the subject of conflicting interpretations (and possible litigation) among industry and state authorities.

VI. Conclusion

The final closure plan is due on August 1, 2019 in accordance with this determination. Based on DEQ's evaluation of the options submitted by Duke Energy, DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the Active Ash Basin and Unit 5 Inactive Ash Basin at Rogers Energy/Cliffside in accord with N.C. Gen. Stat. § 130A-309.214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

While beneficiation is not a requirement of the closure plan, DEQ encourages Duke Energy to consider opportunities for beneficiation of coal ash that would convert coal combustion residuals into a useful and safe product.

ATTACHMENT A

DEQ EVALUATION OF CLOSURE IN PLACE AND HYBRID OPTIONS BASED ON GROUNDWATER MONITORING AND MODELING DATA

DEQ EVALUATION OF CLOSURE IN PLACE AND HYBRID OPTIONS BASED ON GROUNDWATER MONITORING AND MODELING DATA

I. Groundwater Monitoring Summary

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary upon full implementation of the closure plan. To help address this question, DEQ considered the current state of the groundwater contamination.

Figure ES-1 shows the inferred general extent of constituent migration in groundwater based on evaluation of concentrations greater than both the calculated PBTVs, 2L Standards, and/or IMACs. The figure also shows that groundwater within the area of the CCR surface impoundments generally flows from south to north and discharges to the Broad River and to Suck Creek, a perennial stream flowing south to north and discharging to the Broad River. The horizontal extent of contaminant concentrations greater than the PBTV or 2L Standard approximates the leading edge of the CCR-derived plume (yellow shaded area) from the source areas.

The plume near the Active Ash Basin has extended beyond the compliance boundary near the northeast corner of the CCR surface impoundment where a small portion of an adjacent property extends along the Broad River. The plume has also extended beyond the compliance boundary in the area of the ash storage area.

The vertical extent of most constituents of interest is within the shallow and transition flow zones. However, the results of the assessment show that the bedrock aquifer has been impacted by CCR. Arsenic, sulfate, thallium, TDS, and total radium appear to have exceedances in the bedrock north of Unit 5 Inactive Ash Basin and/or near the plant.

DEQ concludes that the contaminated groundwater plume in the area near the Active Ash Basin has extended beyond the compliance boundary near the northeast corner of the impoundment where a small portion of an adjacent property extends along the Broad River. The plume has also extended beyond the compliance boundary in the area of the ash storage area. The horizontal extent of nearly all COIs such as arsenic, chromium, cobalt, iron, manganese, strontium, sulfate, thallium, TDS, vanadium, total uranium, and total radium occur in the shallow flow zone and are generally within the boron plume footprint. Total chromium and cobalt appear to have some exceedances in isolated pockets outside the boron plume near the plant. Strontium and sulfate plumes appear to be slightly more widespread, extending outside the boron plume near the Unit 5 Inactive Ash Basin and the plant.

The Unit 5 Inactive Ash Basin does not have a NPDES or any other agency permit and therefore does not have compliance boundaries. Any exceedance of the 2L Standards in this area, including within the waste boundary is subject to cleanup requirements.

Figure ES-1: Cliffside from 2017 CSA Update

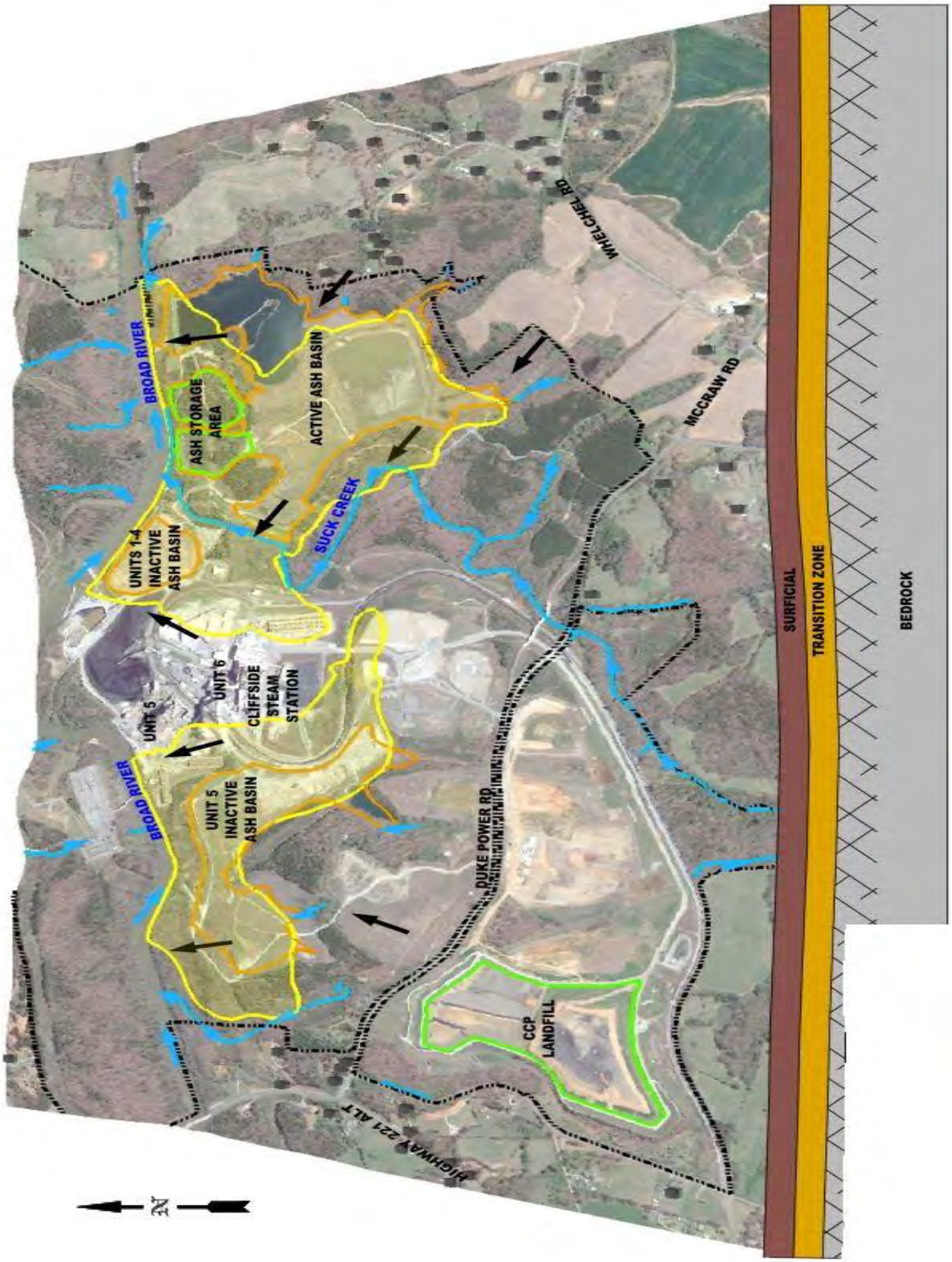


Figure ES-1 Legend: Cliffside from 2017 CSA Update

LEGEND

- AREA OF CONCENTRATION IN GROUNDWATER ABOVE NC2L (SEE NOTE 5)
- ASH BASIN WASTE BOUNDARY
- APPROXIMATE LANDFILL WASTE BOUNDARY
- GENERALIZED GROUNDWATER FLOW DIRECTION
- RESIDENTIAL UNIT
- DESIGNATED EFFLUENT CHANNEL WITH FLOW DIRECTION
- STREAM WITH FLOW DIRECTION
- DUKE ENERGY PROPERTY BOUNDARY

NOTE:

1. OCTOBER, 2016 AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON SEPTEMBER 11, 2017. AERIAL DATED APRIL 8, 2017.
2. STREAM FROM AMEC NRTR REPORT, 2015.
3. GENERALIZED GROUNDWATER FLOW DIRECTION BASED ON APRIL 3, 2017 WATER LEVEL DATA.
4. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY.
5. GENERALIZED AREAL EXTENT OF MIGRATION REPRESENTED BY NCAC 02L EXCEEDANCES OF BORON.

II. Groundwater Cross-section Modeling

DEQ evaluated cross-sections of the groundwater modeling results provided by Duke Energy to determine whether Duke Energy's final closure *Option 1: Closure-in-Place* and *Option 3: Hybrid* for the Active Ash Basin would meet the criteria of CAMA Option B. DEQ considered whether the agency could conclude that the proposed closure option includes design measures to prevent any post closure exceedances of the 2L groundwater quality standards (15A NCAC 02L) at the compliance boundary upon the plan's full implementation. Cross section A-A' was evaluated and can be seen in the figures below. This cross section represents where the boron concentration above the 2L standard of 700 µg/L has crossed the compliance boundary based on groundwater monitoring and modeling.

Next, the model results were evaluated based on the following model simulations:

- current conditions in 2017 when the model was calibrated based on raw field data
- upon completion of the final closure-in-place cover system at t=0 years
- closure-in-place option at t=100 years
- upon completion of the hybrid option at t=0 years
- hybrid option at t=125 years

The table below summarizes the results from the model simulations. The boron concentrations depicted in the table represent the maximum boron concentration in any layer (ash, saprolite, transition zone, and bedrock) of the model.

Cliffside Modeling Results for Cross-Section A-A'			
Model Simulation	Maximum Concentration of Boron Above 2L Beyond Compliance Boundary (µg/L)	Depth of GW Contamination Above 2L Beyond Compliance Boundary (feet bgs)	Width of Contamination Plume Beyond Compliance Boundary (feet)
Current Conditions	700-4,000	80	600
Completion of Final Cover (t=0 yrs)	700-4,000	80	580
Final Cover (t=100 yrs)	700-4,000	120	175
Completion of Hybrid (t=0 yrs)	700-4,000	80	580
Hybrid (t=125 yrs)	700-4,000	120	100

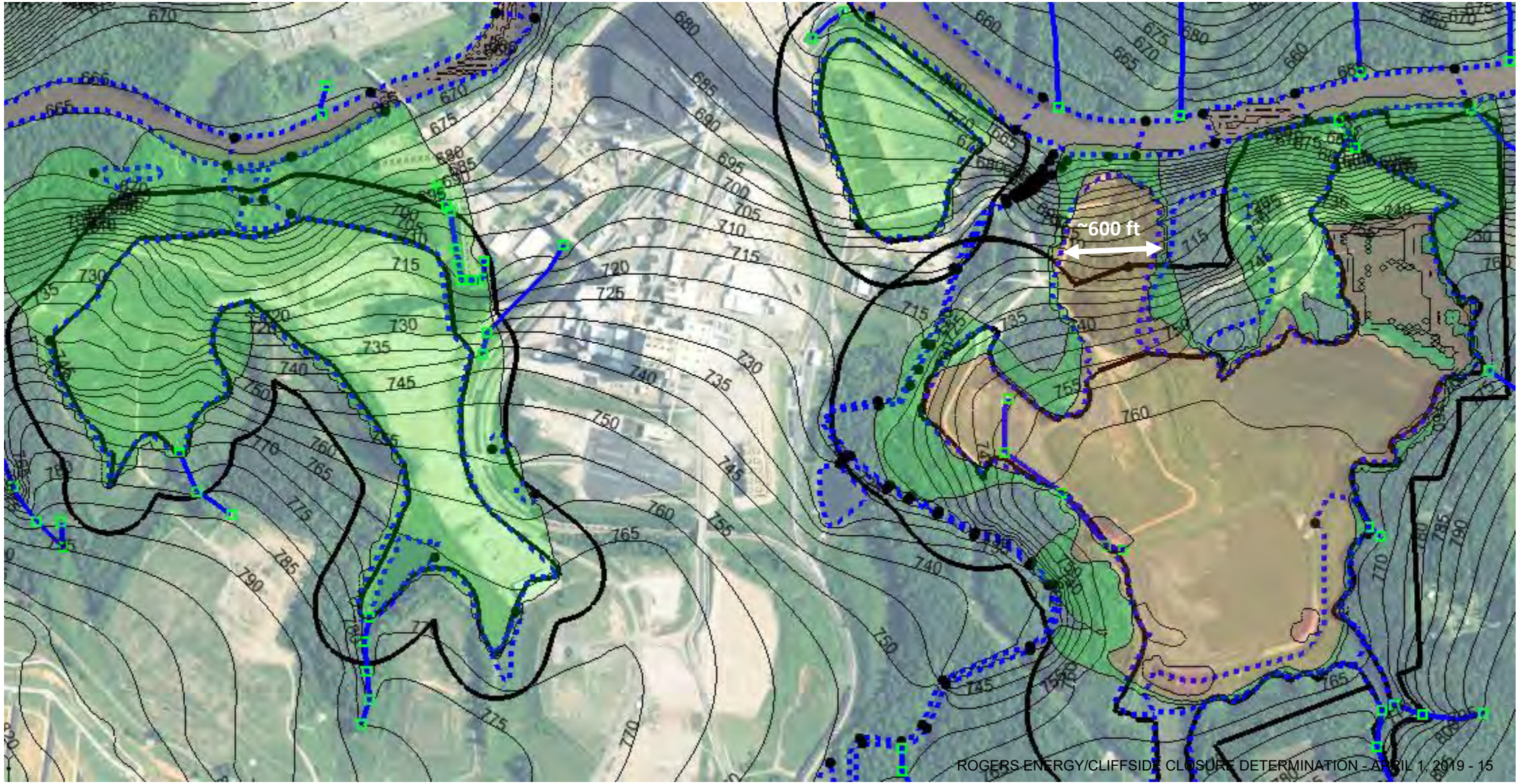
bgs – below ground surface

These data illustrate that after completion of closure with the final cover or hybrid option, the groundwater plume still extends beyond the compliance boundary above the 2L groundwater standard and the area of the plume requiring remediation is immense. Even 100 or 125 years beyond completion of closure, the area of the plume requiring remediation remains extensive under these two closure options.

DEQ recognizes that there are no groundwater remediation corrective actions included in the groundwater modeling simulations submitted to DEQ as part of Duke Energy's closure options analysis documentation. However, based on the current geographic scope, vertical extent of the groundwater contamination plume, and future modeled extent of the plume, DEQ does not believe these two closure options can meet the requirements of CAMA Option B for the Active Ash Basin. DEQ also does not believe Duke Energy's *Option 1: Closure-in-Place* for the Unit 5 Inactive Ash Basin can meet the requirements of CAMA Option B, given the extent of the groundwater plume beyond the waste boundary, extending to the Broad River as depicted in ES-1 in Attachment B, and the lack of a compliance boundary for the impoundment.

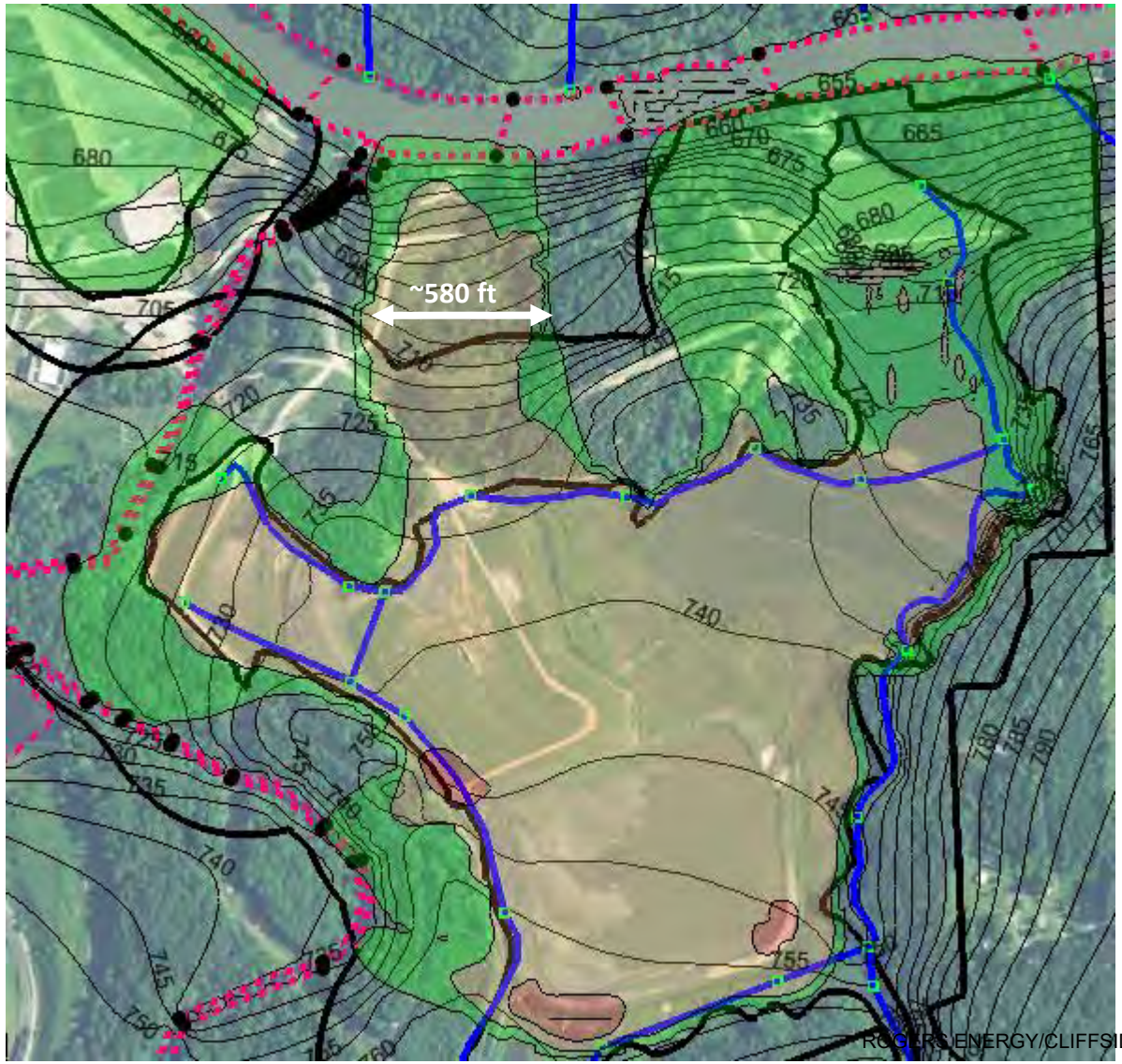
CLIFFSIDE **CURRENT CONDITIONS IN 2018**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



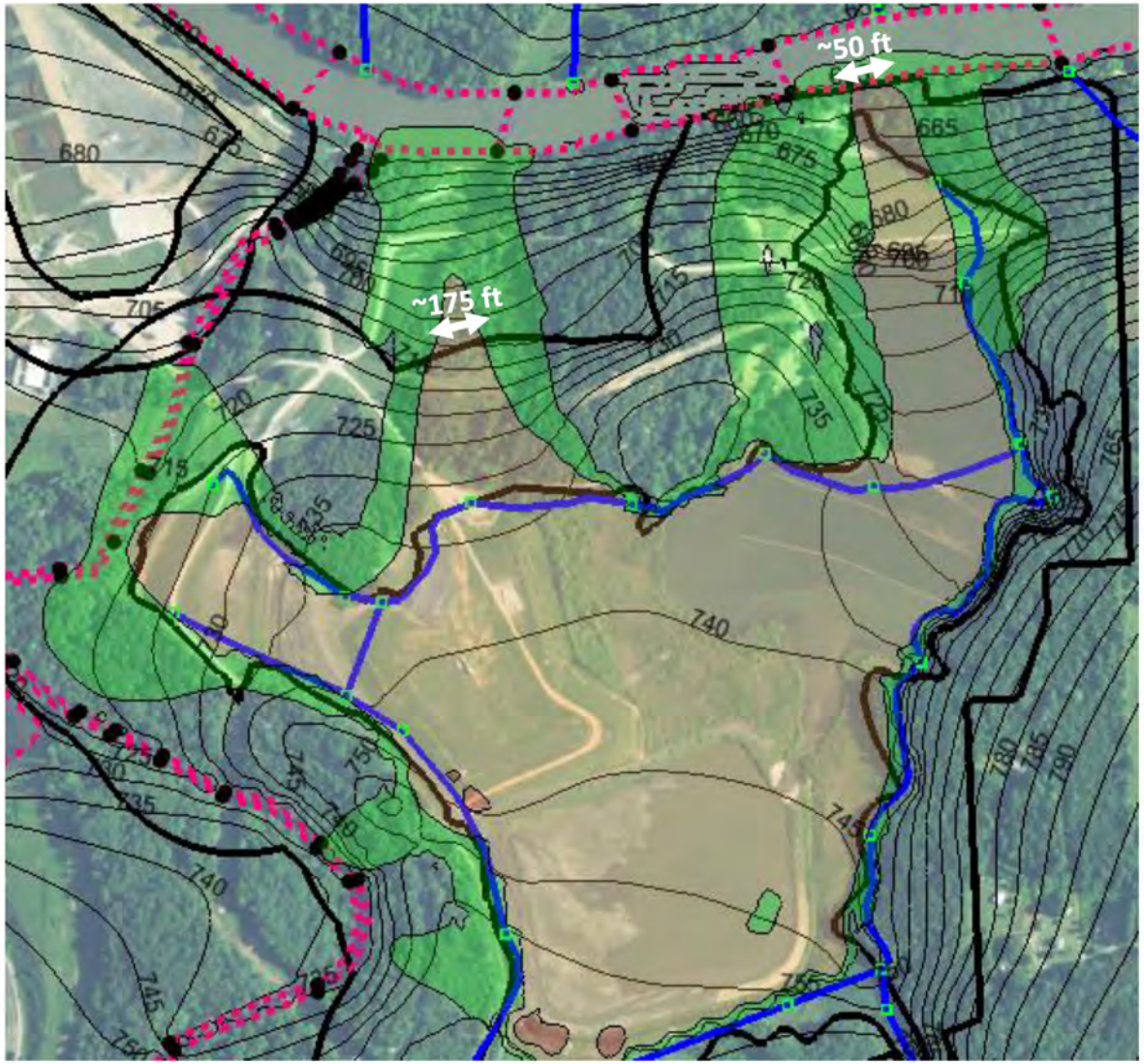
CLIFFSIDE **UPON COMPLETION OF FINAL COVER IN 2022**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



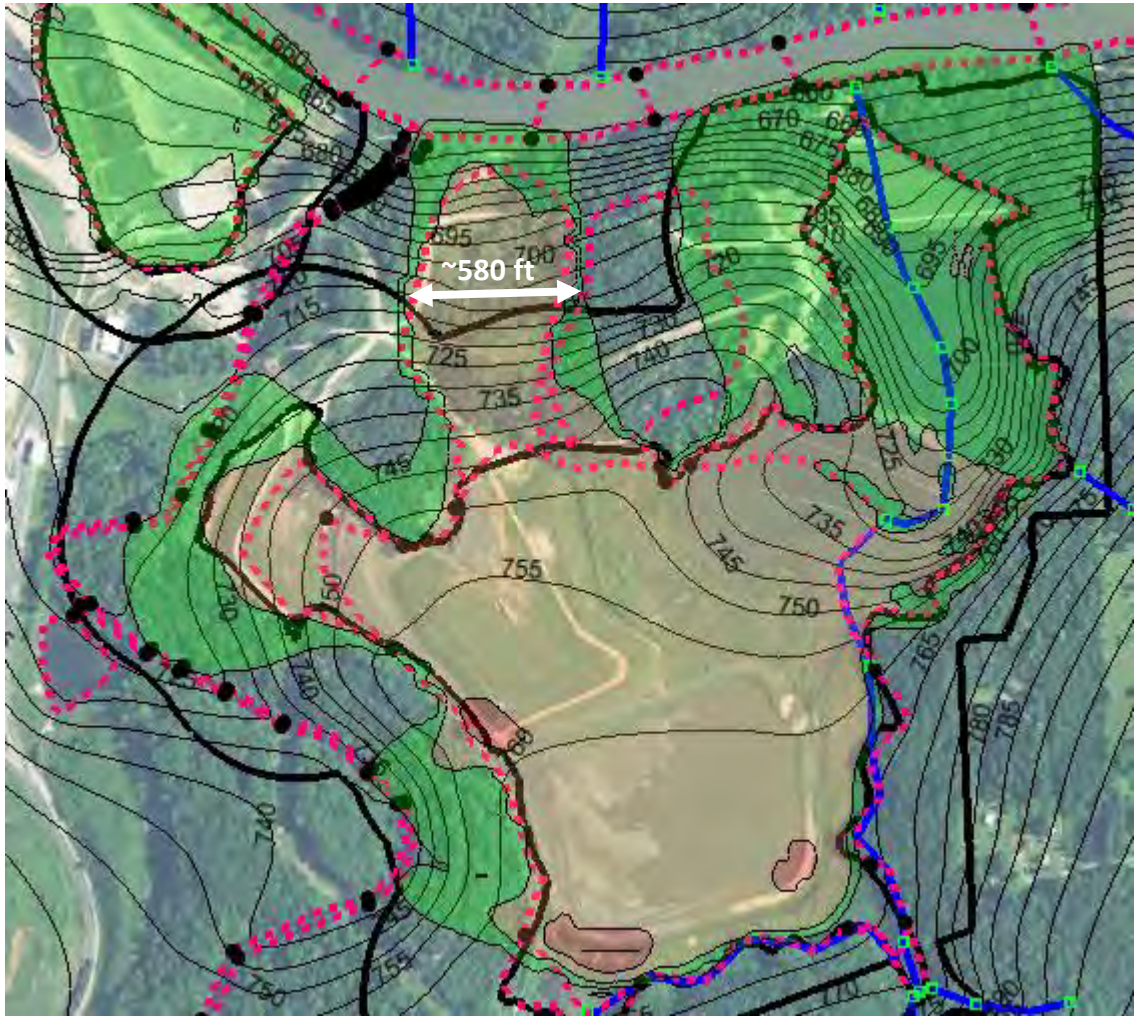
CLIFFSIDE **FINAL COVER IN 2125, t ~ 100 years**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



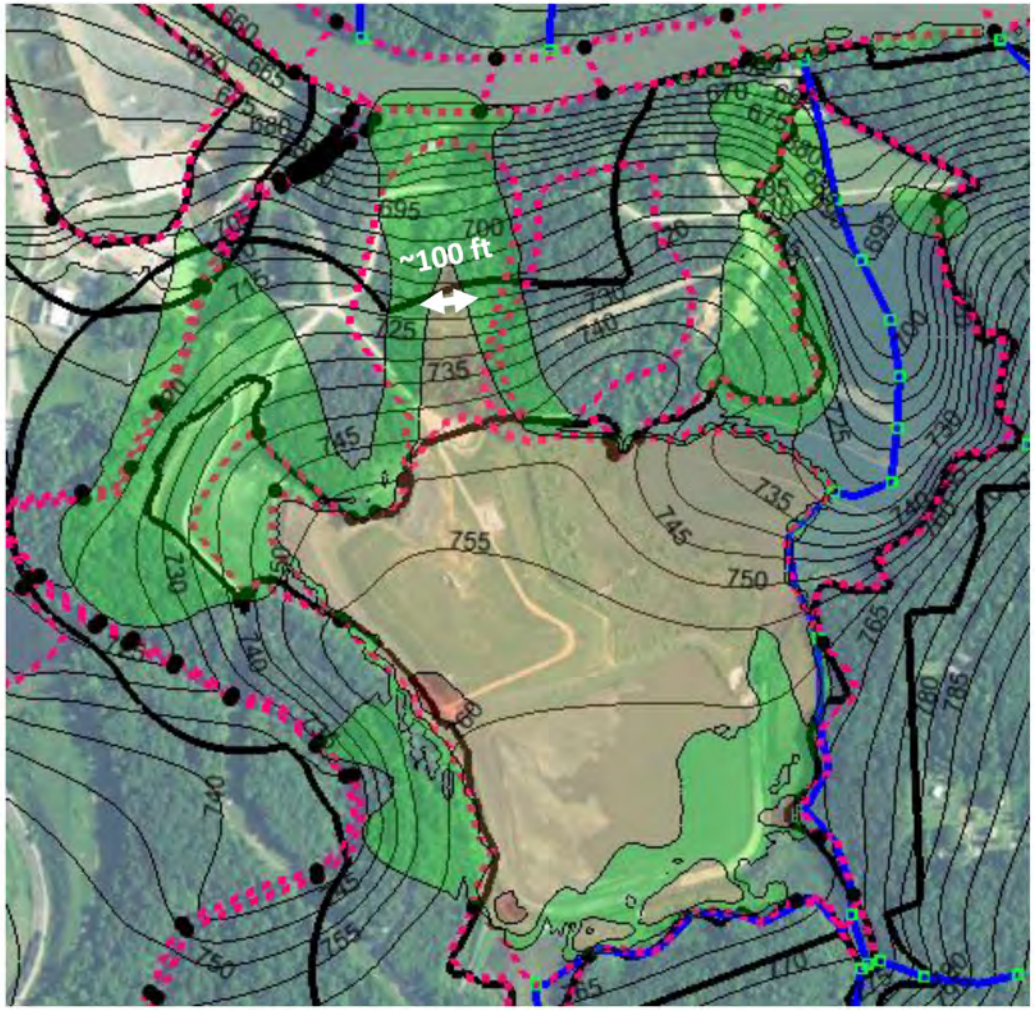
CLIFFSIDE **UPON COMPLETION OF HYBRID IN 2023**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



CLIFFSIDE **HYBRID IN 2125, t ~ 100 years**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



CLIFFSIDE **CURRENT CONDITIONS IN 2018**

CROSS SECTION A-A' (VIEWED FROM EAST SIDE OF CROSS SECTION LOOKING WEST)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Cliffside model layers:

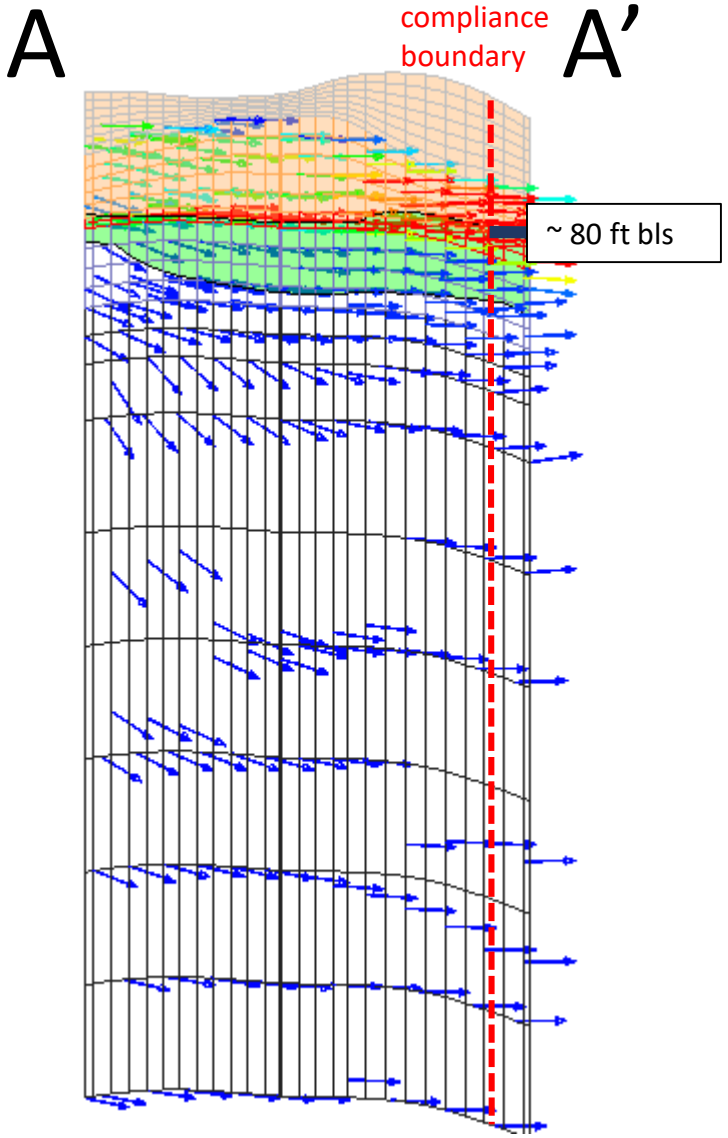
Ash 1-8

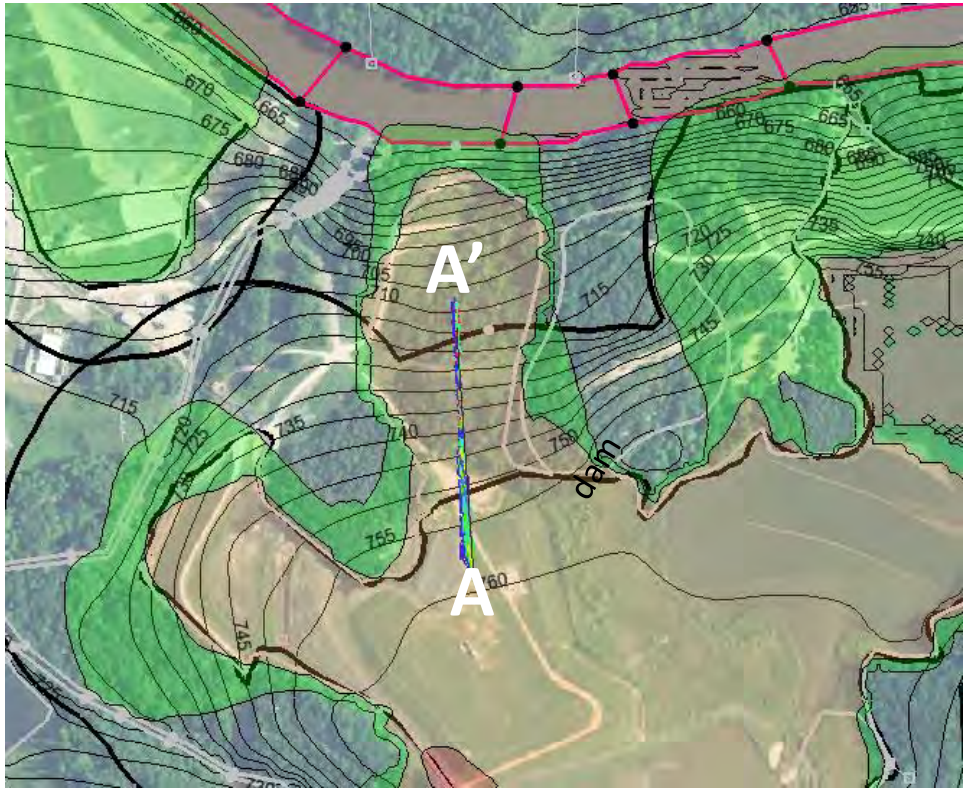
Saprolite 9-13

TZ 14-16

Bedrock 16-28

Vertical exaggeration X 3





A-A' ~800 ft

CLIFFSIDE **UPON COMPLETION OF FINAL COVER IN 2022, t = 0**

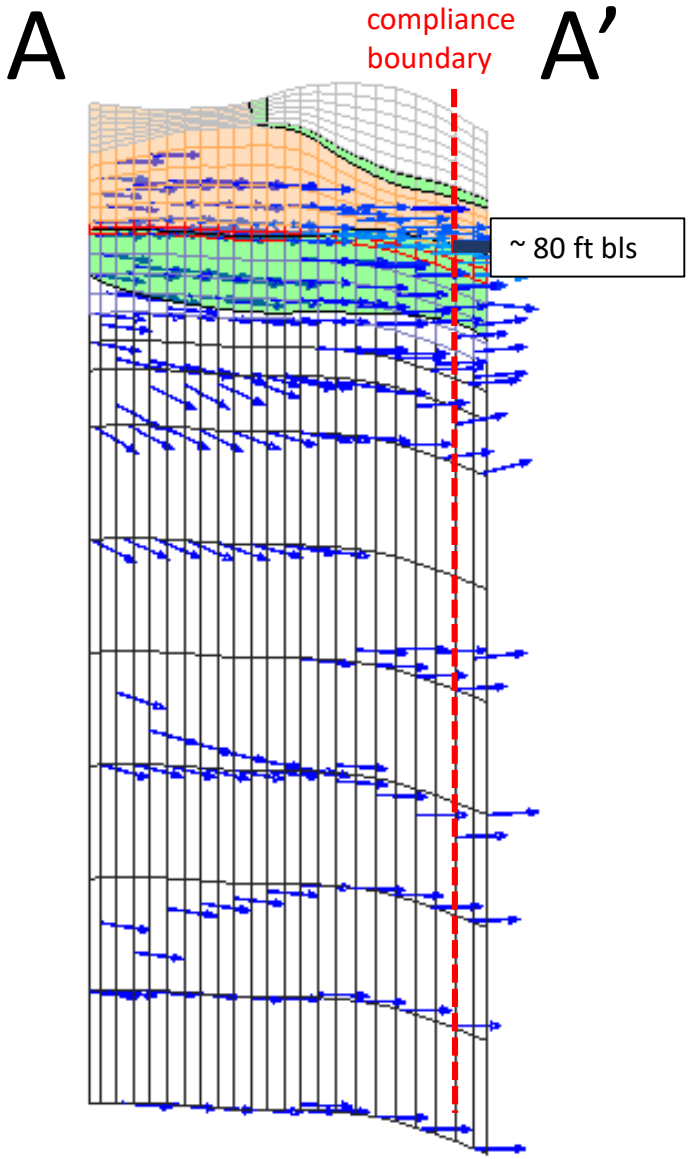
CROSS SECTION A-A' (VIEWED FROM EAST SIDE OF CROSS SECTION LOOKING WEST)

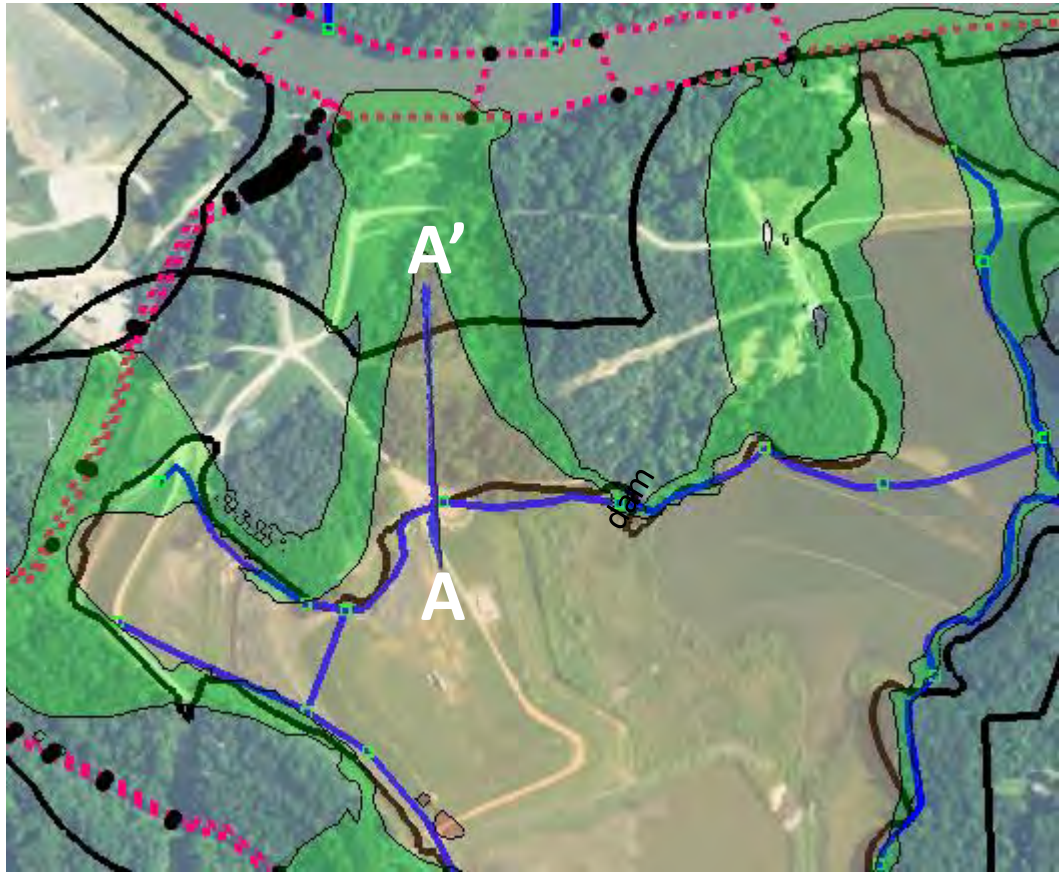
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Cliffside model layers:

Ash 1-8
Saprolite 9-13
TZ 14-16
Bedrock 16-28

Vertical exaggeration X 3





A-A' ~800 ft

CLIFFSIDE **FINAL COVER IN 2125, t ~ 100 years**

CROSS SECTION A-A' (VIEWED FROM EAST SIDE OF CROSS SECTION LOOKING WEST)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Cliffside model layers:

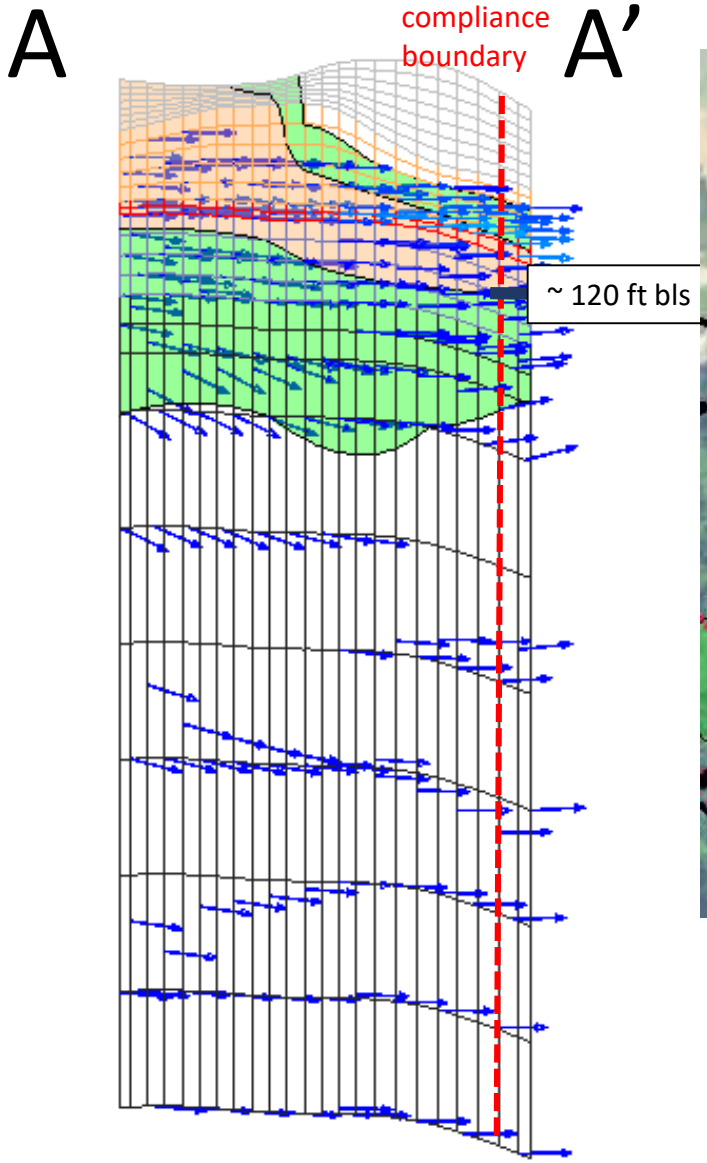
Ash 1-8

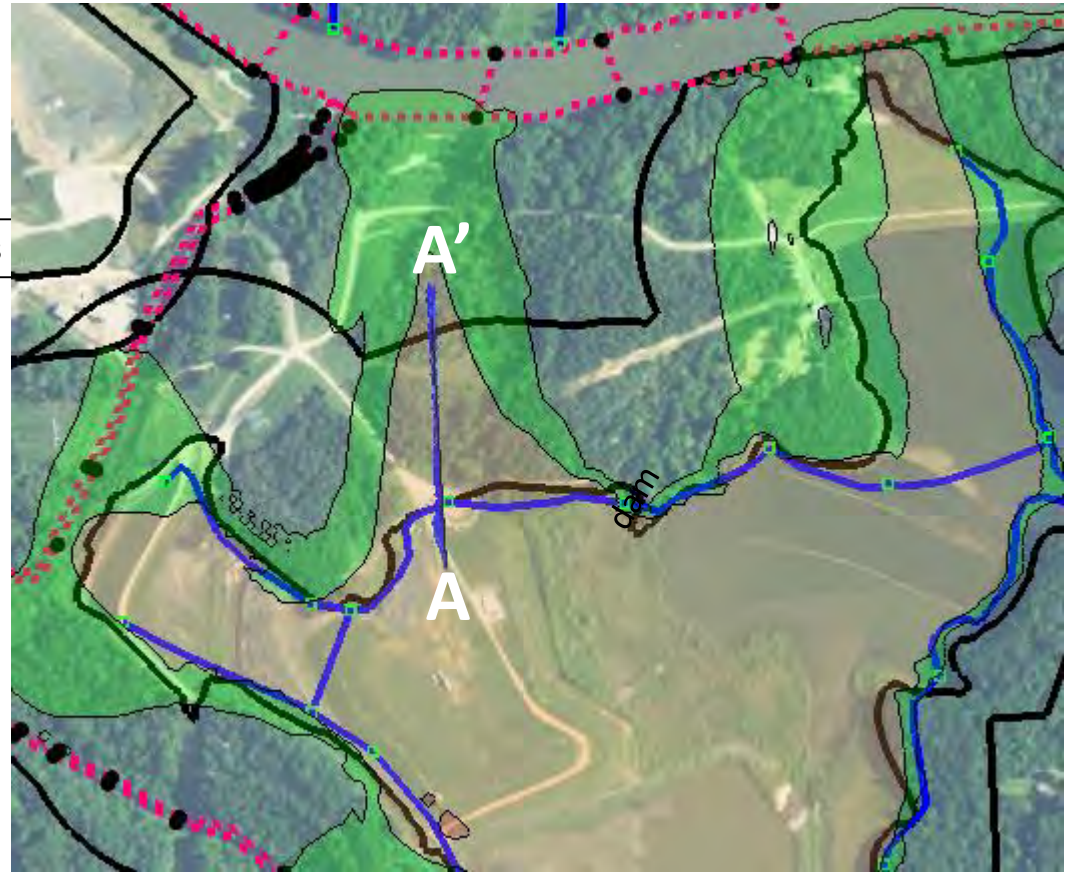
Saprolite 9-13

TZ 14-16

Bedrock 16-28

Vertical exaggeration X 3





A-A' ~800 ft

CLIFFSIDE **UPON COMPLETION OF HYBRID IN 2023, t = 0**

CROSS SECTION A-A' (VIEWED FROM EAST SIDE OF CROSS SECTION LOOKING WEST)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Cliffside model layers:

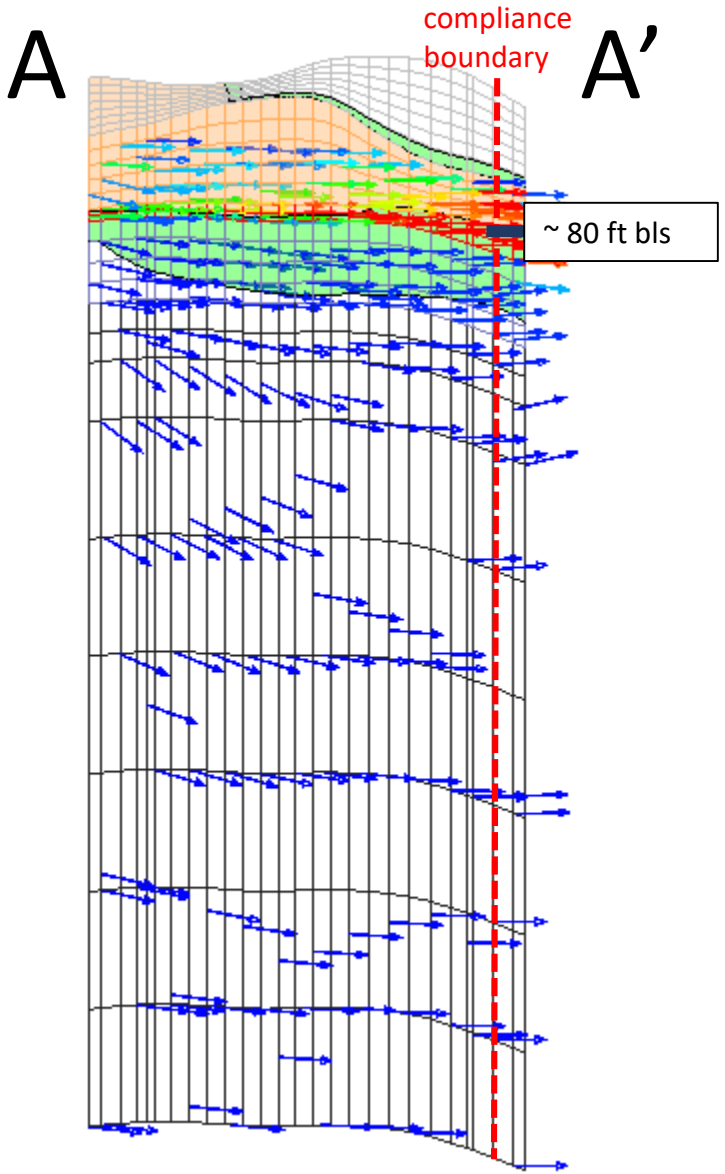
Ash 1-8

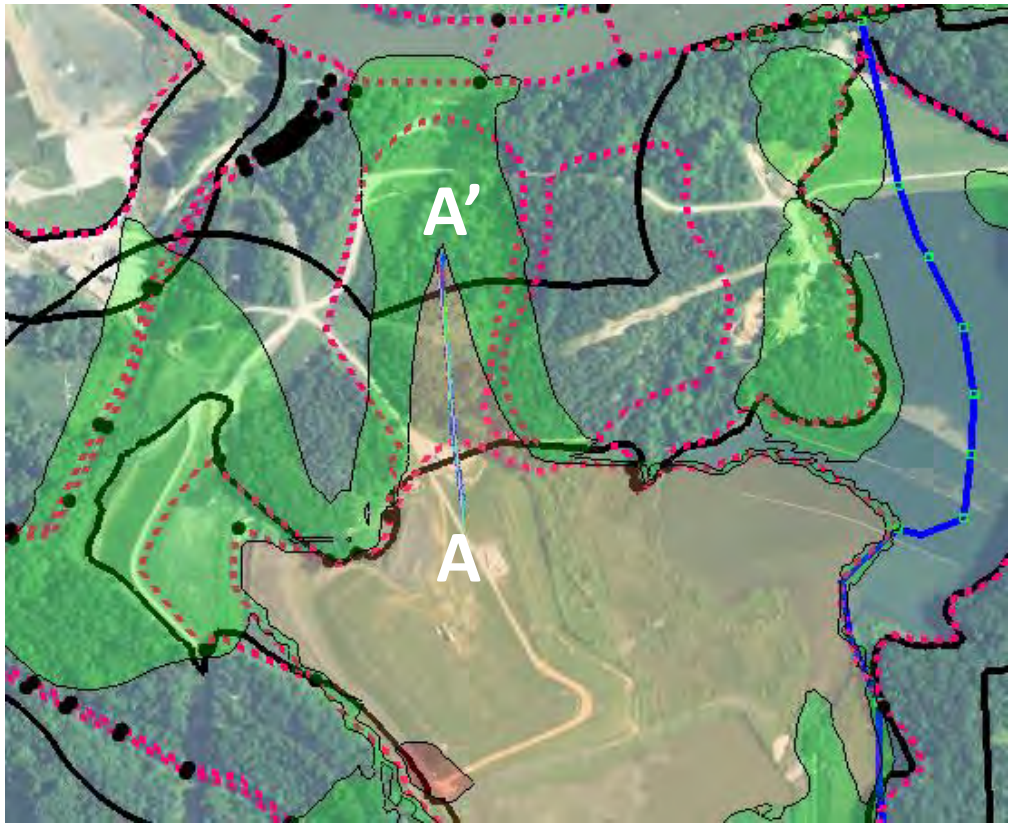
Saprolite 9-13

TZ 14-16

Bedrock 16-28

Vertical exaggeration X 3





A-A' ~800 ft

CLIFFSIDE **UPON COMPLETION OF HYBRID IN 2150, t ~ 125 years**

CROSS SECTION A-A' (VIEWED FROM EAST SIDE OF CROSS SECTION LOOKING WEST)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Cliffside model layers:

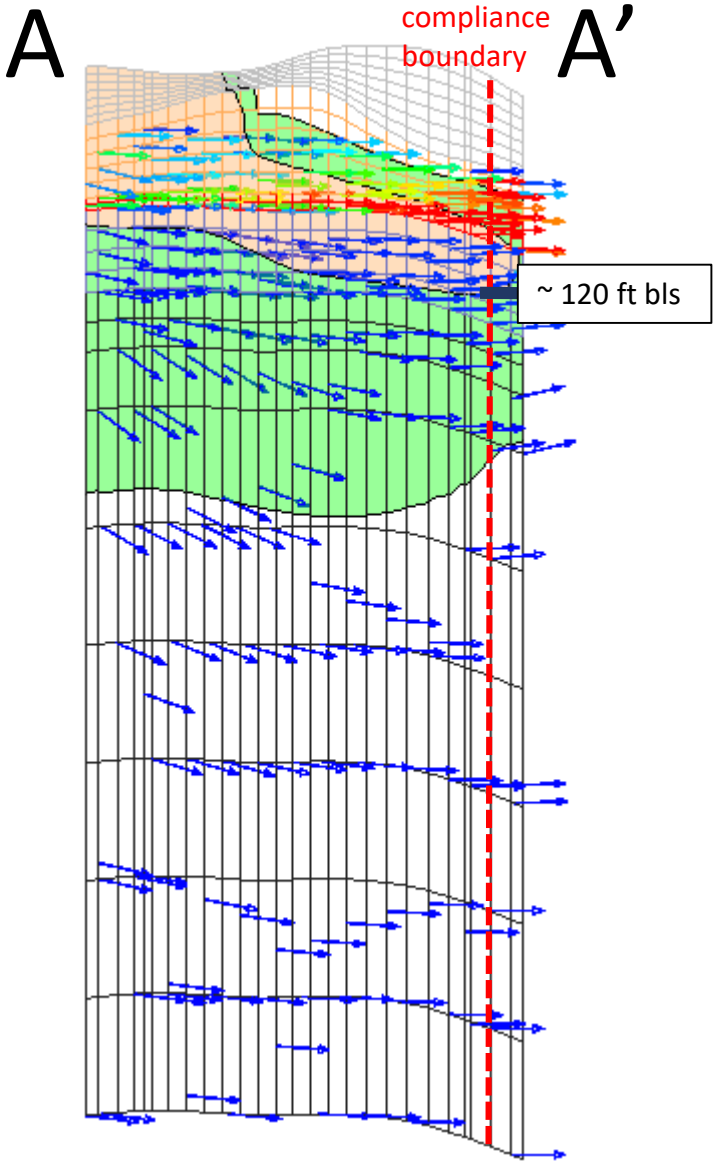
Ash 1-8

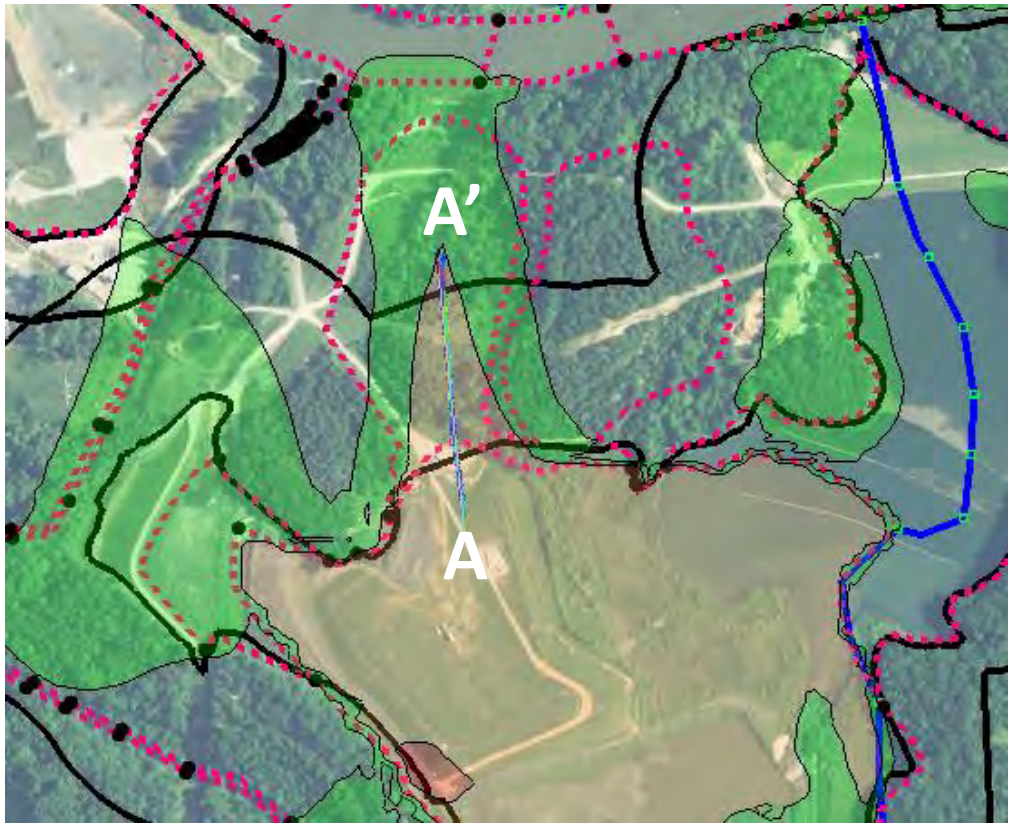
Saprolite 9-13

TZ 14-16

Bedrock 16-28

Vertical exaggeration X 3





A-A' ~800 ft

ATTACHMENT B

RESPONSE TO COMMENTS

RESPONSE TO COMMENTS

I. Summary of Responses to Comments

The North Carolina Department of Environmental Quality ("NCDEQ," or "Department") received approximately 1207 comments regarding the five closure options at the Duke Energy Rogers facility. The majority of the comments supported closure by removal to a lined landfill without specifying the location of the landfill. A sizeable minority specifically recommended excavating coal ash and moving it to an onsite landfill. A small minority of commenters either urged for excavation without registering any opinion as to how the excavated coal ash should be handled, or discussed disposal options other than relocation to a lined landfill. No commenters unequivocally supported closure-in-place, however, one commenter registered qualified support for this option. Detailed responses to the comments received by the Department regarding closure options for this site, as well as responses to those comments, are below.

II. Detailed Responses to Comments

A. Closure-in-place

No comments were received which unequivocally favored closure-in-place. Of the more than 1200 comments received, all but two advocated for excavating coal ash from its existing location. A very small number of commenters solely urged for excavation of coal ash without any further specific comment. Similarly, a small number of commenters registered their opposition of cap-in-place, went on to cite specific reasons for their opposition of cap-in-place, but made no specific proposal regarding disposition of excavated coal ash.

Among these commenters, the reasons cited for opposing cap-in-place were: water quality and health concerns, concerns regarding Duke's motives in proposing this solution, concerns over the effectiveness of long-term monitoring, accountability concerns, and/or general fairness concerns over leaving coal ash in place in some places when it is being excavated at others. One commenter did not specifically address any of the closure options, but, rather expressed his concern with the effects of contamination associated with coal ash. These general concerns are summarized and addressed in this section under the sub-heading "General Opposition of Closure-in-place." Most commenters expressed some opinion regarding the ultimate disposition of excavated coal ash and are summarized in different sections below. One commenter neither expressly supported closure-in-place, nor opposed the option. A summary of that comment follows:

Comment: One commenter indicated that cap-in-place could potentially be a viable option, but expressed concern regarding the specific proposal for cap-in-place presented by Duke. He stated his opinion that additional study and safeguards would be needed for this option to comply with applicable regulations and be safely utilized.

Response: After review of the comments and other relevant data, the Department will require the removal of all coal ash, which must then be disposed of in lined landfills.

Comment: As noted above, some comments were submitted exclusively registering the commenters' opposition of closure-in-place. Additionally, a small number of commenters registered their opposition of cap-in-place, cited specific reasons for their opposition of cap-in-place, but made no were silent regarding disposition of excavated coal ash. Among these commenters, the chief reasons cited for opposing cap-in-place were: water quality and health concerns, concerns regarding Duke's motives in proposing this solution, concerns over the effectiveness of long-term monitoring, accountability concerns, and/or general fairness concerns over leaving coal ash in place in some places when it is being excavated at others. One commenter did not specifically address any of the closure options, but, rather expressed his general concern with the effects of contamination associated with coal ash.

Response: The Department will require all coal ash at the site to be excavated and disposed of in lined landfills.

B. Hybrid Option

There were no comments directly addressing either hybrid option.

C. Closure by Removal to a Lined Landfill

1. Comments Supporting Closure by Removal to a New Onsite Landfill

Of the approximately 1200 comments North Carolina Department of Environmental Quality (NCDEQ) received regarding the five Rogers closure options, the overwhelming majority of comments were submitted via one of several form emails that supported removal to a lined landfill. The form email commenters asked for coal ash removal from leaking, unlined pits and movement to dry lined storage away from waterways and groundwater. Most of these commenters, however, did not specifically distinguish between moving the coal ash to an onsite landfill or removal to an offsite landfill.

A large number (approximately 238) of commenters supported closure by removal specifically to a new onsite dry lined landfill. The vast majority of commenters supporting this option submitted one of two form letters. Some of these commenters included individualized comments along with the form letter. A small number of commenters supporting this option did not utilize either form letter. Those comments are summarized as follows:

Comment: Roughly 70% of comments supporting closure by removal specifically to an onsite dry lined landfill were submitted using the following form letter:

"I urge you to require Duke Energy to remove the coal ash from their leaking, unlined pits and to move it to dry lined storage, which is already available onsite, away from the Broad River and the groundwater of Cliffside. The Cliffside community has come out time after time over the last several years to make their concerns about this toxic coal ash clear. It is long past time for DEQ to listen.

The coal ash pit at Cliffside extends dozens of feet deep into the groundwater table, violating of federal and state rules. Cap in place in place won't solve these problems; it will just hide them. Duke's own models show that cap in place will continue polluting groundwater for 500 more years!

North Carolinians deserve better. To comply with the law and protect water quality Duke must excavate its coal ash now.

Thank you for your consideration."

Response: The Department will require all coal ash at the site to be excavated and disposed of in a lined landfill. The Department has not yet determined whether disposal shall be at an onsite landfill, or an offsite landfill.

Comment: A smaller number of commenters supporting closure by removal to an onsite dry lined landfill submitted the following form email:

• DEQ should require Duke Energy to remove its coal ash from its leaking, unlined pits and move it to dry, lined storage on its own property — away from the Broad River and out of our groundwater.

• Duke Energy plans to leave its coal ash sitting in the groundwater at Cliffside, where it will keep polluting our groundwater, streams and rivers. Recent monitoring shows Duke Energy is polluting the groundwater surrounding Cliffside with toxic and radioactive materials. We need cleanup—not coverup!

• The community has come out time after time over the last several years, making clear that we're concerned about pollution from Duke Energy's coal ash and want Duke Energy to get its coal ash out of its unlined, leaking pits. It is long past time for DEQ and Duke Energy to remove the ash.

• Duke Energy is already required to remove its coal ash from eight other communities in North Carolina and all of its sites in South Carolina, and the governor of Virginia recently called for all the coal ash to be removed from Dominion's unlined sites—our families and our community deserve the same protections.

• Duke Energy can dispose all the ash from its leaking ponds onsite in an existing safe, lined landfill. Ash will not travel through the community or to other communities.

• Duke cannot exaggerate traffic concerns while downplaying the community's real concern: Duke Energy's water pollution. None of these plans will have a significant increase in offsite trucking, and only excavation will remove the source of the water pollution.

• Duke Energy's own experts know that even cap-in-place will involve trucking construction materials to the site—just like any other construction project. But even under their estimates, the additional trucking impacts are next to nothing. Duke Energy's consultant estimates that 97 trucks currently travel near Cliffside on community roads every day. Excavation would add only nine more trucks on community roads each day, compared to 13 more trucks on community roads for the duration of the cap-in-place scenario.

• It is past time for DEQ to listen to the community—not Duke Energy's consultants—about what our community needs. We need Duke to clean up its coal ash and stop the water pollution.

Response: The Department will require all coal ash at the site to be excavated and disposed of in a lined landfill. The Department has not yet determined whether disposal shall be at an onsite landfill, or an offsite landfill.

Comment: A comment supported excavation of coal ash and relocation to onsite dry lined storage. They discussed the risks associated with cap-in-place, particularly to vulnerable populations, as well as stated that cap-in-place violated applicable regulations. They also expressed concern regarding the data submitted by Duke in favor of cap-in-place.

Response: The Department will require excavation to a lined landfill, but the location of the landfill has not yet been determined.

Comment: A comment urged the Department to require excavating coal ash and moving it to lined landfills on Duke's property at all of the sites under consideration. In the letter supporting this option, the commenter discusses the risks to human and environmental health associated with cap-in-place, as well as the potential long-term costs of the option.

Response: The Department has determined that excavation to a lined landfill will be required, but has not yet determined the location of the landfill.

2. Comments Supporting Removal to a Lined Landfill, No Location Specified

Comment: The overwhelming majority of commenters stated in a form email that they were supportive of closure by removal to dry lined landfill. The comment in that form email states the following:

"Dear Coal Ash Comment Administrator North Carolina DEQ: Rogers,

The North Carolina Department of Environmental Quality (DEQ) should require Duke Energy to remove its coal ash from its leaking, unlined pits and move it to dry lined storage away from our waterways and out of our groundwater. Duke Energy plans to leave its coal ash sitting in the groundwater at six sites in North Carolina, where it will keep polluting our groundwater, lakes, and rivers.

Recent monitoring shows Duke Energy is polluting the groundwater at its coal ash ponds in North Carolina with toxic and radioactive materials. We need cleanup—not coverup!
The communities around the coal ash ponds have come out time after time over the last several years, making clear that we're concerned about pollution from Duke Energy's coal ash and want Duke Energy to get its coal ash out of its unlined, leaking pits. It is long past time for DEQ and Duke Energy to listen to the communities.

Duke Energy is already required to remove its coal ash at eight other sites in North Carolina and all of its sites in South Carolina—our families and our community deserve the same protections."

Response: The Department will require that all coal ash at the site be excavated and relocated to lined landfills.

Comment: Several commenters submitted individual comments urging excavation and relocation of coal ash to lined landfills, citing water quality concerns, health concerns, accountability concerns, fairness concerns, and/or concerns relating to Dukes motives in proposing cap-in-place and/or the data submitted by Duke supporting this option.

Response: The Department will require that all coal ash at the site be excavated and relocated to lined landfills.

Comment: One commenter urged for excavation and removal to a lined landfill stating that compliance with applicable regulations is not possible without excavation. He went on to state that the locations of coal ash impoundments would never have been permitted as hazardous waste disposal sites. He indicated his belief that classification of these sites as low risk is inappropriate, and cited numerous fairness and accountability concerns.

Response: The Department will require that all coal ash at the site be excavated and relocated to lined landfills.

Comment: Citing previous experience with a catastrophic coal spill insisted that NCDEQ should require Duke Energy to remove its coal ash from its leaking, unlined impoundments and move it to dry lined storage. There were also concerns for protecting the Catawba River and downs steam rivers.

Response: The Department will require that all coal ash at the site be excavated and relocated to lined landfills.

Comment: Another commenter expressed serious concern regarding the closure-in-place option and provided lengthy commentary on why this option was not viable:

"Cap-in-place is unacceptable for any of the coal ash sites in North Carolina. Any 'solutions' proposed by Duke Energy that do not excavate and move ash to fully lined,

scientifically designed systems that fully encapsulate coal ash must be rejected. Without multiple, sealed bottom, side, and top liners, North Carolina's groundwater will always be at risk. Due to increases in extreme weather, more frequent hurricanes and massive rainstorms, groundwater models of 100 or 500-year floodplain are obsolete. Given the unpredictable fluctuations in the water tables and groundwater flows, there is no way that surface capping without properly engineered underlying bottom liners can protect groundwater in the coming decades."

The commenter continued by stating: "DEQ should require Duke Energy's new landfills to go beyond the minimal mandatory protections provided by current regulations. DEQ must carry out independent studies and obtain recommendations for the best liner technologies, redundant liners, and with multiple long-term safeguards. Scientifically based placements for baseline and ongoing groundwater monitoring wells should be established. These must be thoroughly and constantly monitored – with full, public, transparent, internet accessible, easily available data from the monitoring results. Ground water and surface monitoring should be ongoing for a minimum of 50 years . . . While transporting existing coal ash dumps away from rivers and floodplains is essential, every effort should be taken by DEQ to ensure that the distances coal ash is moved is minimized and that the coal ash destinations are always kept on Duke Energy's property."

The commenter expressed significant concern for worker safety while the above referenced work is carried out, stating that "During excavation, construction, and filling of the landfills, all worker safety measures should be taken to prevent a repeat of the serious harms to worker health from the cleanup crews that worked on the TVA spill….worker safety, proper fitting and testing of N95, or better, particulate masks should be required…wherever needed, full protective suits should be provided."

The commenter concluded: "Once constructed, these new lined landfills should represent the best technologies and materials available – not materials that create short-term financial savings. The original existing dumps were disasters for public health, for NC communities, and for our state's waters. We have this one chance to remediate some of the damages and most importantly, to safeguard future generations from heavy metal coal ash contamination. Our state-wide re-design of storage systems for millions of tons of coal ash must be done right this time."

Response: The Department will require that all coal ash at the site be excavated and relocated to lined landfills.

Comment: Another commenter who supports removal to a lined landfill urged NCDEQ to consider conducting its own independent analysis that identifies the safest closure option.

Response: The Department will require that all coal ash at the site be excavated and relocated to lined landfills.

Comment: A commenter submitted extensive written comments urging NCDEQ to require the Rogers coal ash basins to be excavated to a lined landfill to protect the environment and human health.

The commenter claimed coal ash impoundments are not eligible for closure-in-place under CAMA because cap-in-place will violate state groundwater Rules and the federal CCR Rules. The commenter sets out the following arguments it believes supports its claim that closure will violate state Groundwater Rules: 1) Duke Energy's modelling demonstrates it will not meet groundwater standards if it chooses closure-in-place; 2) Duke Energy's modelling underestimates the extent of contamination; 3) Duke Energy tested groundwater compliance at the wrong location; 4) the groundwater rule prohibits closure-in-place because the coal ash will contribute to violations of the groundwater standard for centuries; and 5) closure-in-place is unavailable because it will not restore groundwater to the legal standard.

The commenter next claimed that coal ash impoundments at Allen are not eligible for closure-in-place under the Coal Combustion Residuals (CCR) rule. The commenter supported this argument by its assertions that: 1) the CCR rules' performance standards require separating ash from the groundwater and precluding its future impoundment; and 2) the CCR rules' corrective action requirements preclude closure-in-place.

The commenter continues by arguing that NCDEQ must base its closure determination on effectiveness and not cost to the polluter. The commenter further maintains that NCDEQ should reject Duke Energy's "Community Impact Analysis." The commenter claims that Duke's Energy's report downplays well-established pollution risks and exaggerates the impact on communities of excavating and trucking material to offsite landfills. Further, they claim that diesel emissions do not meaningfully distinguish between closure methods and that the report's habitat analysis is flawed. The commenter concludes by questioning the validity of Duke Energy's closure options scoring system - and offers its own analysis to demonstrate why it believes Duke Energy manipulated scores to suit a desired outcome.

Response: The Department will require that all coal ash at the site be excavated and relocated to lined landfills.

Comment: The same commenter requested that NCDEQ ignore a Duke Energy report on estimated greenhouse gas emissions associated with various closure options for the six unresolved coals ash sites. The commenter claimed NCDEQ should disregard this submission because it was made after NCDEQ's deadline for Duke Energy to submit its materials and outside the public comment period, thereby denying the public an opportunity to respond to it. NCDEQ should also disregard this submission because it is irrelevant to the decision facing NCDEQ, which is to select a closure method that stops the ongoing pollution and continuing threat to our water resources posed by Duke Energy's leaking coal ash basins.

Response: The Department is requiring excavation of coal ash and removal to a lined landfill.

Comment: A commenter stated that the pits should be excavated as soon as possible to the maximum safe extent with at least twenty-five (25) percent recycled through encasement in cement bricks, concrete and other methods. The remainder of excavated ash should be moved into double-lined landfills away from rivers, lakes and aquifers with monitored leak detection systems. The double-lining would include 2' of clay on the exterior with a durable lining impervious to water.

Response: The Department has determined that all coal ash at the site must be excavated and removed to a lined landfill. The Department will consider beneficial use of excavated coal ash, as well as the location of lined landfills for disposal at a later date.

Comment: A small number of other commenters also suggested the material should be at least partially recycled.

Response: The Department has determined that all coal ash at the site must be excavated and removed to a lined landfill. The Department will consider beneficial use of excavated coal ash, as well as the location of lined landfills for disposal at a later date.

Comment: Several comments were received in the form of YouTube testimonials following NCDEQ's Environmental Justice Advisory Board meeting in Wilmington, NC. Links to each these testimonials follow:

Caroline Armijo - ACT Member https://youtu.be/cJag3oPI4qU

Johnny Hairston - resident in harm's way of basin failure https://youtu.be/6iK1sbVOO58

Rev. Gregory Hairston – leader/resident in close proximity https://youtu.be/IV9crtEyTJY

John Wagner - ACT Member https://youtu.be/IV9crtEyTJY

Frank Holleman - lead attorney of SELC https://youtu.be/eIwPWPYb3Uc

Response: The Department will require that all coal ash at the site be excavated and relocated to lined landfills.

Comment: Four additional videos were submitted regarding the impact of coal ash spills:

At What Cost (2014) https://youtu.be/rraUoadqr8o

Danielle Bailey-Lash on CNN https://youtu.be/OCTU-CUoQzQ

A Time to Sing (Abridged) (August 2018) https://youtu.be/HQFYKBaf4NQ

A Day of Prayer (February 2019) https://youtu.be/agRzScT_BEs

Response: The Department will require that all coal ash at the site be excavated and relocated to lined landfills.

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination

Marshall Steam Station

April 1, 2019

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination

Marshall Steam Station

Executive Summary

The Coal Ash Management Act (CAMA) establishes criteria for the closure of coal combustion residuals (CCR) surface impoundments. The CCR surface impoundment located at Duke Energy Carolinas, LLC's (Duke Energy) Marshall Steam Station (Marshall) in Catawba County, NC has received a low-risk classification. Therefore, according to N.C. Gen. Stat. § 130A-309.214(a)(3), the closure option for the CCR surface impoundment is at the election of the North Carolina Department of Environmental Quality (DEQ). CAMA provides three principal closure pathways: (a) closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill [CAMA Option A]; (b) closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill [CAMA Option B]; or (c) closure in accordance with the federal CCR rule adopted by EPA [CAMA Option C].

In preparing to make its election, DEQ requested information from Duke Energy related to closure options. By November 15, 2018, Duke Energy provided the following options for consideration: closure in place, full excavation, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing CCR surface impoundment. DEQ held a public information session on January 17, 2019 in Sherrills Ford, NC where the community near Marshall had the opportunity to learn about options for closing coal ash CCR surface impoundments and to express their views about proposed criteria to guide DEQ's coal ash closure decision making process. To evaluate the closure options, the Department considered environmental data gathered as part of the site investigation, permit requirements, ambient monitoring, groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the Active Ash Basin at the Marshall facility in accord with N.C. Gen. Stat. § 130A-309-214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from the unlined CCR surface impoundment at Marshall is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

Duke Energy will be required to submit a final Closure Plan for the CCR surface impoundment at Marshall by August 1, 2019. The Closure Plan must conform to this election by DEQ.

I. Introduction

DEQ has evaluated the closure options submitted by Duke Energy for the CCR surface impoundment at the Marshall Steam Station. This document describes the CAMA requirements for closure of CCR surface impoundments, the DEQ evaluation process to make an election under CAMA for the subject CCR surface impoundment at the Marshall site, and the election by DEQ for the final closure option.

II. Site History

Duke Energy owns and operates the Marshall Steam Station which is located at 8320 NC Highway 150 East in Terrell, Catawba County, North Carolina. Marshall, including the station and supporting facilities, is approximately 1,446 acres in area. Marshall began operation in 1965 as a coal-fired generating station and currently operates four coal-fired units with 2,090 megawatts of total capacity. Coal combustion residuals consisting of bottom and fly ash material from Marshall have historically been managed in the Marshall ash basin, located north of the station adjacent to Lake Norman. Dry ash has been disposed of in other areas at Marshall, including the dry ash landfill units (Phases I and II) and Industrial Landfill No. 1.

There is one CCR surface impoundment at the site, called the Active Ash Basin. According to the Duke Energy website and data current as of September 30, 2018, the Active Ash Basin is approximately 394 acres in size and contains approximately 16,836,000 tons of CCR. The Active Ash Basin is subject to the requirements of N.C. Gen. Stat. § 130A-309.214(a)(3).

III. CAMA Closure Requirements

CAMA establishes closure requirements for CCR surface impoundments. The General Assembly has mandated that DEQ "shall review a proposed Coal Combustion Residuals Surface Impoundment Closure Plan for consistency with the minimum requirements set forth in subsection (a) of this section and whether the proposed Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part." N.C. Gen. Stat. § 130A-309.214(b). Similarly, the General Assembly has required that DEQ "shall disapprove a proposed Coal Combustion Residuals Surface Impoundment Closure Plan unless the Department finds that the Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and other complies with the requirements of this Part." N.C. Gen. Stat. § 130A-309.214(c).

CAMA requires DEQ to review any proposed Closure Plan for consistency with the requirements of N.C. Gen. Stat. § 130A-309.214(a). See N.C. Gen. Stat. § 130A-309.214(b). DEQ must disapprove any proposed Closure Plan that DEQ finds does not meet these requirements. See N.C. Gen. Stat. § 130A-309.214(c). Therefore, an approvable Closure Plan must, at a minimum, meet the requirements of N.C. Gen. Stat. § 130A-309.214(a).

Pursuant to N.C. Gen. Stat. § 130A-309.213(d)(1), DEQ has classified the CCR surface impoundment at Marshall as low-risk. The relevant closure requirements for low-risk

impoundments are in N.C. Gen. Stat. § 130A-309.214(a)(3), which states the following:

- Low-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2029;
- A proposed closure plan for a low-risk impoundment must be submitted as soon as practicable, but no later than December 31, 2019; and
- At a minimum, impoundments located in whole above the seasonal high groundwater table shall be dewatered and impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable.

In addition, N.C. Gen. Stat. § 130A-309.214(a)(3) requires compliance with specific closure criteria set forth verbatim below in Table 1. The statute provides three principal closure pathways: (a) [CAMA Option A] closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill; (b) [CAMA Option B] closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill; or (c) [CAMA Option C] closure in accordance with the federal CCR rule adopted by EPA. For each low-risk impoundment, the choice of the closure pathway in CAMA is at the "election of the Department."

Table 1: CAMA Closure Options for Low-Risk CCR Surface Impoundments
N.C. Gen. Stat. § 130A-309.214(a)(3)

At the election of the Department, the owner of an impoundment shall either:

a. Close in any manner allowed pursuant to subdivision (1) of this subsection; [CAMA Option A]

b. Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall install and maintain a cap system that is designed to minimize infiltration and erosion in conformance with the requirements of Section .1624 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, and, at a minimum, shall be designed and constructed to (i) have a permeability no greater than 1 x 10-5 centimeters per second; (ii) minimize infiltration by the use of a low-permeability barrier that contains a minimum 18 inches of earthen material; and (iii) minimize erosion of the cap system and protect the low-permeability barrier from root penetration by use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth. In addition, the owner of an impoundment shall (i) install and maintain a groundwater monitoring system; (ii) establish financial assurance that will ensure that sufficient funds are available for closure pursuant to this subdivision, post-closure maintenance and monitoring, any corrective action that the Department may require, and satisfy any potential liability for sudden and nonsudden accidental occurrences arising from the impoundment and subsequent costs incurred by the Department in response to an incident, even if the owner becomes insolvent or ceases to reside, be incorporated, do business, or maintain assets in the State; and (iii) conduct post-closure care for a period of 30 years, which period may be increased by the Department upon a determination that a longer period is necessary to protect public health, safety, welfare; the environment; and natural resources, or decreased upon a determination that a shorter period is sufficient to protect public health, safety, welfare; the environment; and natural resources. The Department may require implementation of any other measure it deems necessary to protect public health, safety, and welfare; the environment; and natural resources, including imposition of institutional controls that are sufficient to protect public health, safety, and welfare; the environment; and natural resources. The Department may not approve closure for an impoundment pursuant to sub-subdivision b. of subdivision (3) of this subsection unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment; [CAMA Option B] or

c. Comply with the closure requirements established by the United States Environmental Protection Agency as provided in 40 CFR Parts 257 and 261, "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities." [CAMA Option C]

By referencing the closure options for *high-risk* CCR surface impoundments in "subdivision (1)" or N.C. Gen. Stat. § 130A-309.214(a)(1), CAMA allows for closure of a *low-risk* CCR surface impoundment in N.C. Gen. Stat. § 130A-309.214(a)(3) through the same removal scenarios:

- "Convert the coal combustion residuals impoundment to an industrial landfill by removing all coal combustion residuals and contaminated soil from the impoundment temporarily, safely storing the residuals on-site, and complying with the requirements for such landfills." N.C. Gen. Stat. § 130A-309.214(a)(1)a.; or
- "Remove all coal combustion residuals from the impoundment, return the former impoundment to a nonerosive and stable condition and (i) transfer the coal combustion residuals for disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill or (ii) use the coal combustion products in a structural fill or other beneficial use as allowed by law." N.C. Gen. Stat. § 130A-309.214(a)(1)b.

IV. DEQ Election Process

Beginning with a letter to Duke Energy on October 8, 2018, DEQ began planning for a thorough evaluation of the closure options for low-risk CCR surface impoundments before making an election as outlined in Table 1 above. DEQ's objectives were to receive input on closure options from Duke Energy and to engage with community members near low-risk sites. DEQ outlined the following schedule in the October 8, 2018 letter:

- November 15, 2018 – Duke Energy submittal of revised option analyses and related information
- January 17, 2019 – DEQ public meeting near Marshall
- April 1, 2019 – DEQ evaluation of closure options
- August 1, 2019 – Duke Energy submittal of closure plan
- December 1, 2019 – Duke Energy submittal of updated corrective action plan for all sources at Marshall that are either CCR surface impoundments or hydrologically connected to CCR impoundments

DEQ received the requested information from Duke Energy by November 15, 2018: closure options analysis, groundwater modeling and net environmental benefits assessment. These materials are posted on the DEQ website. Duke Energy provided the following options for consideration: closure in place, full excavation with either an onsite or offsite landfill, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing CCR surface impoundment.

In preparing to make its election of the closure option, DEQ considered environmental data contained in the comprehensive site assessment, permit requirements, ambient monitoring, closure options analysis and groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements. The Marshall site has extensive amounts of data that have been collected during the site assessment process, and these data were used as part of the

evaluation of closure options. DEQ's evaluation of closure in place and hybrid option based on groundwater monitoring and modeling data is provided in Attachment A. That analysis demonstrates that the contaminated plume is already beyond the compliance boundary for the site. All of these references are part of the record supporting DEQ's determination.

DEQ conducted a public meeting in Sherrills Ford, NC near Marshall on January 17, 2019. There were 409 members of the public who attended the meeting. Approximately 1100 comments were received during the comment period, which closed on February 15, 2019. The majority of comments received expressed a preference for excavation and removal to dry-lined storage. The majority of these comments did not specify whether the storage should be on or off-site, but instead requested that it be "away from our waterways and out of our groundwater." A minority of comments expressed support for excavation and specified a preference for on-site disposal in a lined landfill, provided additional feedback on other issues related to the closure process, or expressed additional concerns related to coal ash. A review and response to comments are included in Attachment B.

V. DEQ Evaluation of Closure Options

DEQ has evaluated the closure options proposed by Duke Energy for the CCR surface impoundment at the Marshall facility. The purpose of this evaluation was to determine which closure option or options may be incorporated into an approvable Closure Plan under CAMA.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the Active Ash Basin at Marshall in accord with N.C. Gen. Stat. § 130A-309-214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from the unlined impoundment at Marshall is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

DEQ does not elect CAMA Option B for the CCR surface impoundment at Marshall. In N.C. Gen. Stat. § 130A-309.214(a)(3)b, the General Assembly mandated that "[t]he Department may not approve closure for an impoundment pursuant to [this] sub-subdivision . . . unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment." N.C. Gen. Stat. § 130A-309.214(a)(3)b. In light of these requirements and based on DEQ's review of the information provided by Duke Energy as well as DEQ's independent analysis, DEQ does not believe that Duke Energy can incorporate CAMA Option B into an approvable Closure Plan for Marshall.

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether, upon full implementation of the closure plan, the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary. To address this question, DEQ considered the current state of the groundwater contamination and reviewed the results of the groundwater modeling submitted by Duke Energy. The evaluation is provided in Attachment A. DEQ's overall conclusion is that based on the current geographic scope and vertical extent of the groundwater contamination plume, and the modeled extent of the plume in the future, DEQ does not believe these two closure options can meet the requirements of CAMA Option B for the CCR surface impoundment at Marshall.

DEQ does not elect CAMA Option C (i.e., closure under the federal CCR Rules found in 40 CFR Part 257) for the CCR surface impoundment at Marshall. DEQ has determined that:

a. Under the facts and circumstances here, CAMA Option C is less stringent than CAMA Option A. Specifically, DEQ's election of Option A would also require Duke Energy to meet the requirements of the federal CCR Rule (i.e., CAMA Option C) but election of CAMA Option C would not require implementation of CAMA Option A.
b. Because CAMA Option A adds additional requirements or performance criteria beyond Option C, it advances DEQ's duty to protect the environment (see N.C. Gen. Stat. §§ 279B-2 & 143-211) and the General Assembly's mandate under CAMA that DEQ ensure that any Closure Plan, which must incorporate an approvable closure option, is protective of public health, safety, and welfare, the environment, and natural resources (see N.C. Gen. Stat. § 130A-309.214(b) & (c)).
c. For the CCR surface impoundments for which the closure option(s) must be determined, CAMA Option A provides a better mechanism for ensuring State regulatory oversight of the closure process than Option C, as well as greater transparency and accountability.
d. While the federal CCR Rule was written to provide national minimum criteria for CCR surface impoundments across the country, CAMA was written specifically to address the CCR surface impoundments in North Carolina.
e. While the federal CCR Rule allows CCR surface impoundment owners to select closure either by removal and decontamination (clean closure) or with a final cover system (cap in place), EPA anticipates that most owners will select closure through the less protective method of cap in place.
f. There is considerable uncertainty regarding the status and proper interpretation of relevant provisions of the federal CCR Rule. For instance, EPA is reconsidering portions of the federal CCR Rule. Also, the performance standards in 40 CFR 257.102(d) for cap in place closure are the subject of conflicting interpretations (and possible litigation) among industry and state authorities.

VI. Final Closure Plan

The final closure plan is due on August 1, 2019 in accordance with this determination. Based on DEQ's evaluation of the options submitted by Duke Energy, DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the Active Ash Basin in accord with N.C. Gen. Stat. § 130A-309.214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

While beneficiation is not a requirement of the closure plan, DEQ encourages Duke Energy to consider opportunities for beneficiation of coal ash that would convert coal combustion residuals into a useful and safe product.

ATTACHMENT A

DEQ EVALUATION OF CLOSURE IN PLACE AND HYBRID OPTIONS BASED ON GROUNDWATER MONITORING AND MODELING DATA

DEQ EVALUATION OF CLOSURE IN PLACE AND HYBRID OPTIONS BASED ON GROUNDWATER MONITORING AND MODELING DATA

I. Groundwater Monitoring Summary

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary upon full implementation of the closure plan. Significantly, the contaminated groundwater plume has already extended beyond the compliance boundary in a portion of the CCR surface impoundment. The inferred general extent of groundwater impacts above applicable Background Threshold Values or 2L Standards are shown on Figure ES-1. Additional monitoring and hydrogeological data is available in the Marshall Steam Station January 2018 CSA Update Report (available on the DEQ website).

The groundwater site assessment at the Marshall Steam Station, as required by CAMA, began in 2015 and is still on-going. Based on review of data submitted to date in various reports, both soil and groundwater has been impacted by CCR handling activities at the site. Groundwater within the area of the CCR surface impoundment generally flows from northwest to southeast and discharges to Lake Norman as depicted on Figure ES-1 (below). The inferred general extent of groundwater impacts above applicable PBTVs or 2L Standards are shown on Figure ES-1 from the January 2018 CSA Update Report below. Boron concentrations above 2L Standards approximates the leading edge of the CCR plume (area shaded yellow) at the site.

The vertical extent of most COIs is within the shallow and transition flow layers. However, data suggests the bedrock flow layer has been impacted by CCR handling activities at the site. Manganese and strontium concentrations are fairly widespread in the bedrock flow layer. There are isolated occurrences of boron, chloride, iron, molybdenum and TDS within and downgradient of the ash basin.

DEQ concludes that the contaminated groundwater plume above 2L groundwater standards has extended beyond the compliance boundary along the northern and eastern edge on the shore of Lake Norman.

II. Groundwater Cross-section Modeling

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary upon full implementation of the closure plan. To address this question, DEQ considered the current state of the groundwater contamination and reviewed the results of the groundwater modeling submitted by Duke Energy.

DEQ evaluated cross-sections of the groundwater modeling results provided by Duke Energy to determine whether Duke Energy's final closure *Option 1: Hybrid* and *Option 5: Closure-in-Place* would meet the criteria of CAMA Option B. DEQ considered if the agency could conclude that the proposed closure option includes design measures to prevent any post closure exceedances of the 2L groundwater quality standards at the compliance boundary upon the plan's full implementation. Cross section A-A' was evaluated and can be seen in the figures below. This cross section represents where the boron concentration above the 2L standard of 700 µg/L has crossed the compliance boundary based on groundwater monitoring and modeling.

Next, the model results were evaluated based on the following model simulations:

- current conditions in 2017 when the model was calibrated based on raw field data
- upon completion of the final closure-in-place cover system at t=0 years
- closure-in-place option at t=120 years
- upon completion of the hybrid option at t=0 years
- hybrid option at t=120 years

The table below summarizes the results from the model simulations. The boron concentrations depicted in the table represent the maximum boron concentration in any layer (ash, saprolite, transition zone, and bedrock) of the model.

Marshall Modeling Results for Cross-Section A-A'			
Model Simulation	Maximum Concentration of Boron Above 2L Beyond Compliance Boundary (ug/L)	Depth of GW Contamination Above 2L Beyond Compliance Boundary (feet bgs)	Width of Contamination Plume Beyond Compliance Boundary (feet)
Current Conditions	700-4,000	380	1500
Completion of Final Cover (t=0 yrs)	700-4,000	390	1500
Final Cover (t=120 yrs)	700-4,000	370	1500
Completion of Hybrid (t=0 yrs)	700-4,000	310	1500
Hybrid (t=120 yrs)	700-4,000	360	1600

bgs – below ground surface

These data illustrate that after completion of closure with the final cover or hybrid option, the groundwater plume still extends beyond the compliance boundary above the 2L groundwater standard and the area of the plume requiring remediation is immense. Even 120 years beyond completion of closure, the area of the plume requiring remediation remains extensive.

DEQ recognizes that there are no groundwater remediation corrective actions included in the groundwater modeling simulations submitted to DEQ as part of Duke Energy's closure options analysis documentation. However, based on the current geographic scope, vertical extent of the groundwater contamination plume, and future modeled extent of the plume, DEQ does not believe these two closure options can meet the requirements of CAMA Option B.

Figure ES-1: Marshall Steam Station January 2018 CSA Update Report

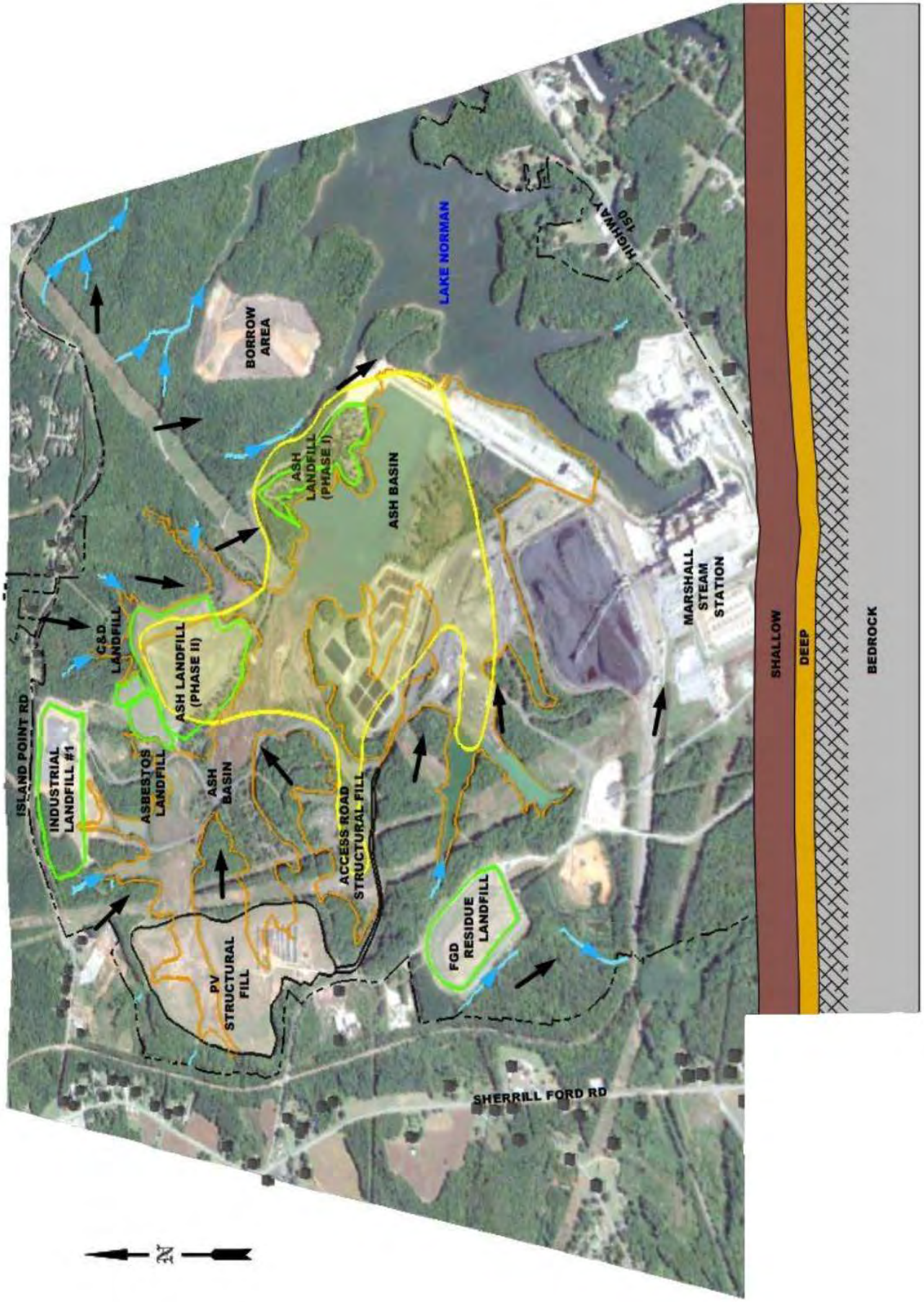


Figure ES-1 Legend: Marshall Steam Station January 2018 CSA Update Report

LEGEND

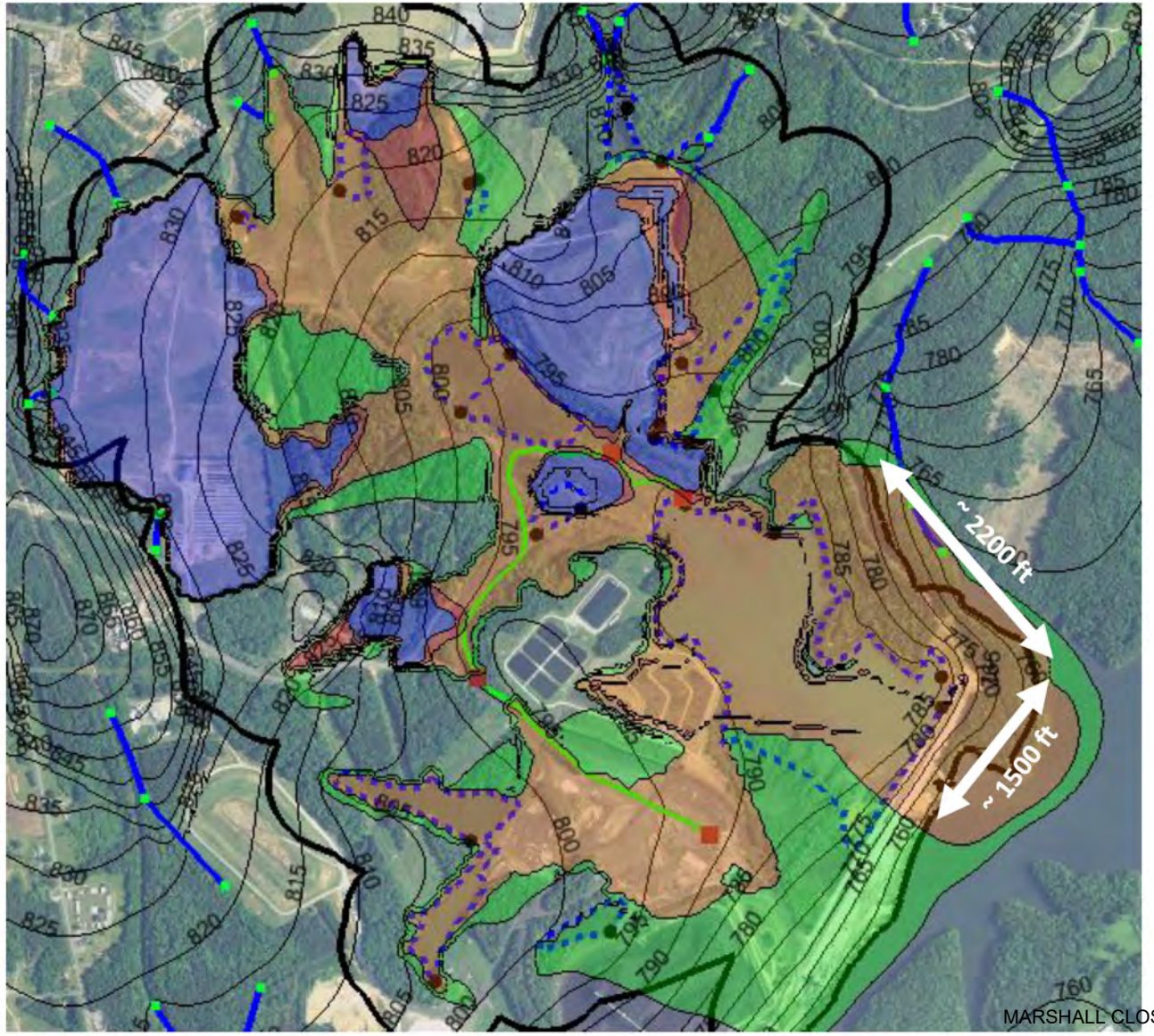
- AREA OF CONCENTRATION IN GROUNDWATER ABOVE NC2L (SEE NOTE 5)
- ASH BASIN WASTE BOUNDARY
- APPROXIMATE LANDFILL WASTE BOUNDARY
- APPROXIMATE STRUCTURAL FILL BOUNDARY
- GENERALIZED GROUNDWATER FLOW DIRECTION
- WATER SUPPLY WELL LOCATION
- STREAM WITH FLOW DIRECTION
- DUKE ENERGY PROPERTY BOUNDARY

NOTE:

1. OCTOBER, 2016 AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON SEPTEMBER 18, 2017. AERIAL DATED OCTOBER 28, 2016.
2. STREAMS OBTAINED FROM AMEC FOSTER WHEELER NRTR, MAY 2015.
3. GENERALIZED GROUNDWATER FLOW DIRECTION BASED ON SEPTEMBER 11, 2017 WATER LEVEL DATA.
4. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY.
5. GENERALIZED AREAL EXTENT OF MIGRATION REPRESENTED BY NCAC 02L EXCEEDANCES OF MULTIPLE CONSTITUENTS IN MULTIPLE FLOW ZONES.

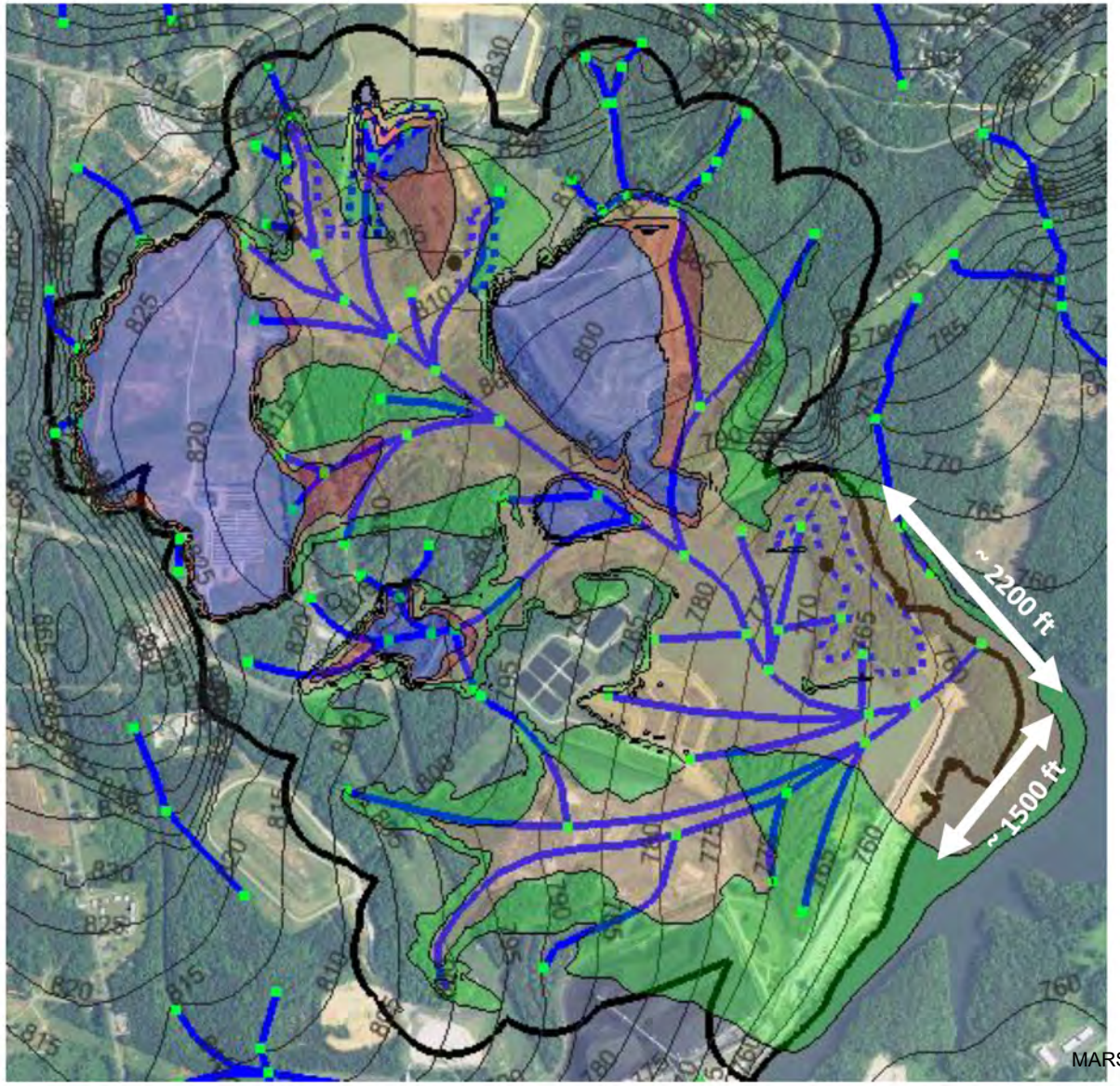
MARSHALL **CURRENT CONDITIONS IN 2018**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



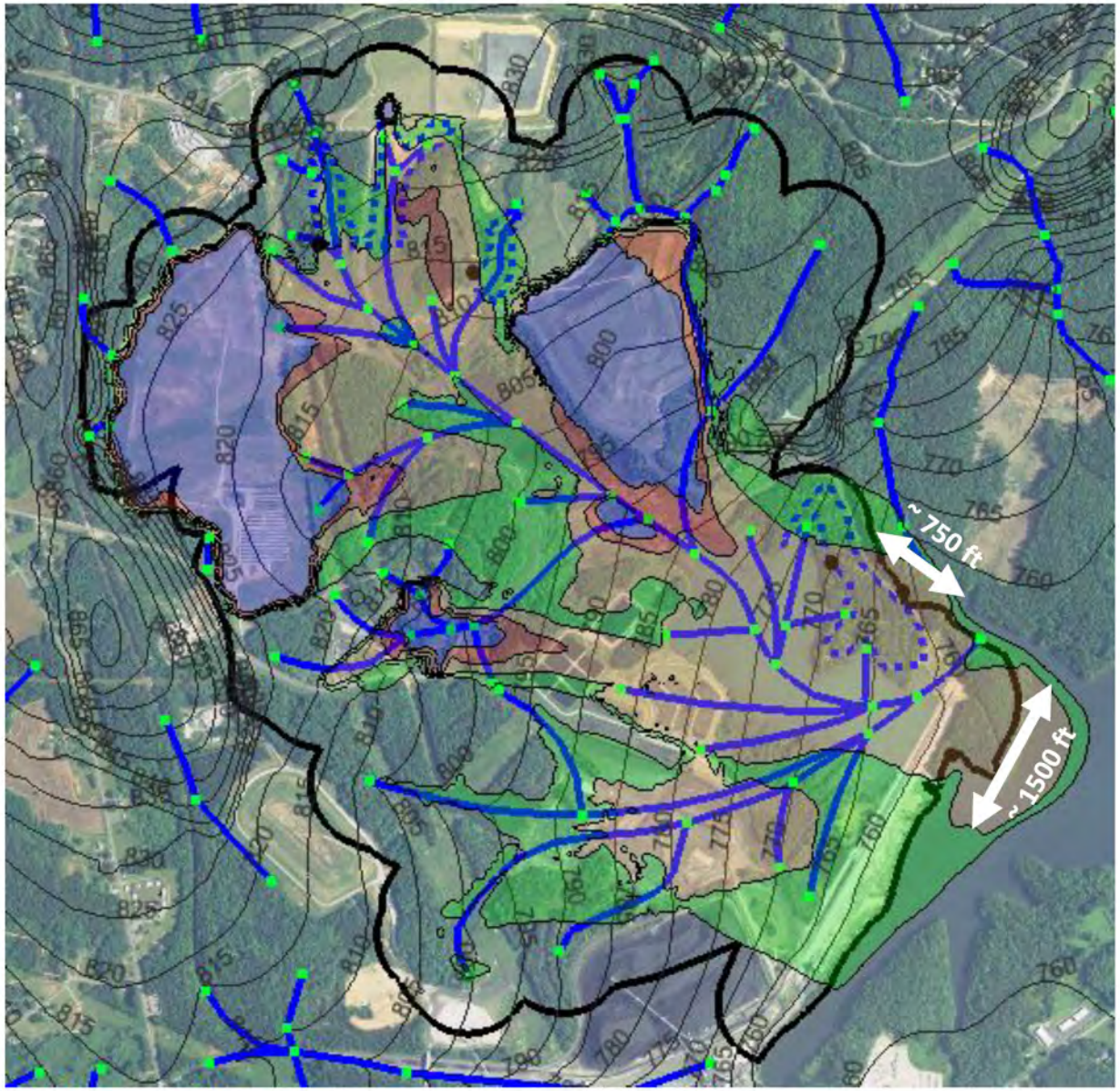
MARSHALL **UPON COMPLETION OF FINAL COVER IN 2030, t = 0**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



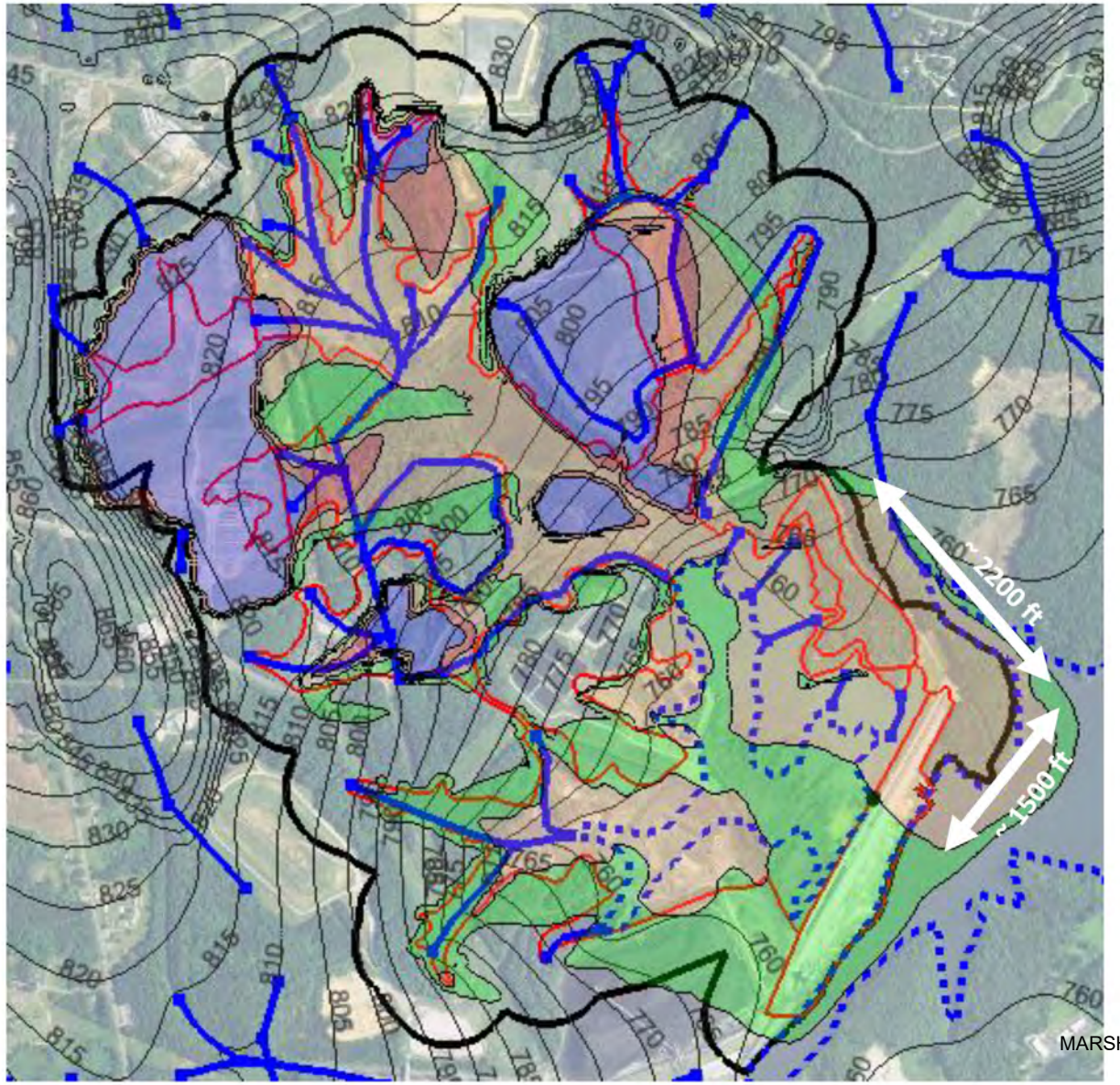
MARSHALL **FINAL COVER, 2150, t = 120 years**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



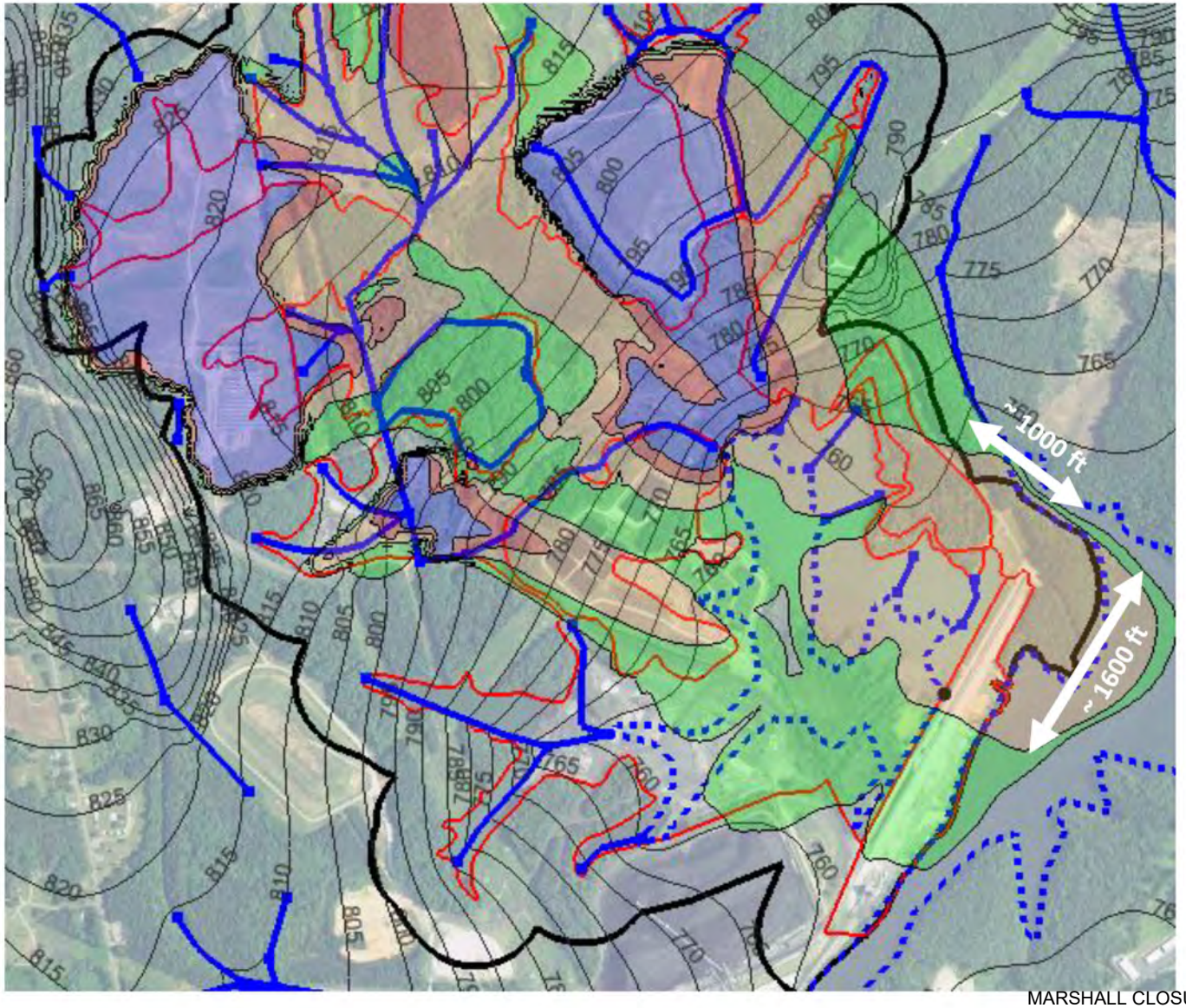
MARSHALL **UPON COMPLETION OF HYBRID IN 2030, t = 0**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



MARSHALL **UPON COMPLETION OF HYBRID IN 2150, t = 120 years**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



MARSHALL **CURRENT CONDITIONS IN 2018**

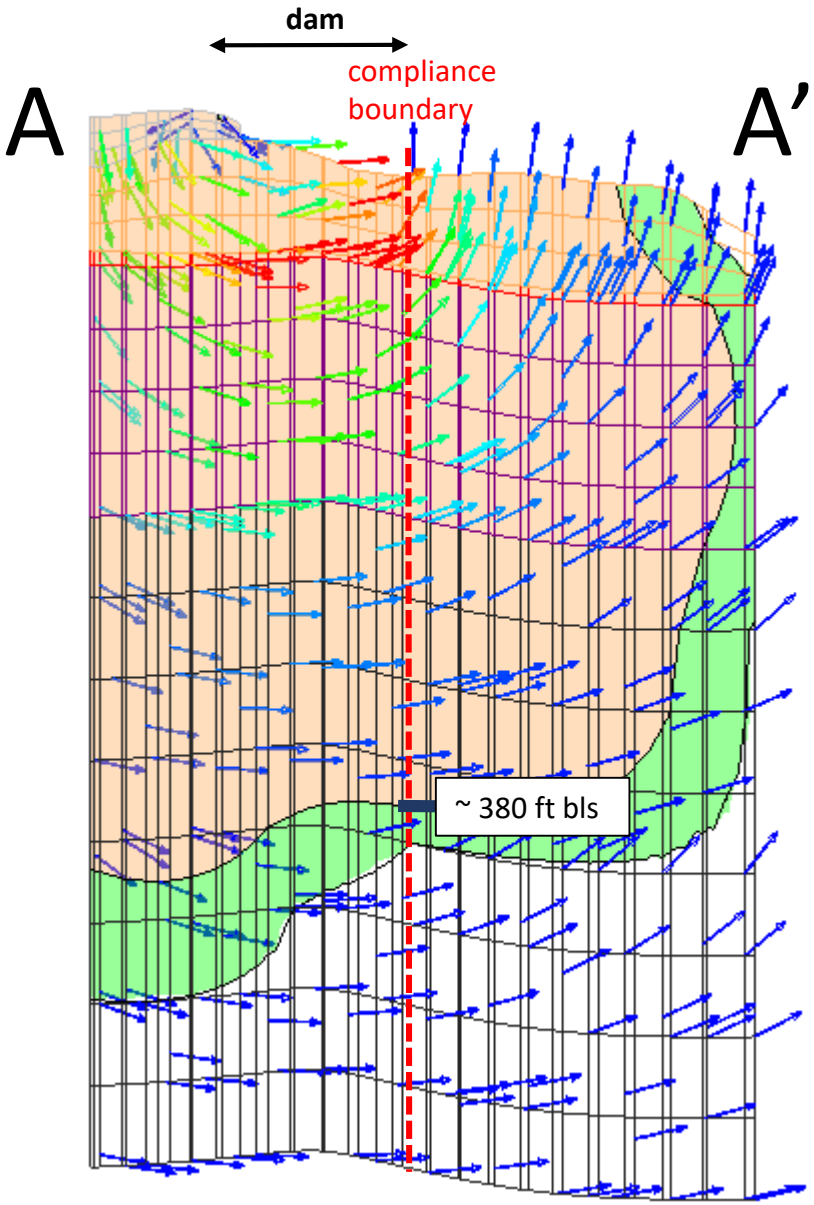
CROSS SECTION A-A' (VIEWED FROM SW SIDE OF DAM LOOKING NE)

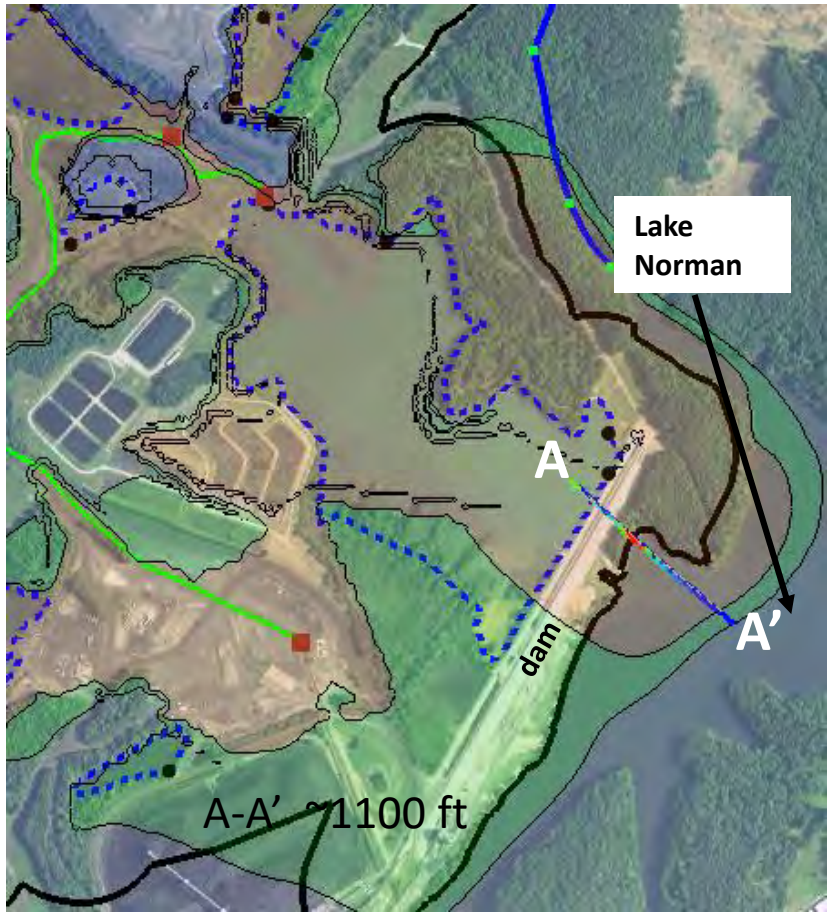
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Marshall model layers:

Ash 1-4
Saprolite 5-7
TZ 8
Bedrock 9-20

Vertical exaggeration X 3





MARSHALL **UPON COMPLETION OF FINAL COVER IN 2030, t = 0**

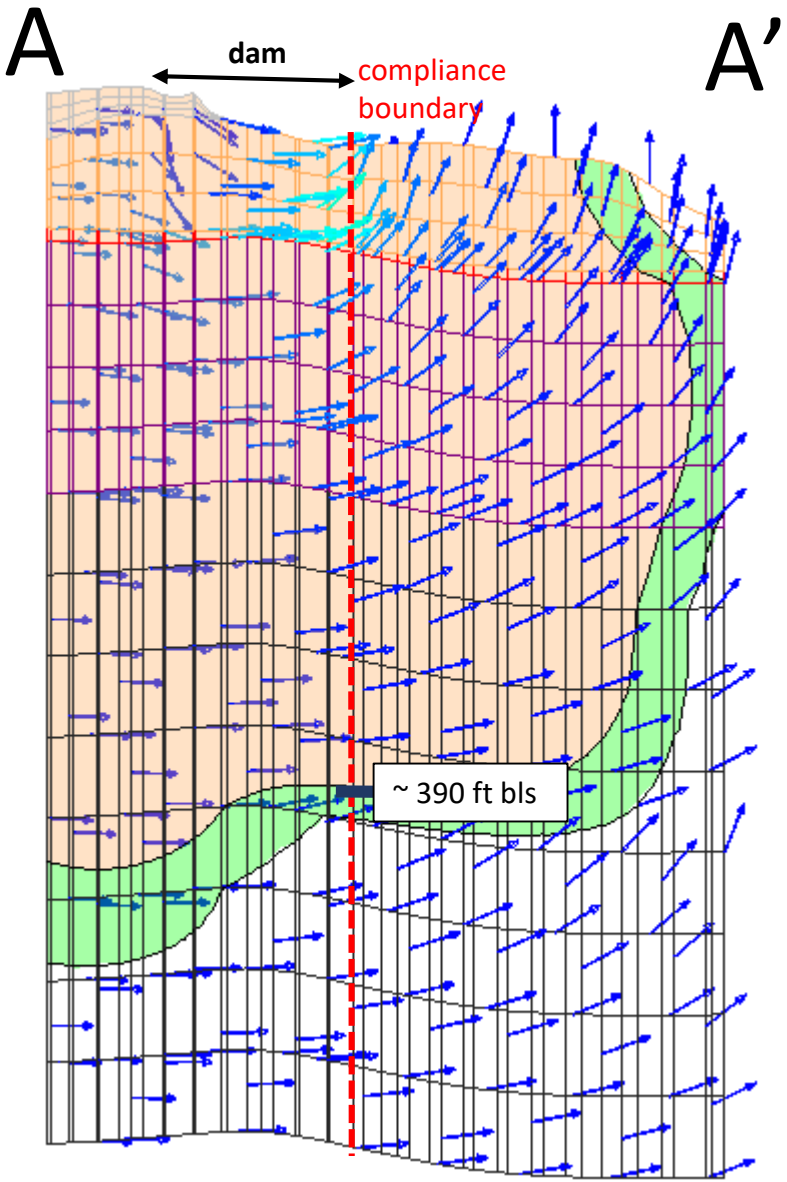
CROSS SECTION A-A' (VIEWED FROM SW SIDE OF DAM LOOKING NE)

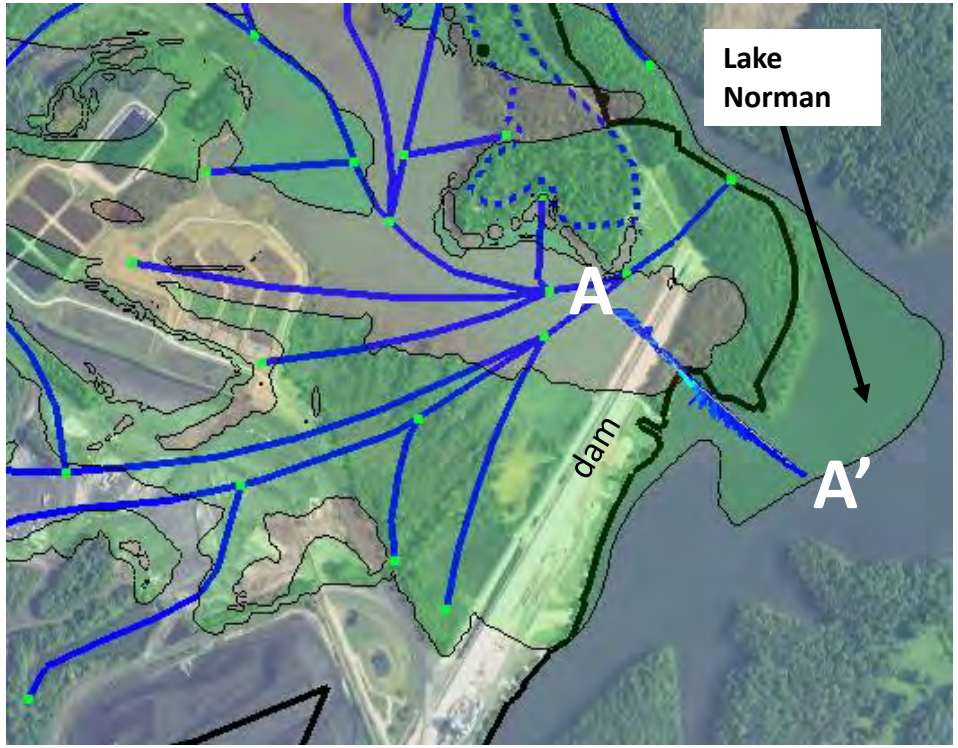
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Marshall model layers:

Ash 1-4
Saprolite 5-7
TZ 8
Bedrock 9-20

Vertical exaggeration X 3





A-A' ~1200 ft

MARSHALL **UPON COMPLETION OF FINAL COVER IN 2150, t = 120 years**

CROSS SECTION A-A' (VIEWED FROM SW SIDE OF DAM LOOKING NE)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Marshall model layers:

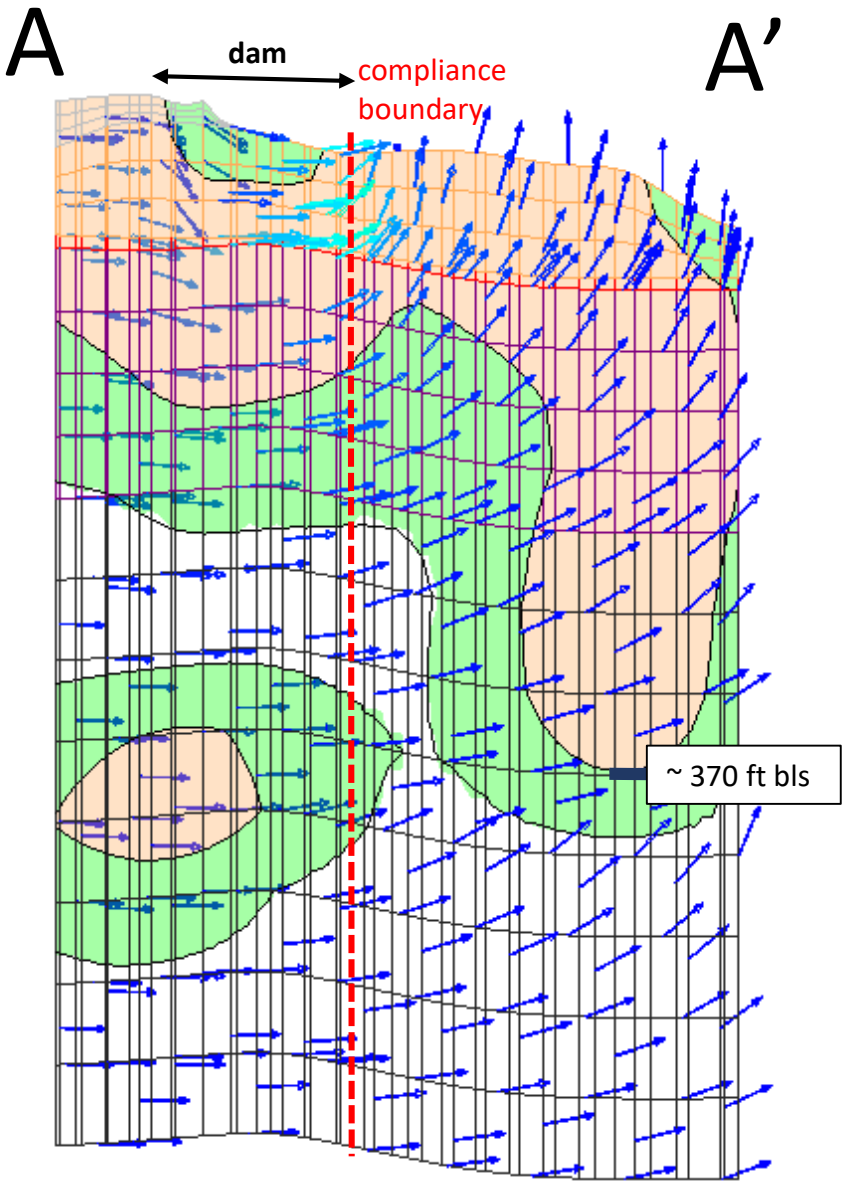
Ash 1-4

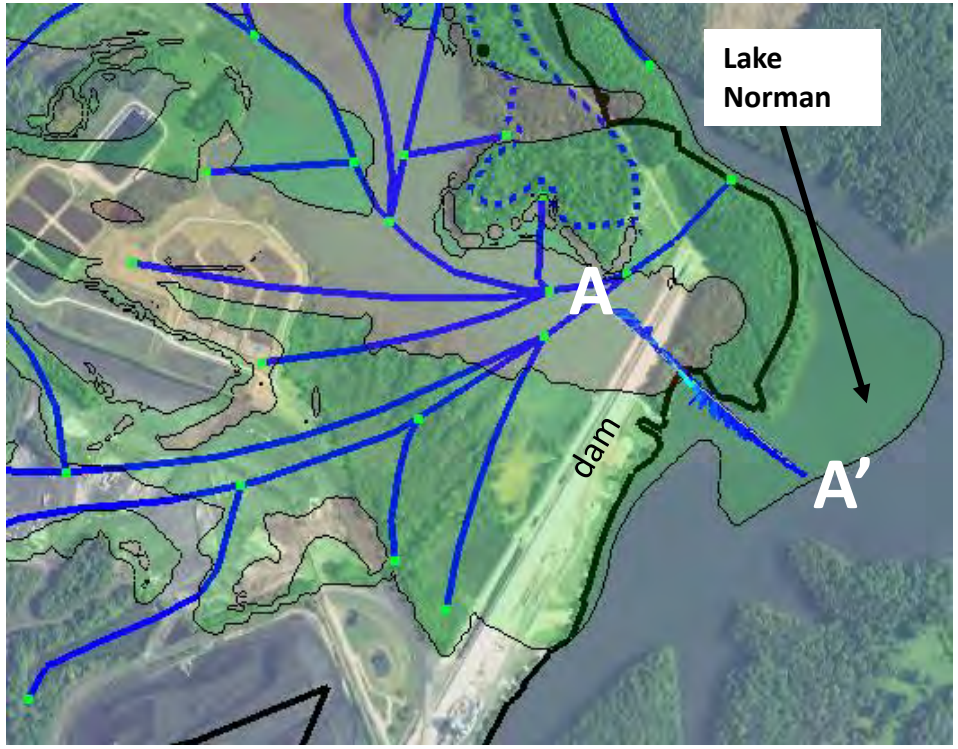
Saprolite 5-7

TZ 8

Bedrock 9-20

Vertical exaggeration X 3





A-A' ~1200 ft

MARSHALL **UPON COMPLETION OF HYBRID IN 2030, t = 0**

CROSS SECTION A-A' (VIEWED FROM SW SIDE OF DAM LOOKING NE)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Marshall model layers:

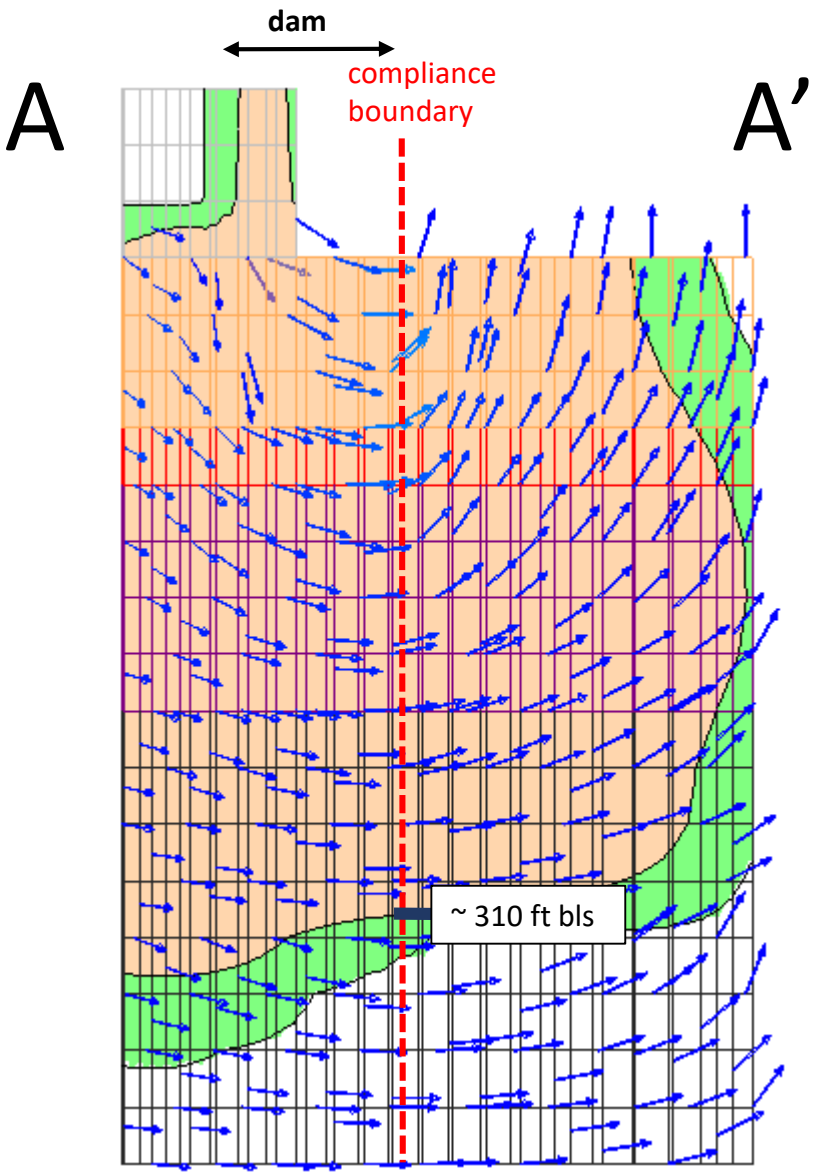
Ash 1-4

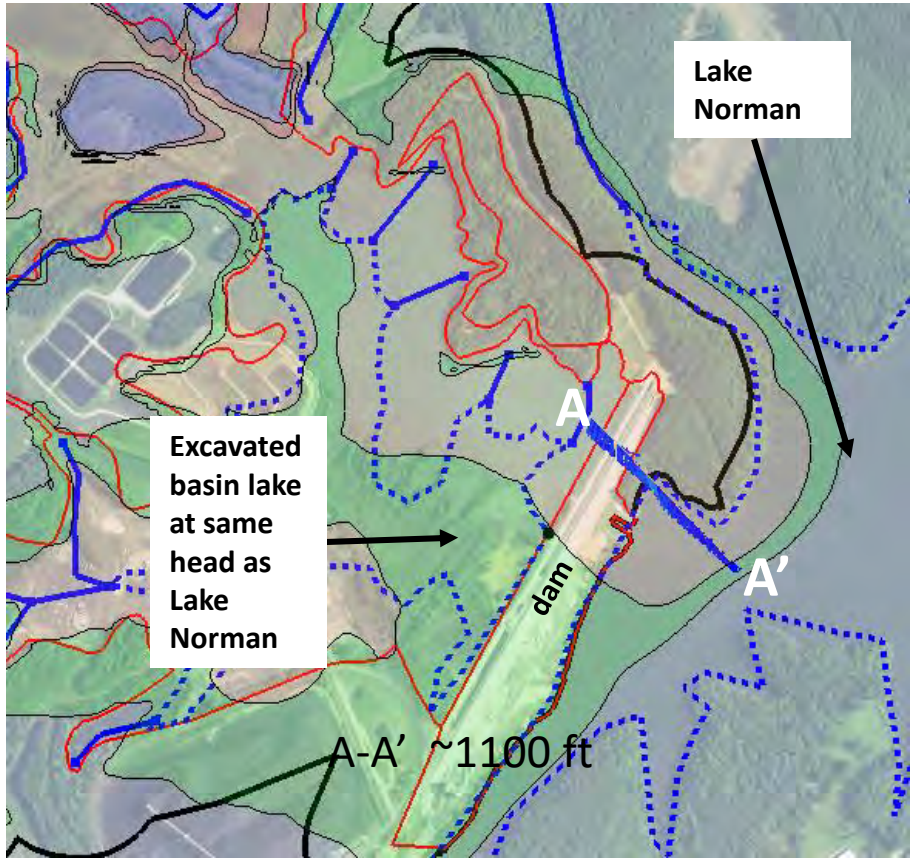
Saprolite 5-7

TZ 8

Bedrock 9-20

Vertical exaggeration X 3





MARSHALL **HYBRID IN 2150, t = 120 years**

CROSS SECTION A-A' (VIEWED FROM SW SIDE OF DAM LOOKING NE)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Marshall model layers:

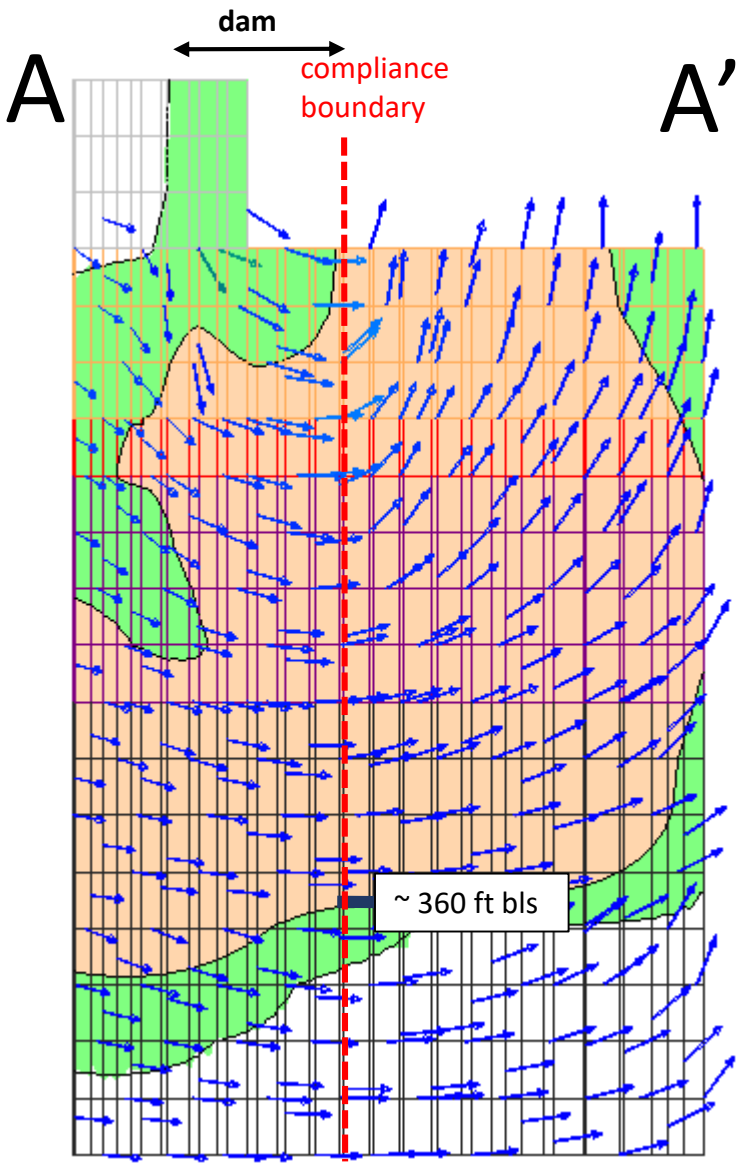
Ash 1-4

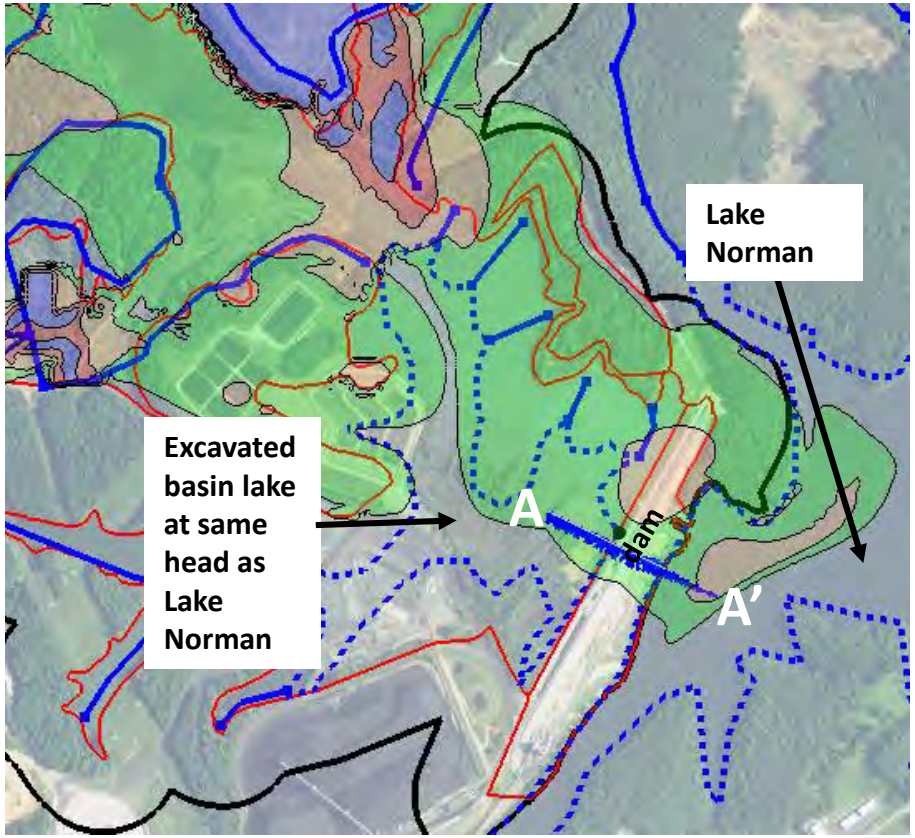
Saprolite 5-7

TZ 8

Bedrock 9-20

Vertical exaggeration X 3





A-A' ~1200 ft

ATTACHMENT B

RESPONSE TO COMMENTS

RESPONSE TO COMMENTS

I. Summary of Responses to Comments

The North Carolina Department of Environmental Quality (DEQ) received approximately 1,100 public comments regarding the closure options for coal combustion residuals (CCR) surface impoundments at Duke Energy's Marshall Steam Station. The overwhelming majority of comments received expressed a preference for excavation and removal to dry-lined storage. The majority of these comments did not specify whether the storage should be on or off-site, but instead requested that it be "away from our waterways and out of our groundwater." A minority of comments expressed support for excavation and specified a preference for on-site disposal in a lined landfill, provided additional feedback on other issues related to the closure process, or expressed additional concerns related to coal ash.

II. Detailed Responses to Comments

A. Comments Opposing Cap in Place

Comment: Many comments opposed allowing Duke Energy to cap the existing ash in its current location and supported excavation.

Response: DEQ agrees with these concerns and has determined that the CCR surface impoundments at Marshall must be excavated.

Comment: One comment opposed "cap in place" and requested that DEQ perform an independent analysis that "identifies the safest closure option for the long-term protection of water supplies."

Response: DEQ agrees with these concerns and has determined that the CCR surface impoundments at Marshall must be excavated.

Comment: One comment opposed "cap in place" and stated that professionals recommend storage in lined landfills. This comment also raised concerns about a lack of research regarding future impacts from beneficial reuse in building materials and expressed an opinion that Duke Energy should not be able to pass cleanup costs on to consumers.

Response: DEQ understands these concerns and has determined that the CCR surface impoundments at Marshall must be excavated. DEQ will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act. Analysis and evaluation of beneficial reuse may be included in the closure plan. The issue of cost is not within the purview of DEQ. Instead, this issue rests with the North Carolina Utilities Commission.

Comment: A commenter submitted an extensive written comment urging DEQ to require the Marshall coal ash basins to be excavated to a lined landfill to protect the environment and human health.

The commenter claimed coal ash impoundments at Marshall are not eligible for closure-in-place under CAMA. The commenter alleged that closure-in-place violates the North Carolina groundwater rule. The commenter sets out several arguments it believes support that claim: 1) Duke Energy's modelling demonstrates it will not meet groundwater standards if it chooses closure-in-place; 2) Duke Energy's modelling underestimates the extent of contamination; 3) Duke Energy tested groundwater compliance at the wrong location; 4) the groundwater rule prohibits closure-in-place because the coal ash will contribute to violations of the groundwater standard for centuries; and 5) closure-in-place is unavailable because it will not restore groundwater to the legal standard.

The commenter next claimed that coal ash impoundments at Marshall are not eligible for closure-in-place under the Coal Combustion Residuals (CCR) rule. The commenter alleged that: 1) the CCR rules' performance standards require separating ash from the groundwater and precluding its future impoundment; and 2) the CCR rules' corrective action requirements preclude closure-in-place.

The commenter continues by asserting that DEQ must base its closure determination on effectiveness and not cost to the polluter. The commenter further maintains that DEQ should reject Duke Energy's "Community Impact Analysis." The commenter claims that Duke's Energy's report downplays well-established pollution risks and exaggerates the impact on communities of excavating and trucking material to offsite landfills. Further, they claim that diesel emissions do not meaningfully distinguish between closure methods and that the report's habitat analysis is flawed. The commenter concludes by questioning the validity of Duke Energy's closure options scoring system - and offers its own analysis to demonstrate why it believes Duke Energy manipulated scores to suit a desired outcome.

Response: DEQ understands these concerns and has determined that the CCR surface impoundments at Marshall must be excavated.

B. Comments Supporting Excavation

Comment: Many comments supported excavation but did not express a preference for final disposition of the excavated materials.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station.

Comment: One comment supported excavation and implementation of a requirement to publicly disclose the presence of contaminants and associated risks to current residents as well as potential new residents/buyers.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. The Department is not aware of legal authority that would enable it to require Duke Energy to provide the type of notice requested in this comment.

Comment: Several comments supported excavation and secure disposal of the excavated materials but did not express a preference for what secure disposal would entail.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station.

Comment: One comment expressed support for excavation and legislative action to prevent Duke Energy from escaping liability for future problems associated with the site.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. As an executive branch agency, DEQ does not have the ability to implement legislative action.

Comment: One comment expressed support for excavation as a long term solution, while expressing the opinion that the other options would only serve as short term solutions.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station.

Comment: Multiple comments expressed support for excavation, but expressed concern over the timeframe for completion or compliance.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. However, the North Carolina General Assembly has set forth the timeframe for completion of this process through the Coal Ash Management Act.

Comment: One comment expressed support for excavation, but expressed concern over pre-existing structural fills that utilized ash.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act. Analysis and evaluation of preexisting structural fill sites will occur separate and apart from the current proceedings.

Comment: One comment expressed support for excavation and removal to an unpopulated area outside of North Carolina.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. The Department does not have the legal authority to require Duke Energy to dispose of coal ash in an "unpopulated area outside of North Carolina."

Comment: Two comments expressed support for excavation and testing of removed material.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

Comment: One comment expressed support for total excavation, including the construction of a road through the property, but requested that total deforestation be avoided.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

C. Comments Supporting Excavation and Transport to Dry Lined Storage

Comment: The overwhelming majority of comments requested excavation to dry lined storage away from waterways and groundwater using the following form letter, or a derivation that was substantially similar.

"Dear Coal Ash Comment Administrator North Carolina DEQ: Marshall,

The North Carolina Department of Environmental Quality (DEQ) should require Duke Energy to remove its coal ash from its leaking, unlined pits and move it to dry lined storage away from our waterways and out of our groundwater.

Duke Energy plans to leave its coal ash sitting in the groundwater at six sites in North Carolina, where it will keep polluting our groundwater, lakes, and rivers. Recent monitoring shows Duke Energy is polluting the groundwater at its coal ash ponds in North Carolina with toxic and radioactive materials. We need cleanup—not coverup!

The communities around the coal ash ponds have come out time after time over the last several years, making clear that we're concerned about pollution from Duke Energy's coal ash and want Duke Energy to get its coal ash out of its unlined, leaking pits. It is long past time for DEQ and Duke Energy to listen to the communities.

Duke Energy is already required to remove its coal ash at eight other sites in North Carolina and all of its sites in South Carolina—our families and our community deserve the same protections."

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ will continue to take this and future

comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

Comment: Many (non-form letter) comments also requested excavation to dry lined storage or landfills away from waterways.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

Comment: Many comments requested excavation to off-site dry lined storage. One specific comment went into significant detail about the commenters concerns regarding the usage of existing on-site storage options.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ has not yet made a decision regarding location for final disposition. DEQ will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

D. Comments Supporting Excavation and Removal to On-Site Dry Lined Storage

Comment: One comment expressed support for excavation and transport to dry lined storage on Duke Energy property but requested that the distance the ash is moved be minimized.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ has not yet made a decision regarding location for final disposition. DEQ will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

Comment: Numerous commenters submitted the following form letter requesting excavation and on-site dry lined storage, or a derivation that was substantially similar.

> Marshall Steam Station Comments
> N.C. Department of Environmental Quality
> RE: Public Comment on the Marshall Coal Ash Cleanup
> • DEQ should require Duke Energy to remove its coal ash from its leaking, unlined pit and move it to dry, lined storage on its own property — away from Lake Norman and out of our groundwater.
>
> • Duke Energy plans to leave its coal ash sitting in the groundwater at Marshall, where it will keep polluting our groundwater, streams and rivers. Recent monitoring shows Duke Energy is polluting the groundwater surrounding Marshall with toxic and radioactive materials. We need cleanup—not coverup!

• The community has come out time after time over the last several years, making clear that we're concerned about pollution from Duke Energy's coal ash and want Duke Energy to get its coal ash out of its unlined, leaking pits. It is long past time for DEQ and Duke Energy to remove the ash.

• Duke Energy is already required to remove its coal ash from eight other communities in North Carolina and all of its sites in South Carolina, and the governor of Virginia recently called for all the coal ash to be removed from Dominion's unlined sites—our families and our community deserve the same protections.

• Duke Energy can dispose all the ash from its leaking pond onsite in safe, dry, lined storage. Ash will not travel through the community or to other communities.

• Duke cannot exaggerate traffic concerns while downplaying the community's real concern: Duke Energy's water pollution. None of these plans will have a significant increase in offsite trucking, but only excavation will remove the source of the water pollution.

• Duke Energy's own experts know that even cap-in-place will involve trucking construction materials to the site—just like any other construction project. But even under their estimates, the additional trucking impacts are minimal. Excavation would cause only a 4% increase in daily truck traffic on community roads compared to a 7% increase for the duration of the cap-in-place scenario.

• It is past time for DEQ to listen to the community—not Duke Energy's consultants—about what our community needs. We need Duke to clean up its coal ash and stop the water pollution.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ has not yet made a decision regarding location for final disposition. DEQ will continue to take this and other comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

E. Comments in Support of Beneficial Reuse

Comment: Several comments supported excavation of ash to a lined landfill or being recycled into concrete or other building materials.

Response: DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ agrees that it is proper for Duke Energy to consider possible methods to beneficiate coal ash into a product.

Comment: One comment requested the ash be recycled into concrete but did not express any opinions on other closure plans.

Response: DEQ agrees that it is proper for Duke Energy to consider possible methods to beneficiate coal ash into a product.

F. Other Comments

Comment: Numerous comments cited concerns or personal experiences with thyroid cancer and other risks, stating that it was DEQ's responsibility to protect the public. Most comments citing these concerns expressed a preference for excavation.

Response: DEQ understands and appreciates the need for a remedy that addresses adverse impacts to water quality, human health, and the environment. DEQ will require Duke Energy to comply with all applicable laws and regulations during the closure process. At this time, DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station.

Comment: Several comments expressed concerns with Duke Energy passing on removal costs to consumers or requested that Duke Energy pay all costs of the cleanup.

Response: This issue is not within the purview of DEQ. Instead, this issue rests with the North Carolina Utilities Commission.

Comment: Several comments expressed concerns with or complaints regarding the public meeting process (preparedness, information presented, brevity of presentation, lack of answers to questions) or requested that DEQ provide additional information to the public.

Response: DEQ will take this feedback into account for future public meetings.

Comment: One comment requested additional information regarding effective filtration systems.

Response: DEQ does not typically identify or require specific filtration systems or products.

Comment: Several comments did not express a preference for a specific closure option but requested that DEQ clean up, or make sure that Duke Energy cleans up, the Marshall Steam Station site.

Response: DEQ will require Duke Energy to comply with all applicable laws and regulations during the closure process.

Comment: Several comments requested cleanup of a potential ash site near Lake Norman High School.

Response: DEQ has been made aware of this concern and will investigate.

Comment: Several comments expressed concern with Duke Energy clearcutting forest during the cleanup process.

Response: DEQ understands this concern and will continue to protect the natural resources of the State of North Carolina. DEQ will require Duke Energy to comply with all applicable laws and regulations during the closure process. DEQ will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

Comment: Several comments expressed concerns with ancillary impacts of closure, including air quality and traffic.

Response: DEQ will require Duke Energy to comply with all applicable laws and regulations during the closure process. DEQ will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

Comment: One comment provided an in-depth analysis regarding options pertaining to different types of capping in place and expressed an opinion that, if a site were capped in place, an evaluation of all technologies available for dewatering should be considered.

Response: DEQ appreciates the information presented and will continue to take this and future comments into consideration when evaluating closure plans submitted by Duke, as required by the Coal Ash Management Act.

Comment: Several comments raised concerns regarding worker safety in and around ash basins.

Response: DEQ appreciates this concern and will take these comments into consideration when it reviews Duke Energy's closure plans.

Comment: One comment requested that DEQ ignore a Duke Energy report on estimated greenhouse gas emissions associated with various closure options for the six unresolved coals ash sites. The comment claimed DEQ should disregard this submission because it was made after DEQ's deadline for Duke Energy to submit its materials and outside the public comment period, thereby denying the public an opportunity to respond to it. The comment also claimed that DEQ should disregard this submission because it is irrelevant to the decision facing DEQ, which is to select a closure method that stops the ongoing pollution and continuing threat to our water resources posed by Duke Energy's leaking coal ash basins.

Response: At this time, DEQ has determined that coal ash must be excavated and removed from CCR surface impoundments at the Marshall Steam Station. DEQ will require Duke Energy to comply with all applicable laws and regulations during the closure process.

I/A

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2013

SESSION LAW 2014-122
SENATE BILL 729

AN ACT TO (1) PROHIBIT RECOVERY OF COSTS RELATED TO UNLAWFUL DISCHARGES FROM COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS; (2) ESTABLISH A MORATORIUM ON CERTAIN RATE CASES; (3) CREATE THE COAL ASH MANAGEMENT COMMISSION TO REVIEW AND APPROVE COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS CLASSIFICATIONS AND CLOSURE PLANS AND OTHERWISE STUDY AND MAKE RECOMMENDATIONS ON LAWS GOVERNING MANAGEMENT OF COAL COMBUSTION RESIDUALS; (4) REQUIRE EXPEDITED REVIEW BY THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES OF ANY PERMIT NECESSARY TO CONDUCT ACTIVITIES REQUIRED BY THIS ACT; (5) ESTABLISH VARIOUS REPORTING REQUIREMENTS TO THE GENERAL ASSEMBLY, INCLUDING A QUARTERLY REPORT FROM THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES ON ITS OPERATIONS, ACTIVITIES, PROGRAMS, AND PROGRESS WITH RESPECT TO ITS OBLIGATIONS UNDER THIS ACT FOR COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS; (6) PROHIBIT LOCAL GOVERNMENT REGULATION OF MANAGEMENT OF COAL COMBUSTION RESIDUALS OR COAL COMBUSTION PRODUCTS; (7) PROHIBIT CONSTRUCTION OF NEW OR EXPANSION OF EXISTING COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS EFFECTIVE OCTOBER 1, 2014; (8) PROHIBIT THE DISPOSAL OF COAL COMBUSTION RESIDUALS INTO COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS AT COAL-FIRED GENERATING UNITS THAT ARE NO LONGER PRODUCING COAL COMBUSTION RESIDUALS EFFECTIVE OCTOBER 1, 2014; (9) PROHIBIT DISPOSAL OF STORMWATER TO COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS EFFECTIVE DECEMBER 31, 2018; (10) REQUIRE ALL ELECTRIC GENERATING FACILITIES TO CONVERT TO GENERATION OF DRY FLY ASH ON OR BEFORE DECEMBER 31, 2017, AND DRY BOTTOM ASH ON OR BEFORE DECEMBER 31, 2020, OR RETIRE; (11) REQUIRE THE ASSESSMENT OF GROUNDWATER AT COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS; (12) REQUIRE CORRECTIVE ACTION FOR THE RESTORATION OF GROUNDWATER QUALITY AT COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS; (13) REQUIRE A SURVEY OF DRINKING WATER SUPPLY WELLS AND REPLACEMENT OF CONTAMINATED WATER SUPPLIES; (14) REQUIRE THE IDENTIFICATION, ASSESSMENT, AND CORRECTION OF UNPERMITTED DISCHARGES FROM COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS; (15) REQUIRE THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES TO, AS SOON AS PRACTICABLE, BUT NO LATER THAN DECEMBER 31, 2015, PRIORITIZE FOR THE PURPOSE OF CLOSURE AND REMEDIATION COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS, INCLUDING ACTIVE AND RETIRED SITES, BASED ON THESE SITES' RISKS TO PUBLIC HEALTH, SAFETY, AND WELFARE, THE ENVIRONMENT, AND NATURAL RESOURCES; (16) REQUIRE OWNERS OF COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS TO SUBMIT A PROPOSED PLAN FOR CLOSURE OF ALL IMPOUNDMENTS TO THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES; (17) REQUIRE CLOSURE AND REMEDIATION OF CERTAIN COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS AS SOON AS PRACTICABLE, BUT NO LATER THAN AUGUST 1, 2019; (18) REQUIRE THE

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES TO ESTABLISH A SCHEDULE AND PROCESS FOR CLOSURE AND REMEDIATION OF ALL COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS BASED UPON THE DEPARTMENT'S RISK ASSESSMENT OF THESE SITES, BASELINE REQUIREMENTS SET BY THE GENERAL ASSEMBLY, EVALUATION OF PROPOSED CLOSURE PLANS SUBMITTED BY IMPOUNDMENT OWNERS, AND INPUT FROM THE PUBLIC AND OTHER STAKEHOLDERS; (19) ESTABLISH MINIMUM STATUTORY REQUIREMENTS FOR STRUCTURAL FILL PROJECTS USING COAL COMBUSTION PRODUCTS AND REQUIRE THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES TO INVENTORY AND INSPECT CERTAIN STRUCTURAL FILL PROJECTS; (20) PLACE A MORATORIUM ON CERTAIN PROJECTS USING COAL COMBUSTION PRODUCTS AS STRUCTURAL FILL UNTIL AUGUST 1, 2015, AND DIRECT THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES AND THE ENVIRONMENTAL MANAGEMENT COMMISSION TO STUDY THE ADEQUACY OF CURRENT LAW GOVERNING USE OF COAL COMBUSTION PRODUCTS AS STRUCTURAL FILL AND FOR BENEFICIAL USE; (21) PLACE A MORATORIUM ON THE EXPANSION AND CONSTRUCTION OF COAL COMBUSTION RESIDUALS LANDFILLS UNTIL AUGUST 1, 2015, AND DIRECT THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES TO ASSESS THE RISKS TO PUBLIC HEALTH, SAFETY, AND WELFARE, THE ENVIRONMENT, AND NATURAL RESOURCES OF COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS LOCATED BENEATH THESE LANDFILLS TO DETERMINE THE ADVISABILITY OF CONTINUED OPERATION OF THESE LANDFILLS; (22) STRENGTHEN THE REPORTING AND NOTIFICATION REQUIREMENTS APPLICABLE TO DISCHARGES OF WASTEWATER TO WATERS OF THE STATE; (23) REQUIRE CERTAIN EMERGENCY CALLS TO BE RECORDED; (24) REQUIRE DEVELOPMENT OF EMERGENCY ACTION PLANS FOR HIGH AND INTERMEDIATE HAZARD DAMS AND AMEND OTHER DAM SAFETY LAW REQUIREMENTS APPLICABLE TO COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS; (25) TRANSFER SOLID WASTE RULE-MAKING AUTHORITY FROM COMMISSION FOR PUBLIC HEALTH TO ENVIRONMENTAL MANAGEMENT COMMISSION; (26) AMEND COMPLIANCE BOUNDARY PROVISIONS; (27) PROVIDE FOR VARIOUS STUDIES; (28) REQUIRE THE STATE CONSTRUCTION OFFICE AND THE DEPARTMENT OF TRANSPORTATION TO DEVELOP TECHNICAL SPECIFICATIONS FOR USE OF COAL COMBUSTION PRODUCTS; AND (29) PROVIDE RESOURCES FOR IMPLEMENTATION OF THIS ACT.

The General Assembly of North Carolina enacts:

PART I. PROHIBIT RECOVERY OF COSTS RELATED TO UNLAWFUL DISCHARGES FROM COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS; MORATORIUM ON RATE CASES

SECTION 1.(a) Article 7 of Chapter 62 of the General Statutes is amended by adding a new section to read:

"**§ 62-133.13. Recovery of costs related to unlawful discharges from coal combustion residuals surface impoundments to the surface waters of the State.**

The Commission shall not allow an electric public utility to recover from the retail electric customers of the State costs resulting from an unlawful discharge to the surface waters of the State from a coal combustion residuals surface impoundment, unless the Commission determines the discharge was due to an event of force majeure. For the purposes of this section, "coal combustion residuals surface impoundments" has the same meaning as in G.S. 130A-309.201. For the purposes of this section, "unlawful discharge" means a discharge that results in a violation of State or federal surface water quality standards."

SECTION 1.(b) Section 1(a) of this act is effective when it becomes law and applies to discharges occurring on or after January 1, 2014.

SECTION 2.(a) Moratorium on Cost Recovery. – The Utilities Commission shall not issue an order authorizing an electric public utility the recovery of any costs related to coal

combustion residuals surface impoundments that were not included in the utility's cost of service approved in its most recent general rate case until the end of the moratorium provided in this section. Nothing in this section prohibits the utility from seeking, nor prohibits the Commission from authorizing under its existing authority, a deferral for costs related to coal ash combustion residual surface impoundments. The moratorium established under this section shall not apply to the net recovery of any fuel and fuel-related costs under G.S. 62-133.2. For the purposes of this section, "coal combustion residuals surface impoundments" has the same meaning as in G.S. 130A-309.201. The moratorium in this section shall end January 15, 2015.

SECTION 2.(b) Purpose of Moratorium. – The purpose of the moratorium is to allow the State to study the disposition of coal combustion residuals surface impoundments, including any final rules adopted by the United States Environmental Protection Agency on the regulation of coal combustion residuals.

PART II. PROVISIONS FOR COMPREHENSIVE MANAGEMENT OF COAL COMBUSTION RESIDUALS

SECTION 3.(a) Article 9 of Chapter 130A of the General Statutes is amended by adding a new Part to read:

"Part 2I. Coal Ash Management.

"Subpart 1. Short Title, Definitions, and General Provisions.

"**§ 130A-309.200. Title.**

This Part may be cited as the "Coal Ash Management Act of 2014."

"**§ 130A-309.201. Definitions.**

Unless a different meaning is required by the context, the definitions of G.S. 130A-290 and the following definitions apply throughout this Part:

(1) "Beneficial and beneficial use" means projects promoting public health and environmental protection, offering equivalent success relative to other alternatives, and preserving natural resources.

(2) "Boiler slag" means the molten bottom ash collected at the base of slag tap and cyclone type furnaces that is quenched with water. It is made up of hard, black, angular particles that have a smooth, glassy appearance.

(3) "Bottom ash" means the agglomerated, angular ash particles formed in pulverized coal furnaces that are too large to be carried in the flue gases and collect on the furnace walls or fall through open grates to an ash hopper at the bottom of the furnace.

(4) "Coal combustion products" means fly ash, bottom ash, boiler slag, or flue gas desulfurization materials that are beneficially used, including use for structural fill.

(5) "Coal combustion residuals" has the same meaning as defined in G.S. 130A-290.

(6) "Coal combustion residuals surface impoundment" means a topographic depression, excavation, or diked area that is (i) primarily formed from earthen materials; (ii) without a base liner approved for use by Article 9 of Chapter 130A of the General Statutes or rules adopted thereunder for a combustion products landfill or coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill; and (iii) designed to hold accumulated coal combustion residuals in the form of liquid wastes, wastes containing free liquids, or sludges, and that is not backfilled or otherwise covered during periods of deposition. "Coal combustion residuals surface impoundment" shall only include impoundments owned by a public utility, as defined in G.S. 62-3. "Coal combustion residuals surface impoundment" includes all of the following:

a. An impoundment that is dry due to the deposited liquid having evaporated, volatilized, or leached.

b. An impoundment that is wet with exposed liquid.

c. Lagoons, ponds, aeration pits, settling ponds, tailings ponds, and sludge pits, when these structures are designed to hold accumulated coal combustion residuals.

d. A coal combustion residuals surface impoundment that has been covered with soil or other material after the final deposition of coal combustion residuals at the impoundment.

(7) "Commission" means the Environmental Management Commission.

(8) "Fly ash" means the very fine, powdery material, composed mostly of silica with nearly all particles spherical in shape, which is a product of burning finely ground coal in a boiler to produce electricity and is removed from the plant exhaust gases by air emission control devices.

(9) "Flue gas desulfurization material" means the material produced through a process used to reduce sulfur dioxide emissions from the exhaust gas system of a coal-fired boiler. The physical nature of these materials varies from a wet sludge to a dry powdered material, depending on the process, and their composition comprises either sulfites, sulfates, or a mixture thereof.

(10) "Minerals" means soil, clay, coal, phosphate, metallic ore, and any other solid material or substance of commercial value found in natural deposits on or in the earth.

(11) "Open pit mine" means an excavation made at the surface of the ground for the purpose of extracting minerals, inorganic and organic, from their natural deposits, which excavation is open to the surface.

(12) "Owner" or "owner of a coal combustion residuals surface impoundment" means a public utility, as defined in G.S. 62-3, that owns a coal combustion residuals surface impoundment.

(13) "Receptor" means any human, plant, animal, or structure which is, or has the potential to be, affected by the release or migration of contaminants. Any well constructed for the purpose of monitoring groundwater and contaminant concentrations shall not be considered a receptor.

(14) "Structural fill" means an engineered fill with a projected beneficial end use constructed using coal combustion products that are properly placed and compacted. For purposes of this Part, the term includes fill used to reclaim open pit mines and for embankments, greenscapes, foundations, construction foundations, and for bases or sub-bases under a structure or a footprint of a paved road, parking lot, sidewalk, walkway, or similar structure.

(15) "Use or reuse of coal combustion products" means the procedure whereby coal combustion products are directly used as either of the following:

a. As an ingredient in an industrial process to make a product, unless distinct components of the coal combustion products are recovered as separate end products.

b. In a function or application as an effective substitute for a commercial product or natural resource.

"**§ 130A-309.202. Coal Ash Management Commission.**

(a) Creation. – In recognition of the complexity and magnitude of the issues associated with the management of coal combustion residuals and the proper closure and remediation of coal combustion residuals surface impoundments, the Coal Ash Management Commission is hereby established.

(b) Membership. – The Commission shall consist of nine members as follows:

(1) One appointed by the General Assembly upon recommendation of the President Pro Tempore of the Senate in accordance with G.S. 120-121 who shall at the time of appointment be a resident of the State.

(2) One appointed by the General Assembly upon recommendation of the President Pro Tempore of the Senate in accordance with G.S. 120-121 who shall at the time of appointment have special training or scientific expertise in waste management, including solid waste disposal, hauling, or beneficial use.

(3) One appointed by the General Assembly upon recommendation of the President Pro Tempore of the Senate in accordance with G.S. 120-121 who shall at the time of appointment be a licensed physician or a person with experience in public health.

(4) One appointed by the General Assembly upon recommendation of the Speaker of the House of Representatives in accordance with G.S. 120-121

who shall at the time of appointment be a member of a nongovernmental conservation interest.

(5) One appointed by the General Assembly upon recommendation of the Speaker of the House of Representatives in accordance with G.S. 120-121 who shall at the time of appointment have special training or scientific expertise in waste management, including solid waste disposal, hauling, or beneficial use, or is a representative of or on the faculty of a State college or university that conducts coal ash research.

(6) One appointed by the General Assembly upon recommendation of the Speaker of the House of Representatives in accordance with G.S. 120-121 who shall at the time of appointment be a representative of an electric membership corporation organized under Article 2 of Chapter 117 of the General Statutes and have a background in power supply resource planning and engineering.

(7) One appointed by the Governor who shall at the time of appointment have experience in economic development.

(8) One appointed by the Governor who shall at the time of appointment have expertise in determining and evaluating the costs associated with electricity generation and establishing the rates associated with electricity consumption.

(9) One appointed by the Governor who shall at the time of appointment be a person with experience in science or engineering in the manufacturing sector.

(c) Chair. – The Governor shall appoint the Chair of the Commission from among the Commission's members, and that person shall serve at the pleasure of the Governor. The Chair shall serve two-year terms. The Governor shall make:

(1) The initial appointment of the Chair no later than October 1, 2014. If the initial appointment is not made by that date, the Chair shall be elected by a vote of the membership; and

(2) Appointments of a subsequent Chair, including appointments to fill a vacancy of the Chair created by resignation, dismissal, death, or disability of the Chair, no later than 30 days after the last day of the previous Chair's term. If an appointment of a subsequent Chair is not made by that date, the Chair shall be elected by a vote of the membership.

(d) Vacancies. – Any appointment to fill a vacancy on the Commission created by the resignation, dismissal, death, or disability of a member shall be for the balance of the unexpired term. The Governor may reappoint a gubernatorial appointee of the Commission to an additional term if, at the time of the reappointment, the member qualifies for membership on the Commission under subdivisions (7) through (9) of subsection (b) of this section. Appointments by the General Assembly shall be made in accordance with G.S. 120-121, and vacancies in those appointments shall be filled in accordance with G.S. 120-122.

(e) Removal. – The Governor shall have the power to remove any member of the Commission from office for misfeasance, malfeasance, or nonfeasance in accordance with the provisions of G.S. 143B-13 of the Executive Organization Act of 1973.

(f) Powers and Duties. – The Commission shall have all of the following powers and duties:

(1) To review and approve the classification of coal combustion residuals surface impoundments required by G.S. 130A-309.211.

(2) To review and approve Coal Combustion Residuals Surface Impoundment Closure Plans as provided in G.S. 130A-309.212.

(3) To review and make recommendations on the provisions of this Part and other statutes and rules related to the management of coal combustion residuals.

(4) To undertake any additional studies as requested by the General Assembly.

(g) Reimbursement. – The members of the Commission shall receive per diem and necessary travel and subsistence expenses in accordance with the provisions of G.S. 138-5.

(h) Quorum. – Five members of the Commission shall constitute a quorum for the transaction of business.

(i) Staff. – The Commission is authorized and empowered to employ staff as the Commission may determine to be necessary for the proper discharge of the Commission's

duties and responsibilities. The Chair of the Commission shall organize and direct the work of the Commission staff. The salaries and compensation of all such personnel shall be fixed in the manner provided by law for fixing and regulating salaries and compensation by other State agencies. The Chair, within allowed budgetary limits and as allowed by law, shall authorize and approve travel, subsistence, and related expenses of such personnel incurred while traveling on official business. All State agencies, including the constituent institutions of The University of North Carolina, shall provide information and support to the Commission upon request.

(j) Conflicts of Interest; Disclosure. – The Governor shall require adequate disclosure of potential conflicts of interest by members. The Governor, by executive order, shall promulgate criteria regarding conflicts of interest and disclosure thereof for determining the eligibility of persons under this subsection, giving due regard to the requirements of federal legislation and, for this purpose, may promulgate rules, regulations, or guidelines in conformance with those established by any federal agency interpreting and applying provisions of federal law.

(k) Covered Persons. – All members of the Commission are covered persons for the purposes of Chapter 138A of the General Statutes, the State Government Ethics Act. As covered persons, members of the Commission shall comply with the applicable requirements of the State Government Ethics Act, including mandatory training, the public disclosure of economic interests, and ethical standards for covered persons. Members of the Commission shall comply with the provisions of the State Government Ethics Act to avoid conflicts of interest.

(l) Meetings. – The Commission shall meet at least once every two months and may hold special meetings at any time and place within the State at the call of the Chair or upon the written request of at least five members.

(m) Reports. – The Commission shall submit quarterly written reports as to its operation, activities, programs, and progress to the Environmental Review Commission. The Commission shall supplement the written reports required by this subsection with additional written and oral reports as may be requested by the Environmental Review Commission. The Commission shall submit the written reports required by this subsection whether or not the General Assembly is in session at the time the report is due.

(n) Administrative Location; Independence. – The Commission shall be administratively located in the Division of Emergency Management of the Department of Public Safety. The Commission shall exercise all of its powers and duties independently and shall not be subject to the supervision, direction, or control of the Division or Department.

(o) Terms of Members. – Members of the Commission shall serve terms of six years, beginning effective July 1 of the year of appointment.

"**§ 130A-309.203. Expedited permit review.**

(a) The Department shall act as expeditiously as practicable, but no later than the deadlines established under subsection (b) of this section, except in compliance with subsection (c) of this section, to issue all permits necessary to conduct activities required by this Part.

(b) Notwithstanding G.S. 130A-295.8(e), the Department shall determine whether an application for any permit necessary to conduct activities required by this Part is complete within 30 days after the Department receives the application for the permit. A determination of completeness means that the application includes all required components but does not mean that the required components provide all of the information that is required for the Department to make a decision on the application. If the Department determines that an application is not complete, the Department shall notify the applicant of the components needed to complete the application. An applicant may submit additional information to the Department to cure the deficiencies in the application. The Department shall make a final determination as to whether the application is complete within the later of (i) 30 days after the Department receives the application for the permit less the number of days that the applicant uses to provide the additional information or (ii) 10 days after the Department receives the additional information from the applicant. The Department shall issue a draft permit decision on an application for a permit within 90 days after the Department determines that the application is complete. The Department shall hold a public hearing and accept written comment on the draft permit decision for a period of not less than 30 or more than 60 days after the Department issues a draft permit decision. The Department shall issue a final permit decision on an application for a permit within 60 days after the comment period on the draft permit decision closes. If the

Department fails to act within any time period set out in this subsection, the applicant may treat the failure to act as a denial of the permit and may challenge the denial as provided in Chapter 150B of the General Statutes.

(c) If the Department finds that compliance with the deadlines established under subsection (b) of this section would result in insufficient review of a permit application that would pose a risk to public health, safety, and welfare; the environment; or natural resources, the applicable deadline shall be waived for the application as necessary to allow for adequate review. If a deadline is waived pursuant to this subsection, the Secretary shall issue a written declaration, including findings of fact, documenting the need for the waiver.

(d) Notwithstanding any other provision of this section or any other provision of law, the Department shall either issue or deny a permit required for dewatering of a retired impoundment within 90 days of receipt of a completed application, in such a form and including such information as the Department may prescribe, for the dewatering activities. The Department shall accept written comment on a draft permit decision for a period of not less than 30 days or more than 60 days prior to issuance or denial of such a permit. If the Department fails to act within any time period set out in this subsection, the applicant may treat the failure to act as a denial of the permit and may challenge the denial as provided in Chapter 150B of the General Statutes.

"**§ 130A-309.204. Reports.**

(a) The Department shall submit quarterly written reports to the Environmental Review Commission and the Coal Ash Management Commission on its operations, activities, programs, and progress with respect to its obligations under this Part concerning all coal combustion residuals surface impoundments. At a minimum, the report shall include information concerning the status of assessment, corrective action, prioritization, and closure for each coal combustion residuals surface impoundment and information on costs connected therewith. The report shall include an executive summary of each annual Groundwater Protection and Restoration Report submitted to the Department by the operator of any coal combustion residuals surface impoundments pursuant to G.S. 130A-309.209(d) and a summary of all groundwater sampling, protection, and restoration activities related to the impoundment for the preceding year. The report shall also include an executive summary of each annual Surface Water Protection and Restoration Report submitted to the Department by the operator of any coal combustion residuals surface impoundments pursuant to G.S. 130A-309.210(e) and a summary of all surface water sampling, protection, and restoration activities related to the impoundment for the preceding year, including the status of the identification, assessment, and correction of unpermitted discharges from coal combustion residuals surface impoundments to the surface waters of the State. The Department shall supplement the written reports required by this subsection with additional written and oral reports as may be requested by the Environmental Review Commission. The Department shall submit the written reports required by this subsection whether or not the General Assembly is in session at the time the report is due.

(b) On or before October 1 of each year, the Department shall report to each member of the General Assembly who has a coal combustion residuals surface impoundment in the member's district. This report shall include the location of each impoundment in the member's district, the amount of coal combustion residuals known or believed to be located in the impoundment, the last action taken at the impoundment, and the date of that last action.

(c) On or before October 1 of each year, a public utility generating coal combustion residuals and coal combustion products shall submit an annual summary to the Department. The annual summary shall be for the period of July 1 through June 30 and shall include all of the following:

(1) The volume of coal combustion residuals and products produced.
(2) The volume of coal combustion residuals disposed.
(3) The volume of coal combustion products used in structural fill projects.
(4) The volume of coal combustion products beneficially used, other than for structural fill.

"**§ 130A-309.205. Local ordinances regulating management of coal combustion residuals and coal combustion products invalid; petition to preempt local ordinance.**

(a) It is the intent of the General Assembly to maintain a uniform system for the management of coal combustion residuals and coal combustion products, including matters of disposal and beneficial use, and to place limitations upon the exercise by all units of local

government in North Carolina of the power to regulate the management of coal combustion residuals and coal combustion products by means of ordinances, property restrictions, zoning regulations, or otherwise. Notwithstanding any authority granted to counties, municipalities, or other local authorities to adopt local ordinances, including those imposing taxes, fees, or charges or regulating health, environment, or land use, all provisions of local ordinances, including those regulating land use, adopted by counties, municipalities, or other local authorities that regulate or have the effect of regulating the management of coal combustion residuals and coal combustion products, including regulation of carbon burn-out plants, within the jurisdiction of a local government are invalidated, to the extent necessary to effectuate the purposes of this Part, that do the following:

(1) Place any restriction or condition not placed by this Part upon management of coal combustion residuals or coal combustion products within any county, city, or other political subdivision.

(2) Conflict or are in any manner inconsistent with the provisions of this Part.

(b) If a local zoning or land-use ordinance imposes requirements, restrictions, or conditions that are generally applicable to development, including, but not limited to, setback, buffer, and stormwater requirements, and coal combustion residuals and coal combustion products would be regulated under the ordinance of general applicability, the operator of the proposed activities may petition the Environmental Management Commission to review the matter. After receipt of a petition, the Commission shall hold a hearing in accordance with the procedures in subsection (c) of this section and shall determine whether or to what extent to preempt the local ordinance to allow for the management of coal combustion residuals and coal combustion products.

(c) When a petition described in subsection (b) of this section has been filed with the Environmental Management Commission, the Commission shall hold a public hearing to consider the petition. The public hearing shall be held in the affected locality within 60 days after receipt of the petition by the Commission. The Commission shall give notice of the public hearing by both of the following means:

(1) Publication in a newspaper or newspapers having general circulation in the county or counties where the activities are to be conducted, once a week for three consecutive weeks, the first notice appearing at least 30 days prior to the scheduled date of the hearing.

(2) First-class mail to persons who have requested notice. The Commission shall maintain a mailing list of persons who request notice in advance of the hearing pursuant to this section. Notice by mail shall be complete upon deposit of a copy of the notice in a postage-paid wrapper addressed to the person to be notified at the address that appears on the mailing list maintained by the Commission in a post office or official depository under the exclusive care and custody of the United States Postal Service.

(d) Any interested person may appear before the Environmental Management Commission at the hearing to offer testimony. In addition to testimony before the Commission, any interested person may submit written evidence to the Commission for the Commission's consideration. At least 20 days shall be allowed for receipt of written comment following the hearing.

(e) A local zoning or land-use ordinance is presumed to be valid and enforceable to the extent the zoning or land-use ordinance imposes requirements, restrictions, or conditions that are generally applicable to development, including, but not limited to, setback, buffer, and stormwater requirements, unless the Environmental Management Commission makes a finding of fact to the contrary. The Commission shall determine whether or to what extent to preempt local ordinances so as to allow the project involving management of coal combustion residuals and coal combustion products no later than 60 days after conclusion of the hearing. The Commission shall preempt a local ordinance only if the Commission makes all of the following findings:

(1) That there is a local ordinance that would regulate the management of coal combustion residuals and coal combustion products.

(2) That all legally required State and federal permits or approvals have been issued by the appropriate State and federal agencies or that all State and federal permit requirements have been satisfied and that the permits or approvals have been denied or withheld only because of the local ordinance.

(3) That local citizens and elected officials have had adequate opportunity to participate in the permitting process.

(4) That the project involving management of coal combustion residuals and coal combustion products will not pose an unreasonable health or environmental risk to the surrounding locality and that the operator has taken or consented to take reasonable measures to avoid or manage foreseeable risks and to comply to the maximum feasible extent with applicable local ordinances.

(f) If the Environmental Management Commission does not make all of the findings under subsection (e) of this section, the Commission shall not preempt the challenged local ordinance. The Commission's decision shall be in writing and shall identify the evidence submitted to the Commission plus any additional evidence used in arriving at the decision.

(g) The decision of the Environmental Management Commission shall be final, unless a party to the action files a written appeal under Article 3 of Chapter 150B of the General Statutes, as modified by this section, within 30 days of the date of the decision. The record on appeal shall consist of all materials and information submitted to or considered by the Commission, the Commission's written decision, a complete transcript of the hearing, the specific findings required by subsection (e) of this section, and any minority positions on the specific findings required by subsection (e) of this section. The scope of judicial review shall be as set forth in G.S. 150B-51, except as this subsection provides regarding the record on appeal.

(h) If the court reverses or modifies the decision of the Environmental Management Commission, the judge shall set out in writing, which writing shall become part of the record, the reasons for the reversal or modification.

(i) In computing any period of time prescribed or allowed by the procedure in this section, the provisions of Rule 6(a) of the Rules of Civil Procedure, G.S. 1A-1, shall apply.

"**§ 130A-309.206. Federal preemption; severability.**

The provisions of this Part shall be severable, and if any phrase, clause, sentence, or provision is declared to be unconstitutional or otherwise invalid or is preempted by federal law or regulation, the validity of the remainder of this Part shall not be affected thereby.

"**§ 130A-309.207. General rule making for Part.**

The Environmental Management Commission shall adopt rules as necessary to implement the provisions of the Part. Such rules shall be exempt from the requirements of G.S. 150B-19.3.

"Subpart 2. Management of Coal Ash Residuals; Closure of Coal Ash Impoundments.

"**§ 130A-309.208. Generation, disposal, and use of coal combustion residuals.**

(a) On or after October 1, 2014, the construction of new and expansion of existing coal combustion residuals surface impoundments is prohibited.

(b) On or after October 1, 2014, the disposal of coal combustion residuals into a coal combustion residuals surface impoundment at an electric generating facility where the coal-fired generating units are no longer producing coal combustion residuals is prohibited.

(c) On or after December 31, 2018, the discharge of stormwater into a coal combustion surface impoundment at an electric generating facility where the coal-fired generating units are no longer producing coal combustion residuals is prohibited.

(d) On or after December 31, 2019, the discharge of stormwater into a coal combustion surface impoundment at an electric generating facility where the coal-fired generating units are actively producing coal combustion residuals is prohibited.

(e) On or before December 31, 2018, all electric generating facilities owned by a public utility shall convert to the disposal of "dry" fly ash or the facility shall be retired. For purposes of this subsection, the term "dry" means coal combustion residuals that are not in the form of liquid wastes, wastes containing free liquids, or sludges.

(f) On or before December 31, 2019, all electric generating facilities owned by a public utility shall convert to the disposal of "dry" bottom ash or the facility shall be retired. For purposes of this subsection, the term "dry" means coal combustion residuals that are not in the form of liquid wastes, wastes containing free liquids, or sludges.

"**§ 130A-309.209. Groundwater assessment and corrective action; drinking water supply well survey and provision of alternate water supply; reporting.**

(a) Groundwater Assessment of Coal Combustion Residuals Surface Impoundments. – The owner of a coal combustion residuals surface impoundment shall conduct groundwater monitoring and assessment as provided in this subsection. The requirements for groundwater monitoring and assessment set out in this subsection are in addition to any other groundwater

monitoring and assessment requirements applicable to the owners of coal combustion residuals surface impoundments.

(1) No later than December 31, 2014, the owner of a coal combustion residuals surface impoundment shall submit a proposed Groundwater Assessment Plan for the impoundment to the Department for its review and approval. The Groundwater Assessment Plan shall, at a minimum, provide for all of the following:

a. A description of all receptors and significant exposure pathways.

b. An assessment of the horizontal and vertical extent of soil and groundwater contamination for all contaminants confirmed to be present in groundwater in exceedance of groundwater quality standards.

c. A description of all significant factors affecting movement and transport of contaminants.

d. A description of the geological and hydrogeological features influencing the chemical and physical character of the contaminants.

e. A schedule for continued groundwater monitoring.

f. Any other information related to groundwater assessment required by the Department.

(2) The Department shall approve the Groundwater Assessment Plan if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) No later than 10 days from approval of the Groundwater Assessment Plan, the owner shall begin implementation of the Plan.

(4) No later than 180 days from approval of the Groundwater Assessment Plan, the owner shall submit a Groundwater Assessment Report to the Department. The Report shall describe all exceedances of groundwater quality standards associated with the impoundment.

(b) Corrective Action for the Restoration of Groundwater Quality. – The owner of a coal combustion residuals surface impoundment shall implement corrective action for the restoration of groundwater quality as provided in this subsection. The requirements for corrective action for the restoration of groundwater quality set out in this subsection are in addition to any other corrective action for the restoration of groundwater quality requirements applicable to the owners of coal combustion residuals surface impoundments.

(1) No later than 90 days from submission of the Groundwater Assessment Report required by subsection (a) of this section, or a time frame otherwise approved by the Department not to exceed 180 days from submission of the Groundwater Assessment Report, the owner of the coal combustion residuals surface impoundment shall submit a proposed Groundwater Corrective Action Plan to the Department for its review and approval. The Groundwater Corrective Action Plan shall provide for the restoration of groundwater in conformance with the requirements of Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code. The Groundwater Corrective Action Plan shall include, at a minimum, all of the following:

a. A description of all exceedances of the groundwater quality standards, including any exceedances that the owner asserts are the result of natural background conditions.

b. A description of the methods for restoring groundwater in conformance with the requirements of Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code and a detailed explanation of the reasons for selecting these methods.

c. Specific plans, including engineering details, for restoring groundwater quality.

d. A schedule for implementation of the Plan.

e. A monitoring plan for evaluating the effectiveness of the proposed corrective action and detecting movement of any contaminant plumes.

f. Any other information related to groundwater assessment required by the Department.

(2) The Department shall approve the Groundwater Corrective Action Plan if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) No later than 30 days from the approval of the Groundwater Corrective Action Plan, the owner shall begin implementation of the Plan in accordance with the Plan's schedule.

(c) Drinking Water Supply Well Survey and Provision of Alternate Water Supply. – No later than October 1, 2014, the owner of a coal combustion residuals surface impoundment shall conduct a Drinking Water Supply Well Survey that identifies all drinking water supply wells within one-half mile down-gradient from the established compliance boundary of the impoundment and submit the Survey to the Department. The Survey shall include well locations, the nature of water uses, available well construction details, and information regarding ownership of the wells. No later than December 1, 2014, the Department shall determine, based on the Survey, which drinking water supply wells the owner is required to sample and how frequently and for what period sampling is required. The Department shall require sampling for drinking water supply wells where data regarding groundwater quality and flow and depth in the area of any surveyed well provide a reasonable basis to predict that the quality of water from the surveyed well may be adversely impacted by constituents associated with the presence of the impoundment. No later than January 1, 2015, the owner shall initiate sampling and water quality analysis of the drinking water supply wells. A property owner may elect to have an independent third party selected from a laboratory certified by the Department's Wastewater/Groundwater Laboratory Certification program sample wells located on their property in lieu of sampling conducted by the owner of the coal combustion residuals surface impoundment. The owner of the coal combustion residuals surface impoundment shall pay for the reasonable costs of such sampling. Nothing in this subsection shall be construed to preclude or impair the right of any property owner to refuse such sampling of wells on their property. If the sampling and water quality analysis indicates that water from a drinking water supply well exceeds groundwater quality standards for constituents associated with the presence of the impoundment, the owner shall replace the contaminated drinking water supply well with an alternate supply of potable drinking water and an alternate supply of water that is safe for other household uses. The alternate supply of potable drinking water shall be supplied within 24 hours of the Department's determination that there is an exceedance of groundwater quality standards attributable to constituents associated with the presence of the impoundment. The alternate supply of water that is safe for other household uses shall be supplied within 30 days of the Department's determination that there is an exceedance of groundwater quality standards attributable to constituents associated with the presence of the impoundment. The requirement to replace a contaminated drinking water supply well with an alternate supply of potable drinking water and an alternate supply of water that is safe for other household uses set out in this subsection is in addition to any other requirements to replace a contaminated drinking water supply well with an alternate supply of potable drinking water or an alternate supply of water that is safe for other household uses applicable to the owners of coal combustion residuals surface impoundments.

(d) Reporting. – In addition to any other reporting required by the Department, the owner of a coal combustion residuals surface impoundment shall submit an annual Groundwater Protection and Restoration Report to the Department no later than January 31 of each year. The Report shall include a summary of all groundwater monitoring, protection, and restoration activities related to the impoundment for the preceding year, including the status of the Groundwater Assessment Plan, the Groundwater Assessment Report, the Groundwater Corrective Action Plan, the Drinking Water Supply Well Survey, and the replacement of any contaminated drinking water supply wells. The owner of a coal combustion residuals surface impoundment shall also submit all information required to be submitted to the Department pursuant to this section to the Coal Ash Management Commission.

"**§ 130A-309.210. Identification and assessment of discharges; correction of unpermitted discharges.**

(a) Identification of Discharges from Coal Combustion Residuals Surface Impoundments. –

(1) The owner of a coal combustion residuals surface impoundment shall identify all discharges from the impoundment as provided in this subsection. The requirements for identifying all discharges from an impoundment set out in this subsection are in addition to any other requirements for identifying discharges applicable to the owners of coal combustion residuals surface impoundments.

(2) No later than December 31, 2014, the owner of a coal combustion residuals surface impoundment shall submit a topographic map that identifies the location of all (i) outfalls from engineered channels designed or improved for the purpose of collecting water from the toe of the impoundment and (ii) seeps and weeps discharging from the impoundment that are not captured by engineered channels designed or improved for the purpose of collecting water from the toe of the impoundment to the Department. The topographic map shall comply with all of the following:

a. Be at a scale as required by the Department.

b. Specify the latitude and longitude of each toe drain outfall, seep, and weep.

c. Specify whether the discharge from each toe drain outfall, seep, and weep is continuous or intermittent.

d. Provide an average flow measurement of the discharge from each toe drain outfall, seep, and weep including a description of the method used to measure average flow.

e. Specify whether the discharge from each toe drain outfall, seep, and weep identified reaches the surface waters of the State. If the discharge from a toe drain outfall, seep, or weep reaches the surface waters of the State, the map shall specify the latitude and longitude of where the discharge reaches the surface waters of the State.

f. Include any other information related to the topographic map required by the Department.

(b) Assessment of Discharges from Coal Combustion Residuals Surface Impoundments to the Surface Waters of the State. – The owner of a coal combustion residuals surface impoundment shall conduct an assessment of discharges from the coal combustion residuals surface impoundment to the surface waters of the State as provided in this subsection. The requirements for assessment of discharges from the coal combustion residuals surface impoundment to the surface waters of the State set out in this subsection are in addition to any other requirements for the assessment of discharges from coal combustion residuals surface impoundments to surface waters of the State applicable to the owners of coal combustion residuals surface impoundments.

(1) No later than December 31, 2014, the owner of a coal combustion residuals surface impoundment shall submit a proposed Discharge Assessment Plan to the Department. The Discharge Assessment Plan shall include information sufficient to allow the Department to determine whether any discharge, including a discharge from a toe drain outfall, seep, or weep, has reached the surface waters of the State and has caused a violation of surface water quality standards. The Discharge Assessment Plan shall include, at a minimum, all of the following:

a. Upstream and downstream sampling locations within all channels that could potentially carry a discharge.

b. A description of the surface water quality analyses that will be performed.

c. A sampling schedule, including the frequency and duration of sampling activities.

d. Reporting requirements.

e. Any other information related to the assessment of discharges required by the Department.

(2) The Department shall approve the Discharge Assessment Plan if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) No later than 30 days from the approval of the Discharge Assessment Plan, the owner shall begin implementation of the Plan in accordance with the Plan's schedule.

(c) Corrective Action to Prevent Unpermitted Discharges from Coal Combustion Residuals Surface Impoundments to the Surface Waters of the State. – The owner of a coal combustion residuals surface impoundment shall implement corrective action to prevent unpermitted discharges from the coal combustion residuals surface impoundment to the surface waters of the State as provided in this subsection. The requirements for corrective action to prevent unpermitted discharges from coal combustion residuals surface impoundments to the surface waters of the State set out in this subsection are in addition to any other requirements for corrective action to prevent unpermitted discharges from coal combustion residuals surface impoundments to the surface waters of the State applicable to the owners of coal combustion residuals surface impoundments.

(1) If the Department determines, based on information provided pursuant to subsection (a) or (b) of this section, that an unpermitted discharge from a coal combustion residuals surface impoundment, including an unpermitted discharge from a toe drain outfall, seep, or weep, has reached the surface waters of the State, the Department shall notify the owner of the impoundment of its determination.

(2) No later than 30 days from a notification pursuant to subdivision (1) of this subsection, the owner of the coal combustion residuals surface impoundment shall submit a proposed Unpermitted Discharge Corrective Action Plan to the Department for its review and approval. The proposed Unpermitted Discharge Corrective Action Plan shall include, at a minimum, all of the following:

a. One of the following methods of proposed corrective action:

1. Elimination of the unpermitted discharge.

2. Application for a National Pollutant Discharge Elimination System (NPDES) permit amendment pursuant to G.S. 143-215.1 and Subchapter H of Chapter 2 of Title 15A of the North Carolina Administrative Code to bring the unpermitted discharge under permit regulations.

b. A detailed explanation of the reasons for selecting the method of corrective action.

c. Specific plans, including engineering details, to prevent the unpermitted discharge.

d. A schedule for implementation of the Plan.

e. A monitoring plan for evaluating the effectiveness of the proposed corrective action.

f. Any other information related to the correction of unpermitted discharges required by the Department.

(3) The Department shall approve the Unpermitted Discharge Corrective Action Plan if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(4) No later than 30 days from the approval of the Unpermitted Discharge Corrective Action Plan, the owner shall begin implementation of the Plan in accordance with the Plan's schedule.

(d) Identification of New Discharges. – No later than October 1, 2014, the owner of a coal combustion residuals surface impoundment shall submit a proposed Plan for the Identification of New Discharges to the Department for its review and approval as provided in this subsection.

(1) The proposed Plan for the Identification of New Discharges shall include, at a minimum, all of the following:

a. A procedure for routine inspection of the coal combustion residuals surface impoundment to identify indicators of potential new discharges, including toe drain outfalls, seeps, and weeps.

b. A procedure for determining whether a new discharge is actually present.

c. A procedure for notifying the Department when a new discharge is confirmed.

d. Any other information related to the identification of new discharges required by the Department.

(2) The Department shall approve the Plan for the Identification of New Discharges if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) No later than 30 days from the approval of the Plan for the Identification of New Discharges, the owner shall begin implementation of the Plan in accordance with the Plan.

(e) Reporting. – In addition to any other reporting required by the Department, the owner of a coal combustion residuals surface impoundment shall submit an annual Surface Water Protection and Restoration Report to the Department no later than January 31 of each year. The Report shall include a summary of all surface water sampling, protection, and restoration activities related to the impoundment for the preceding year, including the status of the identification, assessment, and correction of unpermitted discharges from coal combustion residuals surface impoundments to the surface waters of the State. The owner of a coal combustion residuals surface impoundment shall also submit all information required to be submitted to the Department pursuant to this section to the Coal Ash Management Commission.

"**§ 130A-309.211. Prioritization of coal combustion residuals surface impoundments.**

(a) As soon as practicable, but no later than December 31, 2015, the Department shall develop proposed classifications for all coal combustion residuals surface impoundments, including active and retired sites, for the purpose of closure and remediation based on these sites' risks to public health, safety, and welfare; the environment; and natural resources and shall determine a schedule for closure and required remediation that is based on the degree of risk to public health, safety, and welfare; the environment; and natural resources posed by the impoundments and that gives priority to the closure and required remediation of impoundments that pose the greatest risk. In assessing the risk, the Department shall evaluate information received pursuant to G.S. 130A-309.209 and G.S. 130A-309.210 and any other information deemed relevant and, at a minimum, consider all of the following:

(1) Any hazards to public health, safety, or welfare resulting from the impoundment.

(2) The structural condition and hazard potential of the impoundment.

(3) The proximity of surface waters to the impoundment and whether any surface waters are contaminated or threatened by contamination as a result of the impoundment.

(4) Information concerning the horizontal and vertical extent of soil and groundwater contamination for all contaminants confirmed to be present in groundwater in exceedance of groundwater quality standards and all significant factors affecting contaminant transport.

(5) The location and nature of all receptors and significant exposure pathways.

(6) The geological and hydrogeological features influencing the movement and chemical and physical character of the contaminants.

(7) The amount and characteristics of coal combustion residuals in the impoundment.

(8) Whether the impoundment is located within an area subject to a 100-year flood.

(9) Any other factor the Department deems relevant to establishment of risk.

(b) The Department shall issue a proposed classification for each coal combustion residuals surface impoundment based upon the assessment conducted pursuant to subsection (a) of this section as high-risk, intermediate-risk, or low-risk. Within 30 days after a proposed classification has been issued, the Department shall issue a written declaration, including findings of fact, documenting the proposed classification. The Department shall provide for public participation on the proposed risk classification as follows:

(1) The Department shall make copies of the written declaration issued pursuant to this subsection available for inspection as follows:

a. A copy of the declaration shall be provided to the local health director.
b. A copy of the declaration shall be provided to the public library located in closest proximity to the site in the county or counties in which the site is located.
c. The Department shall post a copy of the declaration on the Department's Web site.
d. The Department shall place copies of the declaration in other locations so as to assure the reasonable availability thereof to the public.

(2) The Department shall give notice of the written declaration issued pursuant to this subsection as follows:
a. A notice and summary of the declaration shall be published weekly for a period of three consecutive weeks in a newspaper having general circulation in the county or counties where the site is located.
b. Notice of the written declaration shall be given by first-class mail to persons who have requested such notice. Such notice shall include a summary of the written declaration and state the locations where a copy of the written declaration is available for inspection. The Department shall maintain a mailing list of persons who request notice pursuant to this section.
c. Notice of the written declaration shall be given by electronic mail to persons who have requested such notice. Such notice shall include a summary of the written declaration and state the locations where a copy of the written declaration is available for inspection. The Department shall maintain a mailing list of persons who request notice pursuant to this section.

(3) No later than 60 days after issuance of the written declaration, the Department shall conduct a public meeting in the county or counties in which the site is located to explain the written declaration to the public. The Department shall give notice of the hearing at least 15 days prior to the date thereof by all of the following methods:
a. Publication as provided in subdivision (1) of this subsection, with first publication to occur not less than 30 days prior to the scheduled date of the hearing.
b. First-class mail to persons who have requested notice as provided in subdivision (2) of this subsection.
c. Electronic mail to persons who have requested notice as provided in subdivision (2) of this subsection.

(4) At least 30 days from the latest date on which notice is provided pursuant to subdivision (2) of this subsection shall be allowed for the receipt of written comment on the written declaration prior to issuance of a final risk classification. At least 20 days will be allowed for receipt of written comment following a hearing conducted pursuant to subdivision (3) of this subsection prior to issuance of a final risk classification.

(c) Within 30 days of the receipt of all written comment as required by subdivision (4) of subsection (b) of this section, the Department shall submit a proposed classification for a coal combustion residuals surface impoundment to the Coal Ash Management Commission established pursuant to G.S. 130A-309.202. The Commission shall evaluate all information submitted in accordance with this Part related to the proposed classification and any other information the Commission deems relevant. The Commission shall only approve the proposed classification if it determines that the classification was developed in accordance with this section and that the classification accurately reflects the level of risk posed by the coal combustion residuals surface impoundment. The Commission shall issue its determination in writing, including findings in support of its determination. If the Commission fails to act on a proposed classification within 60 days of receipt of the proposed classification, the proposed classification shall be deemed approved. Parties aggrieved by a final decision of the Commission pursuant to this subsection may appeal the decision as provided under Article 3 of Chapter 150B of the General Statutes.

"**§ 130A-309.212. Closure of coal combustion residuals surface impoundments.**

(a) An owner of a coal combustion residuals surface impoundment shall submit a proposed Coal Combustion Residuals Surface Impoundment Closure Plan for the Department's approval. If corrective action to restore groundwater has not been completed pursuant to the requirements of G.S. 130A-309.209(b), the proposed closure plan shall include provisions for completion of activities to restore groundwater in conformance with the requirements of Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code. In addition, the following requirements, at a minimum, shall apply to such plans:

(1) High-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2019. A proposed closure plan for such impoundments must be submitted as soon as practicable, but no later than December 31, 2016. At a minimum, (i) impoundments located in whole above the seasonal high groundwater table shall be dewatered; (ii) impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable; and (iii) the owner of an impoundment shall either:

a. Convert the coal combustion residuals impoundment to an industrial landfill by removing all coal combustion residuals and contaminated soil from the impoundment temporarily, safely storing the residuals on-site, and complying with the requirements for such landfills established by this Article and rules adopted thereunder. At a minimum, the landfills shall have a design with a leachate collection system, a closure cap system, and a composite liner system consisting of two components: the upper component shall consist of a minimum 30-ml flexible membrane (FML), and the lower components shall consist of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1 x 10^{-7} centimeters per second. FML components consisting of high density polyethylene (HDPE) shall be at least 60 ml thick. The landfill shall otherwise comply with the construction requirements established by Section .1624 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, and the siting and design requirements for disposal sites established by Section .0503 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except with respect to those requirements that pertain to buffers. In lieu of the buffer requirement established by Section .0503(f)(2)(iii) of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, the owner of the impoundment shall establish and maintain a 300-foot buffer between surface waters and disposal areas. After the temporarily displaced coal combustion residuals have been returned for disposal in the industrial landfill constructed pursuant to the requirements of this sub-subdivision, the owner of the landfill shall comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code. A landfill constructed pursuant to this sub-subdivision shall otherwise be subject to all applicable requirements of this Chapter and rules adopted thereunder. Prior to closure, the Department may allow the disposal of coal combustion residuals, in addition to those originally contained in the impoundment, to the landfill constructed pursuant to this sub-subdivision, if the Department determines that the site is suitable for additional capacity and that disposal of additional coal combustion residuals will not pose an unacceptable risk to public health, safety, welfare; the environment; and natural resources.

b. Remove all coal combustion residuals from the impoundment, return the former impoundment to a nonerosive and stable condition and (i) transfer the coal combustion residuals for disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid

waste landfill or (ii) use the coal combustion products in a structural fill or other beneficial use as allowed by law. The use of coal combustion products (i) as structural fill shall be conducted in accordance with the requirements of Subpart 3 of this Part and (ii) for other beneficial uses shall be conducted in accordance with the requirements of Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By-Products) and Section .1205 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management).

(2) Intermediate-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2024. A proposed closure plan for such impoundments must be submitted as soon as practicable, but no later than December 31, 2017. At a minimum, such impoundments shall be dewatered, and the owner of an impoundment shall close the impoundment in any manner allowed pursuant to subdivision (1) of this subsection.

(3) Low-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2029. A proposed closure plan for such impoundments must be submitted as soon as practicable, but no later than December 31, 2018. At a minimum, (i) impoundments located in whole above the seasonal high groundwater table shall be dewatered; (ii) impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable; and (iii) the owner of an impoundment shall either:

a. Close in any manner allowed pursuant to subdivision (1) of this subsection.

b. Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall install and maintain a cap system that is designed to minimize infiltration and erosion in conformance with the requirements of Section .1624 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, and, at a minimum, shall be designed and constructed to (i) have a permeability no greater than 1 x 10^{-5} centimeters per second; (ii) minimize infiltration by the use of a low-permeability barrier that contains a minimum 18 inches of earthen material; and (iii) minimize erosion of the cap system and protect the low-permeability barrier from root penetration by use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth. In addition, the owner of an impoundment shall (i) install and maintain a groundwater monitoring system; (ii) establish financial assurance that will ensure that sufficient funds are available for closure pursuant to this subdivision, post-closure maintenance and monitoring, any corrective action that the Department may require, and satisfy any potential liability for sudden and nonsudden accidental occurrences arising from the impoundment and subsequent costs incurred by the Department in response to an incident, even if the owner becomes insolvent or ceases to reside, be incorporated, do business, or maintain assets in the State; and (iii) conduct post-closure care for a period of 30 years, which period may be increased by the Department upon a determination that a longer period is necessary to protect public health, safety, welfare; the environment; and natural resources, or decreased upon a determination that a shorter period is sufficient to protect public health, safety, welfare; the environment; and natural resources. The Department may require implementation of any other measure it

deems necessary to protect public health, safety, and welfare; the environment; and natural resources, including imposition of institutional controls that are sufficient to protect public health, safety, and welfare; the environment; and natural resources. The Department may not approve closure for an impoundment pursuant to sub-subdivision b. of subdivision (3) of this subsection unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment.

(4) Closure Plans for all impoundments shall include all of the following:

a. Facility and coal combustion residuals surface impoundment description. – A description of the operation of the site that shall include, at a minimum, all of the following:

1. Site history and history of site operations, including details on the manner in which coal combustion residuals have been stored and disposed of historically.
2. Estimated volume of material contained in the impoundment.
3. Analysis of the structural integrity of dikes or dams associated with impoundment.
4. All sources of discharge into the impoundment, including volume and characteristics of each discharge.
5. Whether the impoundment is lined, and, if so, the composition thereof.
6. A summary of all information available concerning the impoundment as a result of inspections and monitoring conducted pursuant to this Part and otherwise available.

b. Site maps, which, at a minimum, illustrate all of the following:

1. All structures associated with the operation of any coal combustion residuals surface impoundment located on the site. For purposes of this sub-subdivision, the term "site" means the land or waters within the property boundary of the applicable electric generating station.
2. All current and former coal combustion residuals disposal and storage areas on the site, including details concerning coal combustion residuals produced historically by the electric generating station and disposed of through transfer to structural fills.
3. The property boundary for the applicable site, including established compliance boundaries within the site.
4. All potential receptors within 2,640 feet from established compliance boundaries.
5. Topographic contour intervals of the site shall be selected to enable an accurate representation of site features and terrain and in most cases should be less than 20-foot intervals.
6. Locations of all sanitary landfills permitted pursuant to this Article on the site that are actively receiving waste or are closed, as well as the established compliance boundaries and components of associated groundwater and surface water monitoring systems.
7. All existing and proposed groundwater monitoring wells associated with any coal combustion residuals surface impoundment on the site.
8. All existing and proposed surface water sample collection locations associated with any coal combustion residuals surface impoundment on the site.

c. The results of a hydrogeologic, geologic, and geotechnical investigation of the site, including, at a minimum, all of the following:
   1. A description of the hydrogeology and geology of the site.
   2. A description of the stratigraphy of the geologic units underlying each coal combustion residuals surface impoundment located on the site.
   3. The saturated hydraulic conductivity for (i) the coal combustion residuals within any coal combustion residuals surface impoundment located on the site and (ii) the saturated hydraulic conductivity of any existing liner installed at an impoundment, if any.
   4. The geotechnical properties for (i) the coal combustion residuals within any coal combustion residuals surface impoundment located on the site, (ii) the geotechnical properties of any existing liner installed at an impoundment, if any, and (iii) the uppermost identified stratigraphic unit underlying the impoundment, including the soil classification based upon the Unified Soil Classification System, in-place moisture content, particle size distribution, Atterberg limits, specific gravity, effective friction angle, maximum dry density, optimum moisture content, and permeability.
   5. A chemical analysis of the coal combustion residuals surface impoundment, including water, coal combustion residuals, and coal combustion residuals-affected soil.
   6. Identification of all substances with concentrations determined to be in excess of the groundwater quality standards for the substance established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code, including all laboratory results for these analyses.
   7. Summary tables of historical records of groundwater sampling results.
   8. A map that illustrates the potentiometric contours and flow directions for all identified aquifers underlying impoundments (shallow, intermediate, and deep) and the horizontal extent of areas where groundwater quality standards established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code for a substance are exceeded.
   9. Cross-sections that illustrate the following: the vertical and horizontal extent of the coal combustion residuals within an impoundment; stratigraphy of the geologic units underlying an impoundment; and the vertical extent of areas where groundwater quality standards established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code for a substance are exceeded.

d. The results of groundwater modeling of the site that shall include, at a minimum, all of the following:
   1. An account of the design of the proposed Closure Plan that is based on the site hydrogeologic conceptual model developed and includes (i) predictions on post-closure groundwater elevations and groundwater flow directions and velocities, including the effects on and from the potential receptors and (ii) predictions at the compliance boundary for substances with concentrations determined to be in excess of the groundwater quality standards for the substance established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code.

2. Predictions that include the effects on the groundwater chemistry and should describe migration, concentration, mobilization, and fate for substances with concentrations determined to be in excess of the groundwater quality standards for the substance established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code pre- and post-closure, including the effects on and from potential receptors.
3. A description of the groundwater trend analysis methods used to demonstrate compliance with groundwater quality standards for the substance established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code and requirements for corrective action of groundwater contamination established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code.

e. A description of any plans for beneficial use of the coal combustion residuals in compliance with the requirements of Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By-Products) and Section .1205 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management).

f. All engineering drawings, schematics, and specifications for the proposed Closure Plan. If required by Chapter 89C of the General Statutes, engineering design documents should be prepared, signed, and sealed by a professional engineer.

g. A description of the construction quality assurance and quality control program to be implemented in conjunction with the Closure Plan, including the responsibilities and authorities for monitoring and testing activities, sampling strategies, and reporting requirements.

h. A description of the provisions for disposal of wastewater and management of stormwater and the plan for obtaining all required permits.

i. A description of the provisions for the final disposition of the coal combustion residuals. If the coal combustion residuals are to be removed, the owner must identify (i) the location and permit number for the coal combustion residuals landfills, industrial landfills, or municipal solid waste landfills in which the coal combustion residuals will be disposed and (ii) in the case where the coal combustion residuals are planned for beneficial use, the location and manner in which the residuals will be temporarily stored. If the coal combustion residuals are to be left in the impoundment, the owner must (i) in the case of closure pursuant to sub-subdivision (a)(1)a. of this section, provide a description of how the ash will be stabilized prior to completion of closure in accordance with closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code and (ii) in the case of closure pursuant to sub-subdivision (a)(1)b. of this section, provide a description of how the ash will be stabilized pre- and post-closure. If the coal combustion residuals are to be left in the impoundment, the owner must provide an estimate of the volume of coal combustion residuals remaining.

j. A list of all permits that will need to be acquired or modified to complete closure activities.

k. A description of the plan for post-closure monitoring and care for an impoundment for a minimum of 30 years. The length of the post-closure care period may be (i) proposed to be decreased or the frequency and parameter list modified if the owner demonstrates that the reduced period or modifications are sufficient to protect public

health, safety, and welfare; the environment; and natural resources and (ii) increased by the Department at the end of the post-closure monitoring and care period if there are statistically significant increasing groundwater quality trends or if contaminant concentrations have not decreased to a level protective of public health, safety, and welfare; the environment; and natural resources. If the owner determines that the post-closure care monitoring and care period is no longer needed and the Department agrees, the owner shall provide a certification, signed and sealed by a professional engineer, verifying that post-closure monitoring and care has been completed in accordance with the post-closure plan. If required by Chapter 89C of the General Statutes, the proposed plan for post-closure monitoring and care should be signed and sealed by a professional engineer. The plan shall include, at a minimum, all of the following:

1. A demonstration of the long-term control of all leachate, affected groundwater, and stormwater.
2. A description of a groundwater monitoring program that includes (i) post-closure groundwater monitoring, including parameters to be sampled and sampling schedules; (ii) any additional monitoring well installations, including a map with the proposed locations and well construction details; and (iii) the actions proposed to mitigate statistically significant increasing groundwater quality trends.

l. An estimate of the milestone dates for all activities related to closure and post-closure.

m. Projected costs of assessment, corrective action, closure, and post-closure care for each coal combustion residuals surface impoundment.

n. A description of the anticipated future use of the site and the necessity for the implementation of institutional controls following closure, including property use restrictions, and requirements for recordation of notices documenting the presence of contamination, if applicable, or historical site use.

(b) The Department shall review a proposed Coal Combustion Residuals Surface Impoundment Closure Plan for consistency with the minimum requirements set forth in subsection (a) of this section and whether the proposed Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part. Prior to issuing a decision on a proposed Closure Plan, the Department shall provide for public participation on the proposed Closure Plan as follows:

(1) The Department shall make copies of the proposed Closure Plan available for inspection as follows:

a. A copy of the proposed Closure Plan shall be provided to the local health director.

b. A copy of the proposed Closure Plan shall be provided to the public library located in closest proximity to the site in the county or counties in which the site is located.

c. The Department shall post a copy of the proposed Closure Plan on the Department's Web site.

d. The Department shall place copies of the declaration in other locations so as to assure the reasonable availability thereof to the public.

(2) Before approving a proposed Closure Plan, the Department shall give notice as follows:

a. A notice and summary of the proposed Closure Plan shall be published weekly for a period of three consecutive weeks in a newspaper having general circulation in the county or counties where the site is located.

b. Notice that a proposed Closure Plan has been developed shall be given by first-class mail to persons who have requested such notice. Such notice shall include a summary of the proposed Closure Plan and state the locations where a copy of the proposed Closure Plan is available for inspection. The Department shall maintain a mailing list of persons who request notice pursuant to this section.

c. Notice that a proposed Closure Plan has been developed shall be given by electronic mail to persons who have requested such notice. Such notice shall include a summary of the proposed Closure Plan and state the locations where a copy of the proposed Closure Plan is available for inspection. The Department shall maintain a mailing list of persons who request notice pursuant to this section.

(3) No later than 60 days after receipt of a proposed Closure Plan, the Department shall conduct a public meeting in the county or counties in which the site is located to explain the proposed Closure Plan and alternatives to the public. The Department shall give notice of the hearing at least 30 days prior to the date thereof by all of the following methods:

a. Publication as provided in subdivision (1) of this subsection, with first publication to occur not less than 30 days prior to the scheduled date of the hearing.

b. First-class mail to persons who have requested notice as provided in subdivision (2) of this subsection.

c. Electronic mail to persons who have requested notice as provided in subdivision (2) of this subsection.

(4) At least 30 days from the latest date on which notice is provided pursuant to subdivision (2) of this subsection shall be allowed for the receipt of written comment on the proposed Closure Plan prior to its approval. At least 20 days will be allowed for receipt of written comment following a hearing conducted pursuant to subdivision (3) of this subsection prior to the approval of the proposed Closure Plan.

(c) The Department shall disapprove a proposed Coal Combustion Residuals Surface Impoundment Closure Plan unless the Department finds that the Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part. The Department shall provide specific findings to support its decision to approve or disapprove a proposed Closure Plan. If the Department disapproves a proposed Closure Plan, the person who submitted the Closure Plan may seek review as provided in Article 3 of Chapter 150B of the General Statutes. If the Department fails to approve or disapprove a proposed Closure Plan within 120 days after a complete Closure Plan has been submitted, the person who submitted the proposed Closure Plan may treat the Closure Plan as having been disapproved at the end of that time period. The Department may require a person who proposes a Closure Plan to supply any additional information necessary for the Department to approve or disapprove the Closure Plan.

(d) Within 30 days of its approval of a Coal Combustion Residuals Surface Impoundment Closure Plan, the Department shall submit the Closure Plan to the Coal Ash Management Commission. The Commission shall evaluate all information submitted in accordance with this Part related to the Closure Plan and any other information the Commission deems relevant. The Commission shall approve the Closure Plan if it determines that the Closure Plan was developed in accordance with this section, that implementation of the Closure Plan according to the Closure Plan's schedule is technologically and economically feasible, and the Closure Plan is protective of the public health, safety, and welfare; the environment; and natural resources. In addition, the Commission may consider any impact on electricity costs and reliability, but this factor may not be dispositive of the Commission's determination. The Commission shall issue its determination in writing, including findings in support of its determination. If the Commission fails to act on a Closure Plan within 60 days of receipt of the Closure Plan, the Closure Plan shall be deemed approved. Parties aggrieved by a final decision of the Commission pursuant to this subsection may appeal the decision as provided under Article 3 of Chapter 150B of the General Statutes.

(e) As soon as practicable, but no later than 60 days after a Coal Combustion Residuals Surface Impoundment Closure Plan has been approved by the Coal Ash Management

Commission, the owner of the coal combustion residuals impoundment shall begin implementation of the approved plan. Modifications to an approved Closure Plan may only be allowed in conformance with the requirements of this Part, upon written request of an owner of an impoundment, with the written approval of the Department, and after public notice of the change in accordance with the requirements of subdivision (2) of subsection (b) of this section. Provided, however, minor technical modifications may be made in accordance with standard Department procedures for such minor modifications and may be made without written approval of the Department or public notice of the change.

(f) Nothing in this section shall be construed to obviate the need for sampling, remediation, and monitoring activities at the site as required by G.S. 130A-309.209 and G.S. 130A-309.310.

"**§ 130A-309.213. Variance authority.**

(a) In recognition of the complexity and magnitude of the issues surrounding the management of coal combustion residuals and coal combustion residuals surface impoundments, the General Assembly authorizes the Commission to grant a variance to extend any deadline for closure of an impoundment established under G.S. 130A-309.212 in conformance with the requirements of this section. To request such a variance the owner of an impoundment shall, no earlier than two years prior to the applicable deadline, submit an application in a form acceptable to the Department which shall include, at a minimum, all of the following information: identification of the site, applicable requirements, and applicable deadlines for which a variance is sought, and the site-specific circumstances that support the need for the variance. The owner of the impoundment shall also provide detailed information that demonstrates (i) the owner has substantially complied with all other requirements and deadlines established by this Part; (ii) the owner has made good faith efforts to comply with the applicable deadline for closure of the impoundment; and (iii) that compliance with the deadline cannot be achieved by application of best available technology found to be economically reasonable at the time and would produce serious hardship without equal or greater benefits to the public. As soon as practicable, but no later than 60 days from receipt of an application, the Secretary shall evaluate the information submitted in conjunction with the application, and any other information the Secretary deems relevant, to determine whether the information supports issuance of a variance. After such evaluation, if the Secretary finds that the information supports issuance of a variance from the deadline, the Secretary shall issue a proposed variance. Within 10 days after a proposed variance has been issued, the Secretary shall issue a written declaration, including findings of fact, documenting the proposed variance. The Department shall provide for public participation on the proposed variance in the manner provided by G.S. 130A-309.212(b) and shall take the public input received through the process into account in its decision concerning the proposed variance. Within 30 days of the receipt of all public input received, the Department shall submit a proposed variance to the Coal Ash Management Commission. The Commission shall evaluate all information submitted in accordance with this section and any other information the Commission deems relevant. The Commission shall only approve a variance if it determines that compliance with the deadline cannot be achieved by application of best available technology found to be economically reasonable at the time and would produce serious hardship without equal or greater benefits to the public. The Commission shall issue its determination in writing, including findings in support of its determination. If the Commission fails to act on a variance request within 60 days of receipt, the variance shall be deemed denied. Parties aggrieved by a final decision of the Commission pursuant to this subsection may appeal the decision as provided under Article 3 of Chapter 150B of the General Statutes.

(b) A variance granted pursuant to this section shall not extend a deadline for closure of an impoundment more than three years beyond the date applicable to the impoundment as provided under G.S. 130A-309.212.

(c) No more than one variance may be granted pursuant to this section per impoundment.

"Subpart 3. Use of Coal Combustion Products in Structural Fill.

"**§ 130A-309.214. Applicability.**

The provisions of this Subpart shall apply to the siting, design, construction, operation, and closure of projects that utilize coal combustion products for structural fill.

"**§ 130A-309.215. Permit requirements for projects using coal combustion products for structural fill.**

(a) Permit Requirements. –

(1) Projects using coal combustion products as structural fill involving the placement of less than 8,000 tons of coal combustion products per acre or less than 80,000 tons of coal combustion products in total per project, which proceed in compliance with the requirements of this section and rules adopted thereunder, are deemed permitted. Any person proposing such a project shall submit an application for a permit to the Department upon such form as the Department may prescribe, including, at a minimum, the information set forth in subdivision (1) of subsection (b) of this section.

(2) No person shall commence or operate a project using coal combustion residuals as structural fill involving the placement of 8,000 or more tons of coal combustion products per acre or 80,000 or more tons of coal combustion products in total per project without first receiving an individual permit from the Department. Any person proposing such a project shall submit an application for a permit to the Department upon such form as the Department may prescribe, including, at a minimum, the information set forth in subdivisions (1) and (2) of subsection (b) of this section.

(b) Information to Be Provided to the Department. – At least 60 days before initiation of a proposed project using coal combustion products as structural fill, the person proposing the project shall submit all of the following information to the Department on a form as prescribed by the Department:

(1) For projects involving placement of less than 8,000 tons of coal combustion products per acre or less than 80,000 tons of coal combustion products in total per project, the person shall provide, at a minimum, the following information:

a. The description of the nature, purpose, and location of the project.

b. The estimated start and completion dates for the project.

c. An estimate of the volume of coal combustion products to be used in the project.

d. A Toxicity Characteristic Leaching Procedure analysis from a representative sample of each different coal combustion product's source to be used in the project for, at a minimum, all of the following constituents: arsenic, barium, cadmium, lead, chromium, mercury, selenium, and silver.

e. A signed and dated statement by the owner of the land on which the structural fill is to be placed, acknowledging and consenting to the use of coal combustion products as structural fill on the property and agreeing to record the fill in accordance with the requirements of G.S. 130A-390.219.

f. The name, address, and contact information for the generator of the coal combustion products.

g. Physical location of the project at which the coal combustion products were generated.

(2) For projects involving placement of 8,000 or more tons of coal combustion products per acre or 80,000 or more tons of coal combustion products in total per project, the person shall provide all information required pursuant to subdivision (1) of this subsection and shall provide construction plans for the project, including a stability analysis as the Department may require. If required by the Department, a stability analysis shall be prepared, signed, and sealed by a professional engineer in accordance with sound engineering practices. A construction plan shall, at a minimum, include a groundwater monitoring system and an encapsulation liner system in compliance with the requirements of G.S. 130A-309.216.

"**§ 130A-309.216. Design, construction, and siting requirements for projects using coal combustion products for structural fill.**

(a) Design, Construction, and Operation of Structural Fill Sites. –

(1) A structural fill site must be designed, constructed, operated, closed, and maintained in such a manner as to minimize the potential for harmful release

of constituents of coal combustion residuals to the environment or create a nuisance to the public.

(2) Coal combustion products shall be collected and transported in a manner that will prevent nuisances and hazards to public health and safety. Coal combustion products shall be moisture conditioned, as necessary, and transported in covered trucks to prevent dusting.

(3) Coal combustion products shall be placed uniformly and shall be compacted to standards, including in situ density, compaction effort, and relative density, specified by a registered professional engineer for a specific end-use purpose.

(4) Equipment shall be provided that is capable of placing and compacting the coal combustion products and handling the earthwork required during the periods that coal combustion products are received at the fill project.

(5) The coal combustion product structural fill project shall be effectively maintained and operated as a nondischarge system to prevent discharge to surface water resulting from the project.

(6) The coal combustion product structural fill project shall be effectively maintained and operated to ensure no violations of groundwater standards adopted by the Commission pursuant to Article 21 of Chapter 143 of the General Statutes due to the project.

(7) Surface waters resulting from precipitation shall be diverted away from the active coal combustion product placement area during filling and construction activity.

(8) Site development shall comply with the North Carolina Sedimentation Pollution Control Act of 1973, as amended.

(9) The structural fill project shall be operated with sufficient dust control measures to minimize airborne emissions and to prevent dust from creating a nuisance or safety hazard and shall not violate applicable air quality regulations.

(10) Coal combustion products utilized on an exterior slope of a structural fill shall not be placed with a slope greater than 3.0 horizontal to 1.0 vertical.

(11) Compliance with this subsection shall not insulate any of the owners or operators of a structural fill project from claims for damages to surface waters, groundwater, or air resulting from the operation of the structural fill project. If the project fails to comply with the requirements of this section, the constructor, generator, owner, or operator shall notify the Department and shall take any immediate corrective action as may be required by the Department.

(b) Liners, Leachate Collection System, Cap, and Groundwater Monitoring System Required for Large Structural Fills. – For projects involving placement of 8,000 or more tons of coal combustion products per acre or 80,000 or more tons of coal combustion products in total per project shall have an encapsulation liner system. The encapsulation liner system shall be constructed on and around the structural fill and shall be designed to efficiently contain, collect, and remove leachate generated by the coal combustion products, as well as separate the coal combustion products from any exposure to surrounding environs. At a minimum, the components of the liner system shall consist of the following:

(1) A base liner, which shall consist of one of the following designs:

a. A composite liner utilizing a compacted clay liner. This composite liner is one liner that consists of two components: a geomembrane liner installed above and in direct and uniform contact with a compacted clay liner with a minimum thickness of 24 inches (0.61 m) and a permeability of no more than 1.0×10^{-7} centimeters per second.

b. A composite liner utilizing a geosynthetic clay liner. This composite liner is one liner that consists of three components: a geomembrane liner installed above and in uniform contact with a geosynthetic clay liner overlying a compacted clay liner with a minimum thickness of 18 inches (0.46 m) and a permeability of no more than 1.0×10^{-5} centimeters per second.

(2) A leachate collection system, which is constructed directly above the base liner and shall be designed to effectively collect and remove leachate from the project.

(3) A cap system that is designed to minimize infiltration and erosion as follows:

a. The cap system shall be designed and constructed to (i) have a permeability less than or equal to the permeability of any base liner system or the in situ subsoils underlying the structural fill, or the permeability specified for the final cover in the effective permit, or a permeability no greater than 1 x 10^{-5} centimeters per second, whichever is less; (ii) minimize infiltration through the closed structural fill by the use of a low-permeability barrier that contains a minimum 18 inches of earthen material; and (iii) minimize erosion of the cap system and protect the low-permeability barrier from root penetration by use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

b. The Department may approve an alternative cap system if the owner or operator can adequately demonstrate (i) the alternative cap system will achieve an equivalent or greater reduction in infiltration as the low-permeability barrier specified in sub-subdivision a. of this subdivision and (ii) the erosion layer will provide equivalent or improved protection as the erosion layer specified in sub-subdivision a. of this subdivision.

(4) A groundwater monitoring system, that shall be approved by the Department and, at a minimum, consists of all of the following:

a. A sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater passing the relevant point of compliance as approved by the Department. A down-gradient monitoring system shall be installed at the relevant point of compliance so as to ensure detection of groundwater contamination in the uppermost aquifer.

b. A proposed monitoring plan, which shall be certified by a licensed geologist or professional engineer to be effective in providing early detection of any release of hazardous constituents from any point in a structural fill or leachate surface impoundment to the uppermost aquifer, so as to be protective of public health, safety, and welfare; the environment; and natural resources.

c. A groundwater monitoring program, which shall include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide an accurate representation of groundwater quality at the background and down-gradient wells. Monitoring shall be conducted through construction and the post-closure care period. The sampling procedures and frequency shall be protective of public health, safety, and welfare; the environment; and natural resources.

d. A detection monitoring program for all Appendix I constituents. For purposes of this subdivision, the term "Appendix I" means Appendix I to 40 C.F.R. Part 258, "Appendix I Constituents for Detection Monitoring," including subsequent amendments and editions.

e. An assessment monitoring program and corrective action plan if one or more of the constituents listed in Appendix I is detected in exceedance of a groundwater protection standard.

(c) Siting for Structural Fill Facilities. – Coal combustion products used as a structural fill shall not be placed:

(1) Within 50 feet of any property boundary.

(2) Within 300 horizontal feet of a private dwelling or well.

(3) Within 50 horizontal feet of the top of the bank of a perennial stream or other surface water body.

(4) Within four feet of the seasonal high groundwater table.

(5) Within a 100-year floodplain except as authorized under G.S. 143-215.54A(b). A site located in a floodplain shall not restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain or result in washout of solid waste so as to pose a hazard to human life, wildlife or land or water resources.

(6) Within 50 horizontal feet of a wetland, unless, after consideration of the chemical and physical impact on the wetland, the United States Army Corps of Engineers issues a permit or waiver for the fill.

"**§ 130A-309.217. Financial assurance requirements for large projects using coal combustion products for structural fill.**

(a) For projects involving placement of 8,000 or more tons of coal combustion products per acre or 80,000 or more tons of coal combustion products in total per project, the applicant for a permit or a permit holder to construct or operate a structural fill shall establish financial assurance that will ensure that sufficient funds are available for facility closure, post-closure maintenance and monitoring, any corrective action that the Department may require, and to satisfy any potential liability for sudden and nonsudden accidental occurrences, and subsequent costs incurred by the Department in response to an incident at a structural fill project, even if the applicant or permit holder becomes insolvent or ceases to reside, be incorporated, do business, or maintain assets in the State.

(b) To establish sufficient availability of funds under this section, the applicant for a permit or a permit holder may use insurance, financial tests, third-party guarantees by persons who can pass the financial test, guarantees by corporate parents who can pass the financial test, irrevocable letters of credit, trusts, surety bonds, or any other financial device, or any combination of the foregoing shown to provide protection equivalent to the financial protection that would be provided by insurance if insurance were the only mechanism used.

(c) The applicant for a permit or a permit holder and any parent, subsidiary, or other affiliate of the applicant, permit holder, or parent, including any joint venturer with a direct or indirect interest in the applicant, permit holder, or parent shall be a guarantor of payment for closure, post-closure maintenance and monitoring, any corrective action that the Department may require, and to satisfy any potential liability for sudden and nonsudden accidental occurrences arising from the operation of the hazardous waste facility.

(d) Assets used to meet the financial assurance requirements of this section shall be in a form that will allow the Department to readily access funds for the purposes set out in this section. Assets used to meet financial assurance requirements of this section shall not be accessible to the permit holder except as approved by the Department.

(e) The Department may provide a copy of any filing that an applicant for a permit or a permit holder submits to the Department to meet the financial responsibility requirements under this section to the State Treasurer. The State Treasurer shall review the filing and provide the Department with a written opinion as to the adequacy of the filing to meet the purposes of this section, including any recommended changes.

(f) In order to continue to hold a permit for a structural fill, a permit holder must maintain financial responsibility as required by this Part and must provide any information requested by the Department to establish that the permit holder continues to maintain financial responsibility.

(g) An applicant for a permit or a permit holder shall satisfy the Department that the applicant or permit holder has met the financial responsibility requirements of this Part before the Department is required to otherwise review the application.

"**§ 130A-309.218. Closure of projects using coal combustion products for structural fill.**

(a) Closure of Structural Fill Projects. –

(1) No later than 30 working days or 60 calendar days, whichever is less, after coal combustion product placement has ceased, the final cover shall be applied over the coal combustion product placement area.

(2) The final surface of the structural fill shall be graded and provided with drainage systems that do all of the following:

a. Minimize erosion of cover materials.

b. Promote drainage of area precipitation, minimize infiltration, and prevent ponding of surface water on the structural fill.

(3) Other erosion control measures, such as temporary mulching, seeding, or silt barriers shall be installed to ensure no visible coal combustion product migration to adjacent properties until the beneficial end use of the project is realized.

(4) The constructor or operator shall submit a certification to the Department signed and sealed by a registered professional engineer or signed by the Secretary of the Department of Transportation or the Secretary's designee certifying that all requirements of this Subpart have been met. The report shall be submitted within 30 days of application of the final cover.

(b) Additional Closure and Post-Closure Requirements for Large Structural Fill Projects. – For projects involving placement of 8,000 or more tons of coal combustion products per acre or 80,000 or more tons of coal combustion products in total per project, a constructor or operator shall conduct post-closure care. Post-closure care shall be conducted for 30 years, which period may be increased by the Department upon a determination that a longer period is necessary to protect public health, safety, and welfare; the environment; and natural resources, or decreased upon a determination that a shorter period is sufficient to protect public health, safety, and welfare; the environment; and natural resources. Additional closure and post-closure requirements include, at a minimum, all of the following:

(1) Submit a written closure plan that includes all of the following:

a. A description of the cap liner system and the methods and procedures used to install the cap that conforms to the requirement in G.S. 130A-309.216(b).

b. An estimate of the largest area of the structural fill project ever requiring the cap liner system at any time during the overall construction period that is consistent with the drawings prepared for the structural fill.

c. An estimate of the maximum inventory of coal combustion products ever on-site over the construction duration of the structural fill.

d. A schedule for completing all activities necessary to satisfy the closure criteria set forth in this section.

(2) Submit a written post-closure plan that includes all of the following:

a. A description of the monitoring and maintenance activities required for the project and the frequency at which these activities must be performed.

b. The name, address, and telephone number of the person or office responsible for the project during the post-closure period.

c. A description of the planned uses of the property during the post-closure period. Post-closure use of the property must not disturb the integrity of the cap system, base liner system, or any other components of the containment system or the function of the monitoring systems, unless necessary to comply with the requirements of this subsection. The Department may approve disturbance if the constructor or operator demonstrates that disturbance of the cap system, base liner system, or other component of the containment system will not increase the potential threat to public health, safety, and welfare; the environment; and natural resources.

d. The cost estimate for post-closure activities required under this section.

(3) Maintain the integrity and effectiveness of any cap system, including repairing the system as necessary to correct the defects of settlement, subsidence, erosion, or other events and preventing run-on and runoff from eroding or otherwise damaging the cap system.

(4) Maintain and operate the leachate collection system. The Department may allow the constructor or operator to stop managing leachate upon a satisfactory demonstration that leachate from the project no longer poses a threat to human health and the environment.

(5) Monitor and maintain the groundwater monitoring system in accordance with G.S. 130A-309.216 and monitor the surface water in accordance with 15A NCAC 13B .0602.

(c) Completion of Post-Closure Care. – Following completion of the post-closure care period, the constructor or operator shall submit a certification, signed by a registered professional engineer, to the Department, verifying that post-closure care has been completed in accordance with the post-closure plan, and include the certification in the operating record.

"**§ 130A-309.219. Recordation of projects using coal combustion products for structural fill.**

(a) The owner of land where coal combustion products have been used in volumes of more than 1,000 cubic yards shall file a statement of the volume and locations of the coal combustion residuals with the Register of Deeds in the county or counties where the property is located. The statement shall identify the parcel of land according to the complete legal description on the recorded deed, either by metes and bounds or by reference to a recorded plat map. The statement shall be signed and acknowledged by the landowners in the form prescribed by G.S. 47-38 through G.S. 47-43.

(b) Recordation shall be required within 90 days after completion of a structural fill project using coal combustion residuals.

(c) The Register of Deeds, in accordance with G.S. 161-14, shall record the notarized statement and index it in the Grantor Index under the name of the owner of the land. The original notarized statement with the Register's seal and the date, book, and page number of recording shall be returned to the Department after recording.

(d) When property with more than 1,000 cubic yards of coal combustion products is sold, leased, conveyed, or transferred in any manner, the deed or other instrument of transfer shall contain in the description section in no smaller type than used in the body of the deed or instrument a statement that coal combustion products have been used as structural fill material on the property.

"**§ 130A-309.220. Department of Transportation projects.**

The Department and the Department of Transportation may agree on specific design, construction, siting, operation, and closure criteria that may apply to the Department of Transportation structural fill projects.

"**§ 130A-309.221. Inventory and inspection of certain structural fill projects.**

No later than July 1, 2015, the Department shall prepare an inventory of all structural fill projects with a volume of 10,000 cubic yards or more. The Department shall update the structural fill project inventory at least annually. The Department shall inspect each structural fill project with a volume of 10,000 cubic yards or more at least annually to determine if the project or facility has been constructed and operated in compliance with Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By-Products) and Section .1200 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management), as applicable.

"**§ 130A-309.222. Amendments required to rules.**

Requirements under existing rules governing the use of coal combustion products for structural fill that do not conflict with the provisions of this Subpart shall continue to apply to such projects. The Environmental Management Commission shall amend existing rules governing the use of coal combustion products for structural fill as necessary to implement the provisions of this Subpart. Such rules shall be exempt from the requirements of G.S. 150B-19.3.

"Subpart 4. Enforcement.

"**§ 130A-309.223. General enforcement.**

Except as otherwise provided in this Subpart, the provisions of this Part shall be enforced as provided in Article 1 of this Chapter.

"**§ 130A-309.224. Penalties for making false statements.**

Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this Part or a rule implementing this Part shall be guilty of a Class 2 misdemeanor, which may include a fine not to exceed ten thousand dollars ($10,000)."

SECTION 3.(b) Notwithstanding G.S. 130A-309.211 or G.S. 130A-309.212, as enacted by Section 3(a) of this act, and except as otherwise preempted by the requirements of

federal law, the following coal combustion residuals surface impoundments shall be deemed high-priority and, as soon as practicable, but no later than August 1, 2019, shall be closed in conformance with Section 3(c) of this act:

(1) Coal combustion residuals surface impoundments located at the Dan River Steam Station, owned and operated by Duke Energy Progress, and located in Rockingham County.

(2) Coal combustion residuals surface impoundments located at the Riverbend Steam Station, owned and operated by Duke Energy Carolinas, and located in Gaston County.

(3) Coal combustion residuals surface impoundments located at the Asheville Steam Electric Generating Plant, owned and operated by Duke Energy Progress, and located in Buncombe County.

(4) Coal combustion residuals surface impoundments located at the Sutton Plant, owned and operated by Duke Energy Progress, and located in New Hanover County.

SECTION 3.(c) The impoundments identified in subsection (b) of this section shall be closed as follows:

(1) Impoundments located in whole above the seasonal high groundwater table shall be dewatered. Impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable.

(2) All coal combustion residuals shall be removed from the impoundments and transferred for (i) disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill or (ii) use in a structural fill or other beneficial use as allowed by law. Any disposal or use of coal combustion products pursuant to this section shall comply with the moratoriums enacted under Section 4(a) and Section 5(a) of this act and any extensions thereof. The use of coal combustion products (i) as structural fill, as authorized by Section 4(b) of this act, shall be conducted in accordance with the requirements of Subpart 3 of Part 2I of Article 9 of the General Statutes, as enacted by Section 3(a) of this act, and (ii) for other beneficial uses shall be conducted in accordance with the requirements of Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By-Products) and Section .1205 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management), as applicable.

(3) If restoration of groundwater quality is degraded as a result of the impoundment, corrective action to restore groundwater quality shall be implemented by the owner or operator as provided in G.S. 130A-309.204.

SECTION 3.(d) G.S. 130A-290(a) reads as rewritten:

"**§ 130A-290. Definitions.**

(a) Unless a different meaning is required by the context, the following definitions shall apply throughout this Article:

…

(2b) ~~"Combustion products"~~"Coal combustion residuals" means residuals, including fly ash, bottom ash, boiler slag, mill rejects, and flue gas desulfurization residue produced by a coal-fired generating ~~unit.~~unit destined for disposal. The term does not include coal combustion products as defined in G.S. 130A-309.201(4).

(2c) ~~"Combustion products landfill"~~"Coal combustion residuals landfill" means a facility or unit for the disposal of combustion products, where the landfill is located at the same facility with the coal-fired generating unit or units producing the combustion products, and where the landfill is located wholly or partly on top of a facility that is, or was, being used for the disposal or storage of such combustion products, including, but not limited to, landfills, wet and dry ash ponds, and structural fill facilities.

…

(3a) "Commission" means the Environmental Management Commission.

…

(20) "Open dump" means any facility or site where solid waste is disposed of that is not a sanitary landfill and that is not a coal combustion residuals surface impoundment or a facility for the disposal of hazardous waste.

…

(35) "Solid waste" means any hazardous or nonhazardous garbage, refuse or sludge from a waste treatment plant, water supply treatment plant or air pollution control facility, domestic sewage and sludges generated by the treatment thereof in sanitary sewage collection, treatment and disposal systems, and other material that is either discarded or is being accumulated, stored or treated prior to being discarded, or has served its original intended use and is generally discarded, including solid, liquid, semisolid or contained gaseous material resulting from industrial, institutional, commercial and agricultural operations, and from community activities. Notwithstanding sub-sub-subdivision b.3. of this subdivision, the term includes coal combustion residuals. The term does not include:

a. Fecal waste from fowls and animals other than humans.

b. Solid or dissolved material in:

1. Domestic sewage and sludges generated by treatment thereof in sanitary sewage collection, treatment and disposal systems which are designed to discharge effluents to the surface waters.

2. Irrigation return flows.

3. Wastewater discharges and the sludges incidental to and generated by treatment which are point sources subject to permits granted under Section 402 of the Water Pollution Control Act, as amended (P.L. 92-500), and permits granted under G.S. 143-215.1 by the ~~Environmental Management Commission.~~ Commission, including coal combustion products. However, any sludges that meet the criteria for hazardous waste under RCRA shall also be a solid waste for the purposes of this Article.

…."

SECTION 3.(e) The initial members of the Coal Ash Management Commission established pursuant to G.S. 130A-309.202, as enacted by Section 3(a) of this act, whose qualifications are described in subdivisions (3), (4), and (9) of G.S. 130A-309.202(b), shall be appointed for an initial term of two years beginning effective July 1, 2014, and subsequent appointments shall be for six-year terms. The initial members of the Coal Ash Management Commission established pursuant to G.S. 130A-309.202, as enacted by Section 3(a) of this act, whose qualifications are described in subdivisions (1), (6), and (8) of G.S. 130A-309.202(b), shall be appointed for an initial term of four years beginning effective July 1, 2014, and subsequent appointments shall be for six-year terms. The initial members of the Coal Ash Management Commission established pursuant to G.S. 130A-309.202, as enacted by Section 3(a) of this act, whose qualifications are described in subdivisions (2), (5), and (7) of G.S. 130A-309.202(b), shall be appointed for an initial term of six years beginning effective July 1, 2014, and subsequent appointments shall be for six-year terms.

SECTION 3.(f) This section is effective when it becomes law. G.S. 130A-309.202, as enacted by Section 3(a) of this act, is repealed June 30, 2030. Subpart 3 of Part 2I of Article 9 of the General Statutes, as enacted by Section 3(a) of this act, applies to the use of coal combustion products as structural fill contracted for on or after that date. The first report due under G.S. 130A-309.210, as enacted by Section 3(a) of this act, is due November 1, 2014. Members to be appointed pursuant to G.S. 130A-309.202(b), as enacted by Section 3(a) of this act, shall be appointed no later than October 1, 2014.

PART III. MORATORIUMS AND STUDY ON (1) USE OF COAL COMBUSTION PRODUCTS AS STRUCTURAL FILL AND (2) CONSTRUCTION OR EXPANSION OF COMBUSTION PRODUCTS LANDFILLS

SECTION 4.(a) Notwithstanding 15A NCAC 13B .1701, et seq., and except as provided in Section 4(b) of this act, the use of coal combustion products, as defined in

G.S. 130A-309.201, as structural fill is prohibited until August 1, 2015, in order to allow the Department of Environment and Natural Resources, the Environmental Management Commission, and the General Assembly time to review and evaluate the use of coal combustion residuals as structural fill.

SECTION 4.(b) Coal combustion products may be used as structural fill for any of the following types of projects:

(1) A project where the structural fill is used with a base liner, leachate collection system, cap liner, or groundwater monitoring system and where the constructor or operator establishes financial assurance, as required by G.S. 130A–309.217.

(2) As the base or sub-base of a concrete or asphalt paved road constructed under the authority of a public entity.

SECTION 4.(c) The use of coal combustion products (i) as structural fill as authorized by Section 4(b) of this act shall be conducted in accordance with the requirements of Subpart 3 of Part 2I of Article 9 of the General Statutes, as enacted by Section 3(a) of this act, and (ii) for other beneficial uses shall be conducted in accordance with the requirements of Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By-Products) and Section .1205 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management), as applicable.

SECTION 4.(d) The Department of Environment and Natural Resources and the Environmental Management Commission shall jointly review Subpart 3 of Part 2I of Article 9 of the General Statutes, as enacted by Section 3(a) of this act, and 15A NCAC 13B .1701, et seq. In conducting this review, the Department and Commission shall do all of the following:

(1) Review the uses of coal combustion products as structural fill and the regulation of this use under Subpart 3 of Part 2I of Article 9 of the General Statutes, as enacted by Section 3(a) of this act, to determine if the requirements are sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(2) Review the uses of coal combustion products for other beneficial uses and the regulation of these uses under Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By-Products) and Section .1200 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management), and other applicable rules, to determine if the rules are sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) Evaluate additional opportunities for the use of coal combustion products as structural fill and for other beneficial uses that would reduce the volume of coal combustion residuals that are being disposed of in coal combustion residuals landfills, industrial landfills, or municipal solid waste landfills while still being protective of public health, safety, and welfare; the environment; and natural resources.

(4) Monitor any actions of the United States Environmental Protection Agency regarding the use of coal combustion products as structural fill or for other beneficial uses.

(5) Jointly report to the Environmental Review Commission no later than January 15, 2015, on their findings and recommendations regarding the use of coal combustion products as structural fill and for other beneficial uses.

SECTION 4.(e) All electric generating facilities owned by a public utility that produce coal combustion residuals and coal combustion products shall issue a request for proposals on or before December 31, 2014, for (i) the conduct of a market analysis for the concrete industry and other industries that might beneficially use coal combustion residuals and coal combustion products; (ii) the study of the feasibility and advisability of installation of technology to convert existing and newly generated coal combustion residuals to commercial-grade coal combustion products suitable for use in the concrete industry and other industries that might beneficially use coal combustion residuals; and (iii) an examination of all innovative technologies that might be applied to diminish, recycle or reuse, or mitigate the impact of existing and newly generated coal combustion residuals. All electric generating

facilities shall present the materials and information received in response to a request for proposals issued pursuant to this section and an assessment of the materials and information, including a forecast of specific actions to be taken in response to the materials and information received, to the Environmental Management Commission and the Coal Ash Management Commission on or before August 1, 2016.

SECTION 4.(f) This section is effective when it becomes law and applies to the use of coal combustion residuals as structural fill contracted for on or after that date.

SECTION 5.(a) There is hereby established a moratorium on construction of new or expansion of existing coal combustion residuals landfills, as defined by G.S. 130A-290(2c) and amended by Section 3(d) of this act. The purpose of this moratorium is to allow the State to assess the risks to public health, safety, and welfare; the environment; and natural resources of coal combustion residuals impoundments located beneath coal combustion residuals landfills to determine the advisability of continued operation of these landfills.

SECTION 5.(b) The Department of Environment and Natural Resources shall evaluate each coal combustion residuals landfill currently operating in the State and, in particular, assess the risks to public health, safety, and welfare; the environment; and natural resources, of coal combustion residuals surface impoundments located beneath coal combustion residuals landfills to determine the advisability of continued operation of these landfills. The Department shall report to the Environmental Review Commission no later than January 15, 2015, on its findings and recommendations concerning the risk assessment of each of these sites and the advisability of continued operation of coal combustion residuals landfills.

SECTION 5.(c) This section is effective when it becomes law and expires August 1, 2015.

PART IV. STRENGTHEN THE REPORTING AND NOTIFICATION REQUIREMENTS APPLICABLE TO DISCHARGES OF WASTEWATER TO WATERS OF THE STATE; REQUIRE CERTAIN EMERGENCY CALLS TO BE RECORDED

SECTION 6.(a) G.S. 143-215.1C reads as rewritten:

"**§ 143-215.1C. Report to wastewater system customers on system performance; <u>report discharge of untreated wastewater to the Department;</u> publication of notice of discharge of untreated wastewater and waste.**

(a) Report to Wastewater System Customers. – The owner or operator of any wastewater collection or treatment works, the operation of which is primarily to collect or treat municipal or domestic wastewater and for which a permit is issued under this Part and having an average annual flow greater than 200,000 gallons per day, shall provide to the users or customers of the collection system or treatment works and to the Department an annual report that summarizes the performance of the collection system or treatment works and the extent to which the collection system or treatment works has violated the permit or federal or State laws, regulations, or rules related to the protection of water quality. The report shall be prepared on either a calendar or fiscal year basis and shall be provided no later than 60 days after the end of the calendar or fiscal year.

<u>(a1) Report Discharge of Untreated Wastewater to the Department. – The owner or operator of any wastewater collection or treatment works for which a permit is issued under this Part shall report a discharge of 1,000 gallons or more of untreated wastewater to the surface waters of the State to the Department as soon as practicable, but no later than 24 hours after the owner or operator has determined that the discharge has reached the surface waters of the State. This reporting requirement shall be in addition to any other reporting requirements applicable to the owner or operator of the wastewater collection or treatment works.</u>

(b) Publication of Notice of Discharge of Untreated Wastewater. – The owner or operator of any wastewater collection or treatment works, the operation of which is primarily to collect or treat municipal or domestic wastewater and for which a permit is issued under this Part shall:

(1) In the event of a discharge of 1,000 gallons or more of untreated wastewater to the surface waters of the State, issue a press release to all print and electronic news media that provide general coverage in the county where the discharge occurred setting out the details of the discharge. The owner or operator shall issue the press release within ~~48~~ <u>24</u> hours after the owner or operator has determined that the discharge has reached the surface waters of

the State. The owner or operator shall retain a copy of the press release and a list of the news media to which it was distributed for at least one year after the discharge and shall provide a copy of the press release and the list of the news media to which it was distributed to any person upon request.

(2) In the event of a discharge of 15,000 gallons or more of untreated wastewater to the surface waters of the State, publish a notice of the discharge in a newspaper having general circulation in the county in which the discharge occurs and in each county downstream from the point of discharge that is significantly affected by the discharge. The Secretary shall determine, at the Secretary's sole discretion, which counties are significantly affected by the discharge and shall approve the form and content of the notice and the newspapers in which the notice is to be published. The notice shall be captioned "NOTICE OF DISCHARGE OF UNTREATED SEWAGE". The owner or operator shall publish the notice within 10 days after the Secretary has determined the counties that are significantly affected by the discharge and approved the form and content of the notice and the newspapers in which the notice is to be published. The owner or operator shall file a copy of the notice and proof of publication with the Department within 30 days after the notice is published. Publication of a notice of discharge under this subdivision is in addition to the requirement to issue a press release under subdivision (1) of this subsection.

(c) Publication of Notice of Discharge of Untreated Waste. – The owner or operator of any wastewater collection or treatment works, other than a wastewater collection or treatment works the operation of which is primarily to collect or treat municipal or domestic wastewater, for which a permit is issued under this Part shall:

(1) In the event of a discharge of 1,000 gallons or more of untreated waste to the surface waters of the State, issue a press release to all print and electronic news media that provide general coverage in the county where the discharge occurred setting out the details of the discharge. The owner or operator shall issue the press release within ~~48~~ 24 hours after the owner or operator has determined that the discharge has reached the surface waters of the State. The owner or operator shall retain a copy of the press release and a list of the news media to which it was distributed for at least one year after the discharge and shall provide a copy of the press release and the list of the news media to which it was distributed to any person upon request.

(2) In the event of a discharge of 15,000 gallons or more of untreated waste to the surface waters of the State, publish a notice of the discharge in a newspaper having general circulation in the county in which the discharge occurs and in each county downstream from the point of discharge that is significantly affected by the discharge. The Secretary shall determine, at the Secretary's sole discretion, which counties are significantly affected by the discharge and shall approve the form and content of the notice and the newspapers in which the notice is to be published. The notice shall be captioned "NOTICE OF DISCHARGE OF UNTREATED WASTE". The owner or operator shall publish the notice within 10 days after the Secretary has determined the counties that are significantly affected by the discharge and approved the form and content of the notice and the newspapers in which the notice is to be published. The owner or operator shall file a copy of the notice and proof of publication with the Department within 30 days after the notice is published. Publication of a notice of discharge under this subdivision is in addition to the requirement to issue a press release under subdivision (1) of this subsection."

SECTION 6.(b) Section 6(a) of this act becomes effective October 1, 2014.

SECTION 6.(c) G.S. 166A-19.12(16) reads as rewritten:

"(16) Establishing and operating a 24-hour Operations Center to serve as a single point of contact for local governments to report the occurrence of emergency and disaster events and to coordinate local and State response assets. The Division shall record all telephone calls to the 24-hour Operations Center

emergency hotline and shall maintain the recording of each telephone call for at least one year."

PART V. REQUIRE NOTIFICATION OF THE DEPARTMENT OF EMERGENCY DAM REPAIRS; REQUIRE EMERGENCY ACTION PLANS FOR CERTAIN DAMS; REQUIRE INSPECTION OF DAMS AT COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS

SECTION 7. G.S. 143-215.27 reads as rewritten:

"**§ 143-215.27. Repair, alteration, or removal of dam.**

(a) Before commencing the repair, alteration or removal of a dam, application shall be made for written approval by the Department, except as otherwise provided by this Part. The application shall state the name and address of the applicant, shall adequately detail the changes it proposes to effect and shall be accompanied by maps, plans and specifications setting forth such details and dimensions as the Department requires. The Department may waive any such requirements. The application shall give such other information concerning the dam and reservoir required by the Department, such information concerning the safety of any change as it may require, and shall state the proposed time of commencement and completion of the work. When an application has been completed it may be referred by the Department for agency review and report, as provided by subsection (b) of G.S. 143-215.26 in the case of original construction.

(b) When emergency repairs are necessary to safeguard life and property they may be started immediately but the Department shall be notified ~~forthwith~~ of the proposed repairs and of the work ~~under way, and they~~underway as soon as possible, but not later than 24 hours after first knowledge of the necessity for the emergency repairs, and the emergency repairs shall be made to conform to ~~its~~ the Department's orders."

SECTION 7.1. Part 3 of Article 21 of Chapter 143 of the General Statutes is amended by adding a new section to read:

"**§ 143-215.27A. Closure of coal combustion residuals surface impoundments to render such facilities exempt from the North Carolina Dam Safety Law of 1967.**

(a) Decommissioning Request. – The owner of a coal combustion residuals surface impoundment, as defined by G.S. 130A-309.201, that seeks to decommission the impoundment shall submit a Decommissioning Request to the Division of Energy, Mineral, and Land Resources of the Department requesting that the facility be decommissioned. The Decommissioning Request shall include, at a minimum, all of the following:

(1) A proposed geotechnical investigation plan scope of work. Upon preliminary plan approval pursuant to subsection (b) of this section, the owner shall proceed with necessary field work and submit a geotechnical report with site-specific field data indicating that the containment dam and material impounded by the containment dam are stable, and that the impounded material is not subject to liquid flow behavior under expected static and dynamic loading conditions. Material testing should be performed along the full extent of the containment dam and in a pattern throughout the area of impounded material.

(2) A topographic map depicting existing conditions of the containment dam and impoundment area at two-foot contour intervals or less.

(3) If the facility contains areas capable of impounding by topography, a breach plan must be included that ensures that there shall be no place within the facility capable of impounding. The breach plan shall include, at a minimum, proposed grading contours superimposed on the existing topographic map as well as necessary engineering calculations, construction details, and construction specifications.

(4) A permanent vegetation and stabilization or capping plan by synthetic liner or other means, if needed. These plans shall include at minimum, proposed grading contours superimposed on the existing topographic map where applicable as well as necessary engineering calculations, construction details, construction specifications, and all details for the establishment of surface area stabilization.

(5) A statement indicating that the impoundment facility has not received sluiced coal combustion residuals for at least three years and that there are

no future plans to place coal combustion residuals in the facility by sluicing methods. The Division of Energy, Mineral, and Land Resources may waive the three-year requirement if proper evidence is presented by a North Carolina registered professional engineer indicating that the impounded material is not subject to liquid flow behavior.

(b) Preliminary Review and Approval. – The Decommissioning Request shall undergo a preliminary review by the Division for completeness and approval of the proposed geotechnical investigation plan scope of work. The owner shall be notified by letter with results of the preliminary review, including approval or revision requests relative to the proposed scope of work included in the geotechnical investigation plan. Upon receipt of a letter issued by the Division approving the preliminary geotechnical plan scope of work, the owner may proceed with field work and development of the geotechnical report.

(c) Final Determination and Approval. – Upon receipt of the geotechnical report, the Division shall complete the submittal review as provided in this subsection.

(1) If it is determined that sufficient evidence has been presented to clearly show that the facility no longer functions as a dam in its current state, a letter decommissioning the facility shall be issued by the Division, and the facility shall no longer be under jurisdiction of the Dam Safety Law of 1967.

(2) If modifications such as breach construction or implementation of a permanent vegetation or surface lining plan are needed, such plans shall be reviewed per standard procedures for consideration of a letter of approval to modify or breach.

(3) If approved, such plans shall follow standard procedure for construction, including construction supervision by a North Carolina registered professional engineer, as-built submittal by a North Carolina registered professional engineer, and follow up final inspection by the Division.

(4) Final approval shall be issued by the Division in the form of a letter decommissioning the facility, and the facility shall no longer be under jurisdiction of the Dam Safety Law of 1967."

SECTION 8.(a) G.S. 143-215.31 reads as rewritten:

"**§ 143-215.31. Supervision over maintenance and operation of dams.**

(a) The Commission shall have jurisdiction and supervision over the maintenance and operation of dams to safeguard life and property and to satisfy minimum streamflow requirements. The Commission may adopt standards for the maintenance and operation of dams as may be necessary for the purposes of this Part. The Commission may vary the standards applicable to various dams, giving due consideration to the minimum flow requirements of the stream, the type and location of the structure, the hazards to which it may be exposed, and the peril of life and property in the event of failure of a dam to perform its function.

(a1) The owner of a dam classified by the Department as a high-hazard dam or an intermediate-hazard dam shall develop an Emergency Action Plan for the dam as provided in this subsection.

(1) The owner of the dam shall submit a proposed Emergency Action Plan for the dam within 90 days after the dam is classified as a high-hazard dam or an intermediate-hazard dam to the Department and the Department of Public Safety for their review and approval. The Department and the Department of Public Safety shall approve the Emergency Action Plan if they determine that it complies with the requirements of this subsection and will protect public health, safety, and welfare; the environment; and natural resources.

(2) The Emergency Action Plan shall include, at a minimum, all of the following:

a. A description of potential emergency conditions that could occur at the dam, including security risks.

b. A description of actions to be taken in response to an emergency condition at the dam.

c. Emergency notification procedures to aid in warning and evacuations during an emergency condition at the dam.

d. A downstream inundation map depicting areas affected by a dam failure and sudden release of the impoundment.

(3) The owner of the dam shall update the Emergency Action Plan annually and shall submit it to the Department and the Department of Public Safety for their review and approval within one year of the prior approval.

(4) The Department shall provide a copy of the Emergency Action Plan to the regional offices of the Department that might respond to an emergency condition at the dam.

(5) The Department of Public Safety shall provide a copy of the Emergency Action Plan to all local emergency management agencies that might respond to an emergency condition at the dam.

(6) Information included in an Emergency Action Plan that constitutes sensitive public security information, as provided in G.S. 132-1.7, shall be maintained as confidential information and shall not be subject to disclosure under the Public Records Act. For purposes of this section, "sensitive public security information" shall include Critical Energy Infrastructure Information protected from disclosure under rules adopted by the Federal Energy Regulatory Commission in 18 C.F.R. § 333.112.

…."

SECTION 8.(b) Notwithstanding G.S. 143-215.31, as amended by Section 8(a) of this act, the owners of all high-hazard dams and intermediate-hazard dams in operation on the effective date of this act shall submit their proposed Emergency Action Plans to the Department of Environment and Natural Resources and the Department of Public Safety no later than March 1, 2015.

SECTION 8.(c) G.S. 143-215.30 reads as rewritten:

"**§ 143-215.30. Notice of completion; certification of final ~~approval.~~approval; notice of transfer.**

(a) Immediately upon completion, enlargement, repair, alteration or removal of a dam, notice of completion shall be given the Commission. As soon as possible thereafter supplementary drawings or descriptive matter showing or describing the dam as actually constructed shall be filed with the Department in such detail as the Commission may require.

(b) When an existing dam is enlarged, the supplementary drawings and descriptive matter need apply only to the new work.

(c) The completed work shall be inspected by the supervising engineers, and upon finding that the work has been done as required and that the dam is safe and satisfies minimum streamflow requirements, they shall file with the Department a certificate that the work has been completed in accordance with approved design, plans, specifications and other requirements. Unless the Commission has reason to believe that the dam is unsafe or is not in compliance with any applicable rule or law, the Commission shall grant final approval of the work in accordance with the certificate, subject to such terms as it deems necessary for the protection of life and property.

(d) Pending issuance of the Commission's final approval, the dam shall not be used except on written consent of the Commission, subject to conditions it may impose.

(e) The owner of a dam shall provide written notice of transfer to the Department within 30 days after title to the dam has been legally transferred. The notice of transfer shall include the name and address of the new dam owner."

SECTION 9. Section 3(b) of S.L. 2009-390 reads as rewritten:

"**SECTION 3.(b)** Any impoundments or other facilities that were in use ~~on the effective date of this section~~January 1, 2010, in connection with nonnuclear electric generating facilities under the jurisdiction of the North Carolina Utilities Commission, and that had been exempted under the provisions of G.S. 143-215.25A(4), prior to ~~amendment by Section 3(a) of this act,~~ January 1, 2010, shall be deemed to have received all of the necessary approvals from the Department of Environment and Natural Resources and the ~~Commission for Dam Safety, and shall not be required to submit application, certificate, or other materials in connection with the continued normal operation and maintenance of those facilities.~~Environmental Management Commission."

SECTION 10. G.S. 143-215.32 reads as rewritten:

"**§ 143-215.32. Inspection of dams.**

(a) The Department may at any time inspect any dam, including a dam that is otherwise exempt from this Part, upon receipt of a written request of any affected person or agency, or upon a motion of the Environmental Management Commission. Within the limits of available

funds the Department shall endeavor to provide for inspection of all dams at intervals of approximately five years.

(a1) Coal combustion residuals surface impoundments, as defined by G.S. 130A-309.201, shall be inspected as provided in this subsection:

(1) The Department shall inspect each dam associated with a coal combustion residuals surface impoundment at least annually.

(2) The owner of a coal combustion residuals surface impoundment shall inspect the impoundment weekly and after storms to detect evidence of any of the following conditions:

a. Deterioration, malfunction, or improper operation of spillway control systems.

b. Sudden drops in the level of the contents of the impoundment.

c. Severe erosion or other signs of deterioration in dikes or other containment devices or structures.

d. New or enlarged seeps along the downstream slope or toe of the dike or other containment devices or structures.

e. Any other abnormal conditions at the impoundment that could pose a risk to public health, safety, or welfare; the environment; or natural resources.

(3) If any of the conditions described in subdivision (2) of this subsection are observed, the owner shall provide documentation of the conditions to the Department and a registered professional engineer. The registered professional engineer shall investigate the conditions and, if necessary, develop a plan of corrective action to be implemented by the owner of the impoundment. The owner of the impoundment shall provide documentation of the completed corrective action to the Department.

(4) The owner of a coal combustion residuals surface impoundment shall provide for the annual inspection of the impoundment by an independent registered professional engineer to ensure that the structural integrity and the design, operation, and maintenance of the impoundment is in accordance with generally accepted engineering standards. Within 30 days of the inspection, the owner shall provide to the Department the inspection report and a certification by the engineer that the impoundment is structurally sound and that the design, operation, and maintenance of the impoundment is in accordance with generally accepted engineering standards. The owner and the Department shall each place the inspection report and certification on a publicly accessible Internet Web site.

(b) If the Department upon inspection finds that any dam is not sufficiently strong, is not maintained in good repair or operating condition, is dangerous to life or property, or does not satisfy minimum streamflow requirements, the Department shall present its findings to the Commission and the Commission may issue an order directing the owner or owners of the dam to make at his or her expense maintenance, alterations, repairs, reconstruction, change in construction or location, or removal as may be deemed necessary by the Commission within a time limited by the order, not less than 90 days from the date of issuance of each order, except in the case of extreme danger to the safety of life or property, as provided by subsection (c) of this section.

(c) If at any time the condition of any dam becomes so dangerous to the safety of life or property, in the opinion of the Environmental Management Commission, as not to permit sufficient time for issuance of an order in the manner provided by subsection (b) of this section, the Environmental Management Commission may immediately take such measures as may be essential to provide emergency protection to life and property, including the lowering of the level of a reservoir by releasing water impounded or the destruction in whole or in part of the dam or reservoir. The Environmental Management Commission may recover the costs of such measures from the owner or owners by appropriate legal action.

(d) An order issued under this Part shall be served on the owner of the dam as provided in G.S. 1A-1, Rule 4."

PART VI. TRANSFER SOLID WASTE RULE-MAKING AUTHORITY FROM COMMISSION FOR PUBLIC HEALTH TO ENVIRONMENTAL MANAGEMENT COMMISSION

SECTION 11.(a) G.S. 130A-29 reads as rewritten:

"**§ 130A-29. Commission for Public Health – Creation, powers and duties.**

…

(c) The Commission shall adopt rules:

(1) Repealed by Session Laws 1983 (Regular Session, 1984), c. 1022, s. 5.

(2) Establishing standards for approving sewage-treatment devices and holding tanks for marine toilets as provided in G.S. 75A-6(o).

(3) Establishing specifications for sanitary privies for schools where water-carried sewage facilities are unavailable as provided in G.S. 115C-522.

(4) Establishing requirements for the sanitation of local confinement facilities as provided in Part 2 of Article 10 of Chapter 153A of the General Statutes.

(5) Repealed by Session Laws 1989 (Regular Session, 1990), c. 1075, s. 1.

(5a) Establishing eligibility standards for participation in Department reimbursement programs.

(6) ~~Requiring proper treatment and disposal of sewage and other waste from chemical and portable toilets.~~

(7) Establishing statewide health outcome objectives and delivery standards.

(8) Establishing permit requirements for the sanitation of premises, utensils, equipment, and procedures to be used by a person engaged in tattooing, as provided in Part 11 of Article 8 of this Chapter.

(9) Implementing immunization requirements for adult care homes as provided in G.S. 131D-9 and for nursing homes as provided in G.S. 131E-113.

(10) Pertaining to the biological agents registry in accordance with G.S. 130A-479.

(11) For matters within its jurisdiction that allow for and regulate horizontal drilling and hydraulic fracturing for the purpose of oil and gas exploration and development.

…."

SECTION 11.(b) G.S. 130A-291.1 reads as rewritten:

"**§ 130A-291.1. Septage management program; permit fees.**

…

(d) Septage shall be treated and disposed only at a wastewater system that has been approved by the Department under rules adopted by the Commission ~~or by the Environmental Management Commission~~ or at a site that is permitted by the Department under this section. A permit shall be issued only if the site satisfies all of the requirements of the rules adopted by the Commission.

…."

SECTION 11.(c) G.S. 130A-294(a)(4) reads as rewritten:

"**§ 130A-294. Solid waste management program.**

(a) The Department is authorized and directed to engage in research, conduct investigations and surveys, make inspections and establish a statewide solid waste management program. In establishing a program, the Department shall have authority to:

…

(4) a. Develop a permit system governing the establishment and operation of solid waste management facilities. A landfill with a disposal area of 1/2 acre or less for the on-site disposal of land clearing and inert debris is exempt from the permit requirement of this section and shall be governed by G.S. 130A-301.1. Demolition debris from the decommissioning of manufacturing buildings, including electric generating stations, that is disposed of on the same site as the decommissioned buildings, is exempt from the permit requirement of this section and rules adopted pursuant to this section and shall be governed by G.S. 130A-301.3. The Department shall not approve an application for a new permit, the renewal of a permit, or a substantial amendment to a permit for a sanitary landfill, excluding demolition

landfills as defined in the rules of the Commission, except as provided in subdivisions (3) and (4) of subsection (b1) of this section. No permit shall be granted for a solid waste management facility having discharges that are point sources until the Department has referred the complete plans and specifications to the ~~Environmental Management~~ Commission and has received advice in writing that the plans and specifications are approved in accordance with the provisions of G.S. 143-215.1. In any case where the Department denies a permit for a solid waste management facility, it shall state in writing the reason for denial and shall also state its estimate of the changes in the applicant's proposed activities or plans that will be required for the applicant to obtain a permit.

b. Repealed by Session Laws 2007-550, s. 1(a), effective August 1, 2007.

c. The Department shall deny an application for a permit for a solid waste management facility if the Department finds that:

1. Construction or operation of the proposed facility would be inconsistent with or violate rules adopted by the Commission.
2. Construction or operation of the proposed facility would result in a violation of water quality standards adopted by the ~~Environmental Management~~ Commission pursuant to G.S. 143-214.1 for waters, as defined in G.S. 143-213.
3. Construction or operation of the facility would result in significant damage to ecological systems, natural resources, cultural sites, recreation areas, or historic sites of more than local significance. These areas include, but are not limited to, national or State parks or forests; wilderness areas; historic sites; recreation areas; segments of the natural and scenic rivers system; wildlife refuges, preserves, and management areas; areas that provide habitat for threatened or endangered species; primary nursery areas and critical fisheries habitat designated by the Marine Fisheries Commission; and Outstanding Resource Waters designated by the ~~Environmental Management~~ Commission.

…."

SECTION 11.(d) G.S. 130A-300 reads as rewritten:

"**§ 130A-300. Effect on laws applicable to water pollution control.**

This Article shall not be considered as amending, repealing or in any manner abridging or interfering with those sections of the General Statutes of North Carolina relative to the control of water pollution as now administered by the ~~Environmental Management~~ Commission nor shall the provisions of this Article be construed as being applicable to or in any way affecting the authority of the ~~Environmental Management~~ Commission to control the discharges of wastes to the waters of the State as provided in Articles 21 and 21A, Chapter 143 of the General Statutes."

SECTION 11.(e) G.S. 130A-302 reads as rewritten:

"**§ 130A-302. Sludge deposits at sanitary landfills.**

Sludges generated by the treatment of wastewater discharges which are point sources subject to permits granted under Section 402 of the Federal Water Pollution Act, as amended (P.L. 92-500), or permits generated under G. S. 143-215.1 by the ~~Environmental Management~~ Commission shall not be deposited in or on a sanitary landfill permitted under this Article unless in a compliance with the rules concerning solid waste adopted under this Article."

SECTION 11.(f) G.S. 130A-310.3 reads as rewritten:

"**§ 130A-310.3. Remedial action programs for inactive hazardous substance or waste disposal sites.**

…

(b) Where possible, the Secretary shall work cooperatively with any owner, operator, responsible party, or any appropriate agency of the State or federal government to develop and implement the inactive hazardous substance or waste disposal site remedial action program. The Secretary shall not take action under this section to the extent that the ~~Environmental~~

~~Management~~ Commission, the Commissioner of Agriculture, or the Pesticide Board has assumed jurisdiction pursuant to Articles 21 or 21A of Chapter 143 of the General Statutes.

…

(d) In any inactive hazardous substance or waste disposal site remedial action program implemented hereunder, the Secretary shall ascertain the most nearly applicable cleanup standard as would be applied under CERCLA/SARA, and may seek federal approval of any such program to insure concurrent compliance with federal standards. State standards may exceed and be more comprehensive than such federal standards. The Secretary shall assure concurrent compliance with applicable standards set by the ~~Environmental Management~~ Commission.

…."

SECTION 11.(g) G.S. 130A-310.4(g) reads as rewritten:

"(g) The Commission ~~on Health Services [Commission for Public Health]~~ shall adopt rules prescribing the form and content of the notices required by this section. The proposed remedial action plan shall include a summary of all alternatives considered in the development of the plan. A record shall be maintained of all comment received by the Department regarding the remedial action plan."

SECTION 11.(h) G.S. 130A-310.31(b)(5) reads as rewritten:

"(5) "Unrestricted use standards" when used in connection with "cleanup", "remediated", or "remediation" means contaminant concentrations for each environmental medium that are considered acceptable for all uses and that comply with generally applicable standards, guidance, or established methods governing the contaminants that are established by statute or adopted, published, or implemented by the ~~Environmental Management Commission, the Commission,~~ Commission or the Department instead of the site-specific contaminant levels established pursuant to this Part."

SECTION 11.(i) G.S. 130A-310.65 reads as rewritten:

"**§ 130A-310.65. Definitions.**

As used in this Part:

(1) "Background standard" means the naturally occurring concentration of a substance in the absence of the release of a contaminant.

(2) ~~"Commission" means the Environmental Management Commission created pursuant to G.S. 143B-282.~~

…

(12) "Unrestricted use standards" means contaminant concentrations for each environmental medium that are acceptable for all uses; that are protective of public health, safety, and welfare and the environment; and that comply with generally applicable standards, guidance, or methods established by statute or adopted, published, or implemented by the ~~Commission, the Commission for Public Health,~~Commission or the Department."

SECTION 11.(j) G.S. 113-391(a)(5)f. reads as rewritten:

"f. Management of wastes produced in connection with oil and gas exploration and development and use of horizontal drilling and hydraulic fracturing treatments for that purpose. Such rules shall address storage, transportation, and disposal of wastes that may contain radioactive materials or wastes that may be toxic or have other hazardous wastes' characteristics that are not otherwise regulated as a hazardous waste by the federal Resource Conservation and Recovery Act (RCRA), such as top-hole water, brines, drilling fluids, additives, drilling muds, stimulation fluids, well servicing fluids, oil, production fluids, and drill cuttings from the drilling, alteration, production, plugging, or other activity associated with oil and gas wells. Wastes generated in connection with oil and gas exploration and development and use of horizontal drilling and hydraulic fracturing treatments for that purpose that constitute hazardous waste under RCRA shall be subject to rules adopted by the Environmental Management Commission ~~for Public Health~~ to implement RCRA requirements in the State."

SECTION 11.(k) G.S. 113-415 reads as rewritten:

"**§ 113-415. Conflicting laws.**

No provision of this Article shall be construed to repeal, amend, abridge or otherwise ~~affect: (i)~~ affect the authority and ~~responsibility~~responsibility (i) vested in the Environmental Management Commission by Article 7 of Chapter 87 of the General Statutes, pertaining to the location, construction, repair, operation and abandonment of ~~wells, or the authority and responsibility~~ wells; (ii) vested in the Environmental Management Commission related to the control of water and air pollution as provided in Articles 21 and 21A of Chapter 143 of the General Statutes; ~~or (ii) the authority or responsibility~~(iii) vested in the Department and the Environmental Management Commission ~~for Public Health~~ by Article 10 of Chapter 130A of the General Statutes pertaining to public water-supply ~~requirements,~~requirements; or ~~the authority and responsibility~~(iv) vested in the Environmental Management Commission ~~for Public Health~~ related to the management of solid and hazardous waste as provided in Article 9 of Chapter 130A of the General Statutes."

SECTION 11.(l) The Revisor of Statutes shall make any conforming statutory changes necessary to reflect the transfer of rule-making authority under Article 9 of Chapter 130A of the General Statutes from the Commission for Public Health to the Environmental Management Commission.

SECTION 11.(m) The Codifier of Rules shall make any conforming rule changes necessary to reflect the transfer of rule-making authority under Article 9 of Chapter 130A of the General Statutes from the Commission for Public Health to the Environmental Management Commission.

PART VII. AMEND COMPLIANCE BOUNDARY PROVISIONS

SECTION 12.(a) G.S. 143-215.1 reads as rewritten:

"**§ 143-215.1. Control of sources of water pollution; permits required.**

…

(i) Any person subject to the requirements of this section who is required to obtain an individual permit from the Commission for a disposal system under the authority of G.S. 143-215.1 or Chapter 130A of the General Statutes shall have a compliance boundary as may be established by rule or permit for various categories of disposal systems and beyond which groundwater quality standards may not be exceeded. ~~The location of the compliance boundary shall be established at the property boundary, except as otherwise established by the Commission.~~ Multiple contiguous properties under common ownership and permitted for use as a disposal system shall be treated as a single property with regard to determination of a compliance ~~boundary under this subsection. Nothing in this subsection shall be interpreted to require a revision to an existing compliance boundary previously approved by rule or permit.~~boundary.

(j) ~~When operation of a disposal system permitted under this section results in an exceedance of the groundwater quality standards adopted in accordance with G.S. 143-214.1, the Commission shall require that the exceedances within the compliance boundary be remedied through cleanup, recovery, containment, or other response only when any of the following conditions occur:~~

~~(1) A violation of any water quality standard in adjoining classified waters of the State occurs or can be reasonably predicted to occur considering hydrogeological conditions, modeling, or any other available evidence.~~

~~(2) An imminent hazard or threat to the environment, public health, or safety exists.~~

~~(3) A violation of any standard in groundwater occurring in the bedrock, including limestone aquifers in Coastal Plain sediments, unless it can be demonstrated that the violation will not adversely affect, or have the potential to adversely affect, a water supply well.~~

(k) Where operation of a disposal system permitted under this section results in exceedances of the groundwater quality standards at or beyond the compliance ~~boundary established under subsection (i) of this section, exceedances shall be remedied through cleanup, recovery, containment, or other response as directed by the Commission.~~boundary, the Commission shall require the permittee to undertake corrective action, without regard to the date that the system was first permitted, to restore the groundwater quality by assessing the cause, significance, and extent of the violation of standards and submit the results of the investigation and a plan and proposed schedule for corrective action to the Director or the

Director's designee. The permittee shall implement the plan as approved by, and in accordance with, a schedule established by the Director or the Director's designee. In establishing a schedule the Director or the Director's designee shall consider any reasonable schedule proposed by the permittee."

SECTION 12.(b) Section 46(b) of S.L. 2013-413 is repealed.

SECTION 12.(c) The Environmental Management Commission shall review the compliance boundary and corrective action provisions of Subchapter 2L of Title 15A of the North Carolina Administrative Code for clarity and internal consistency. The Commission shall report the results of its review, including any recommendations, to the Environmental Review Commission no later than December 1, 2014.

PART VIII. OTHER STUDIES

SECTION 13.(a) The Coal Ash Management Commission, established pursuant to G.S. 130A-309.202, as enacted by Section 3(a) of this act, shall study whether and under what circumstances no further action or natural attenuation is appropriate for a coal combustion residuals surface impoundment that is classified as low-risk pursuant to G.S. 130A-309.211, as enacted by Section 3(a) of this act. In conducting this study, the Commission shall specifically consider whether there is any contact or interaction between coal combustion residuals and groundwater and surface water, whether the area has reverted to a natural state as evidenced by the presence of wildlife and vegetation, and whether no further action or natural attenuation would be protective of public health, safety, and welfare; the environment; and natural resources. The Commission shall report the results of its study, including any recommendations, to the Environmental Review Commission no later than October 1, 2015.

SECTION 13.(b) The Department of Environment and Natural Resources shall review and make recommendations on all deadlines established under Part 2I of Article 9 of Chapter 130A of the General Statutes, as enacted by Section 3(a) of this act. At a minimum, the Department shall identify all permits that may be required for closure requirements established under this act and expected time frames for issuance of these permits. The Department shall report the results of its study, including any recommendations, to the Environmental Review Commission no later than December 1, 2014.

SECTION 13.(c) The Coal Ash Management Commission, established pursuant to G.S. 130A-309.202, as enacted by Section 3(a) of this act, shall study how to promote, incentivize, and prioritize the beneficial use of coal combustion products over the disposal of coal combustion residuals. The Commission shall report the results of its study, including any recommendations, to the Environmental Review Commission no later than December 1, 2014.

SECTION 14. The Department of Transportation shall evaluate additional opportunities for the use of coal combustion products in the construction and maintenance of roads and bridges within the State. The Department shall report the results of its study, including any recommendations, to the Environmental Review Commission and the Joint Legislative Transportation Oversight Committee no later than December 1, 2014.

PART IX. PROVIDE RESOURCES FOR IMPLEMENTATION OF THIS ACT

SECTION 15.(a) Article 14 of Chapter 62 of the General Statutes is amended by adding a new section to read:

"**§ 62-302.1. Regulatory fee for combustion residuals surface impoundments.**

(a) Fee Imposed. – Each public utility with a coal combustion residuals surface impoundment shall pay a regulatory fee for the purpose of defraying the costs of oversight of coal combustion residuals. The fee is in addition to the fee imposed under G.S. 62-302. The fees collected under this section shall only be used to pay the expenses of the Coal Ash Management Commission and the Department of Environment and Natural Resources in providing oversight of coal combustion residuals.

(b) Rate. – The combustion residuals surface impoundment fee shall be three-hundredths of one percent (0.03%) of the North Carolina jurisdictional revenues of each public utility with a coal combustion residuals surface impoundment. For the purposes of this section, the term "North Carolina jurisdictional revenues" has the same meaning as in G.S. 62-302.

(c) When Due. – The fee shall be paid in quarterly installments. The fee is payable to the Coal Ash Management Commission on or before the 15th of the second month following the end of each quarter. Each public utility subject to this fee shall, on or before the date the fee

is due for each quarter, prepare and render a report on a form prescribed by the Commission. The report shall state the public utility's total North Carolina jurisdictional revenues for the preceding quarter and shall be accompanied by any supporting documentation that the Coal Ash Management Commission may by rule require. Receipts shall be reported on an accrual basis.

(d) Use of Proceeds. – A special fund in the Office of State Treasurer and the Coal Ash Management Commission is created. The fees collected pursuant to this section and all other funds received by the Coal Ash Management Commission shall be deposited in the Coal Combustion Residuals Management Fund. The Fund shall be placed in an interest-bearing account, and any interest or other income derived from the Fund shall be credited to the Fund. Moneys in the Fund shall only be spent pursuant to appropriation by the General Assembly. The Commission shall be subject to the provisions of the State Budget Act, except that no unexpended surplus of the Coal Combustion Residuals Management Fund shall revert to the General Fund. All funds credited to the Fund shall be used only to pay the expenses of the Coal Ash Management Commission and the Department of Environment and Natural Resources in providing oversight of coal combustion residuals.

(e) Recovery of Fee. – The North Carolina Utilities Commission shall not allow an electric public utility to recover this fee from the retail electric customers of the State."

SECTION 15.(b) Notwithstanding G.S. 62-302.1, as enacted by this section, for the first two quarters of fiscal year 2014-2015, each public utility shall pay the fee in G.S. 62-302.1 on a monthly basis. The fee shall be paid by the 15th of the following month.

SECTION 15.(c) Twenty-five receipt-supported positions are created in the Department of Environment and Natural Resources to carry out the duties in Part 2I of Article 9 of Chapter 130A of the General Statutes. There is appropriated from the Coal Combustion Residuals Management Fund the sum of one million seven hundred fifty thousand dollars ($1,750,000) to the Department of Environment and Natural Resources to support the positions for the 2014-2015 fiscal year.

SECTION 15.(d) Five receipt-supported positions are created in the Division of Emergency Management of the Department of Public Safety to carry out the duties in G.S. 130A-309.202. The funds remaining in the Coal Combustion Residuals Management Fund after the appropriation to the Department of Environment and Natural Resources are appropriated to the Department of Public Safety for the 2014-2015 fiscal year. These positions shall be used to provide assistance to the Coal Ash Management Commission established by G.S. 130A-309.202, as enacted by Section 3(a) of this act. The positions shall be assigned in the following manner: one of the positions shall be the executive director of the staff, two positions shall be assigned as analysts, one position shall be assigned as a technician, and one position shall be assigned as administrative. The Division of Emergency Management in the Department of Public Safety shall consult with the Chair of the Commission in hiring the staff for the Coal Ash Management Commission. The Division of Emergency Management in the Department of Public Safety shall provide support to the Commission until the staff of the Commission is hired, including the designation of an individual to serve as an interim executive director of the staff.

SECTION 15.(e) Subsection (a) of this section becomes effective July 1, 2014, and expires April 1, 2030, and applies to jurisdictional revenues earned on or after July 1, 2014, and before April 1, 2030. The remainder of this section becomes effective July 1, 2014.

PART X. SPECIFICATIONS FOR USE OF COAL COMBUSTION PRODUCTS IN PUBLIC PROCUREMENT

SECTION 16. Article 3 of Chapter 143 of the General Statutes is amended by adding a new section to read:

"**§ 143-58.6. Specifications for use of coal combustion products.**

(a) State Construction Office to Develop Technical Specifications. – The State Construction Office shall develop recommended technical specifications for the use of coal combustion products that may be utilized in any construction by all State departments, institutions, agencies, community colleges, and local school administrative units, other than the Department of Transportation. The technical specifications shall address all products used in construction, including, but not limited to, the use of coal combustion products in concrete and cement products and in construction fill.

(b) Department of Transportation to Develop Technical Specifications. – The Department of Transportation shall develop recommended technical specifications for the use of coal combustion products that may be utilized in any construction by the Department of Transportation. The technical specifications shall address all products used in construction, including, but not limited to, the use of coal combustion products in concrete and cement products and in construction fill.

(c) Specification Factors. – The State Construction Office and the Department of Transportation shall consider safety, best practice engineering standards, quality, cost, and availability of an in-State source of coal combustion products in developing the recommended technical specifications pursuant to this section.

(d) Consultation. – The State Construction Office and the Department of Transportation shall consult with each other in the development of the recommended technical specifications pursuant to the provisions of this section in order to ensure that the recommended technical standards are uniform for similar types of construction. The goal of the Department of Administration and the Department of Transportation shall be to increase the usage and consumption of coal combustion products in their respective construction projects.

(e) Report of Recommended Specifications. – The State Construction Office and the Department of Transportation shall report the recommended technical specifications developed pursuant to this section to the Environmental Review Commission and the Joint Legislative Transportation Oversight Committee on or before February 1, 2015."

PART XI. SEVERABILITY CLAUSE AND EFFECTIVE DATE

SECTION 17. If any provision of this act or its application is held invalid, the invalidity does not affect other provisions or applications of this act that can be given effect without the invalid provisions or application, and to this end the provisions of this act are severable.

SECTION 18. Except as otherwise provided, this act is effective when it becomes law.

In the General Assembly read three times and ratified this the 20th day of August, 2014.

s/ Daniel J. Forest President of the Senate

s/ Thom Tillis
Speaker of the House of Representatives

This bill having been presented to the Governor for signature on the 20th day of August, 2014 and the Governor having failed to approve it within the time prescribed by law, the same is hereby declared to have become a law. This 20th day of September, 2014.

s/ Karen Jenkins Enrolling Clerk

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2015

SESSION LAW 2016-95
HOUSE BILL 630

A BILL TO BE ENTITLED

AN ACT TO (1) REQUIRE A COAL COMBUSTION RESIDUALS IMPOUNDMENT OWNER TO PROVIDE PERMANENT ALTERNATIVE WATER SUPPLIES FOR RESIDENTS IN AREAS SURROUNDING COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS; (2) REPEAL STATUTORY PROVISIONS RELATED TO THE COAL ASH MANAGEMENT COMMISSION; (3) MODIFY THE CLOSURE REQUIREMENTS FOR COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENTS UNDER THE COAL ASH MANAGEMENT ACT OF 2014; AND (4) MODIFY APPOINTMENTS TO THE MINING COMMISSION AND THE OIL AND GAS COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. Part 2I of Article 9 of Chapter 130A of the General Statutes reads as rewritten:

"Part 2I. Coal Ash Management.

"Subpart 1. Short Title, Definitions, and General Provisions.

"**§ 130A-309.200. Title.**

This Part may be cited as the "Coal Ash Management Act of 2014."

"**§ 130A-309.201. Definitions.**

Unless a different meaning is required by the context, the definitions of G.S. 130A-290 and the following definitions apply throughout this Part:

(1) "Beneficial and beneficial use" means projects promoting public health and environmental protection, offering equivalent success relative to other alternatives, and preserving natural resources.

(2) "Boiler slag" means the molten bottom ash collected at the base of slag tap and cyclone type furnaces that is quenched with water. It is made up of hard, black, angular particles that have a smooth, glassy appearance.

(3) "Bottom ash" means the agglomerated, angular ash particles formed in pulverized coal furnaces that are too large to be carried in the flue gases and collect on the furnace walls or fall through open grates to an ash hopper at the bottom of the furnace.

(4) "Coal combustion products" it means fly ash, bottom ash, boiler slag, or flue gas desulfurization materials that are beneficially used, including use for structural fill.

(5) "Coal combustion residuals" has the same meaning as defined in G.S. 130A-290.

(6) "Coal combustion residuals surface impoundment" means a topographic depression, excavation, or diked area that is (i) primarily formed from earthen materials; (ii) without a base liner approved for use by Article 9 of Chapter 130A of the General Statutes or rules adopted thereunder for a combustion products landfill or coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill; and (iii) designed to hold accumulated coal combustion residuals in the form of liquid wastes, wastes containing free liquids, or sludges, and that is not backfilled or otherwise covered during periods of deposition. "Coal combustion residuals surface impoundment" shall only include impoundments owned by a public utility, as defined in G.S. 62-3. "Coal combustion residuals surface impoundment" includes all of the following:

a. An impoundment that is dry due to the deposited liquid having evaporated, volatilized, or leached.

b. An impoundment that is wet with exposed liquid.

c. Lagoons, ponds, aeration pits, settling ponds, tailings ponds, and sludge pits, when these

structures are designed to hold accumulated coal combustion residuals.

d. A coal combustion residuals surface impoundment that has been covered with soil or other material after the final deposition of coal combustion residuals at the impoundment.

(7) ~~"Commission" means the Coal Ash Management Commission.~~

(8) "Flue gas desulfurization material" means the material produced through a process used to reduce sulfur dioxide emissions from the exhaust gas system of a coal-fired boiler. The physical nature of these materials varies from a wet sludge to a dry powdered material, depending on the process, and their composition comprises either sulfites, sulfates, or a mixture thereof.

(9) "Fly ash" means the very fine, powdery material, composed mostly of silica with nearly all particles spherical in shape, which is a product of burning finely ground coal in a boiler to produce electricity and is removed from the plant exhaust gases by air emission control devices.

(10) "Minerals" means soil, clay, coal, phosphate, metallic ore, and any other solid material or substance of commercial value found in natural deposits on or in the earth.

(11) "Open pit mine" means an excavation made at the surface of the ground for the purpose of extracting minerals, inorganic and organic, from their natural deposits, which excavation is open to the surface.

(12) "Owner" or "owner of a coal combustion residuals surface impoundment" means a public utility, as defined in G.S. 62-3, that owns a coal combustion residuals surface impoundment.

(13) "Receptor" means any human, plant, animal, or structure which is, or has the potential to be, affected by the release or migration of contaminants. Any well constructed for the purpose of monitoring groundwater and contaminant concentrations shall not be considered a receptor.

(14) "Structural fill" means an engineered fill with a projected beneficial end use constructed using coal combustion products that are properly placed and compacted. For purposes of this Part, the term includes fill used to reclaim open pit mines and for embankments, greenscapes, foundations, construction foundations, and for bases or sub-bases under a structure or a footprint of a paved road, parking lot, sidewalk, walkway, or similar structure.

(15) "Use or reuse of coal combustion products" means the procedure whereby coal combustion products are directly used as either of the following:

a. As an ingredient in an industrial process to make a product, unless distinct components of the coal combustion products are recovered as separate end products.

b. In a function or application as an effective substitute for a commercial product or natural resource.

"~~**§ 130A-309.202. (Repealed effective June 30, 2030) Coal Ash Management Commission.**~~

~~(a) Creation. – In recognition of the complexity and magnitude of the issues associated with the management of coal combustion residuals and the proper closure and remediation of coal combustion residuals surface impoundments, the Coal Ash Management Commission is hereby established.~~

~~(b) Membership. – The Commission shall consist of nine members as follows:~~

~~(1) One appointed by the General Assembly upon recommendation of the President Pro Tempore of the Senate in accordance with G.S. 120-121 who shall at the time of appointment be a resident of the State.~~

~~(2) One appointed by the General Assembly upon recommendation of the President Pro Tempore of the Senate in accordance with G.S. 120-121 who shall at the time of appointment have special training or scientific expertise in waste management, including solid waste disposal, hauling, or beneficial use.~~

~~(3) One appointed by the General Assembly upon recommendation of the President Pro Tempore of the Senate in accordance with G.S. 120-121 who shall at the time of appointment be a licensed physician or a person with experience in public health.~~

~~(4) One appointed by the General Assembly upon recommendation of the Speaker of the House of Representatives in accordance with G.S. 120-121 who shall at the time of appointment be a member of a nongovernmental conservation interest.~~

~~(5) One appointed by the General Assembly upon recommendation of the Speaker of the House of Representatives in accordance with G.S. 120-121 who shall at the time of appointment have special training or scientific expertise in waste management, including solid waste disposal, hauling, or beneficial use, or is a representative of or on the faculty of a State college or university that conducts coal ash research.~~

~~(6) One appointed by the General Assembly upon recommendation of the Speaker of the House of~~

~~Representatives in accordance with G.S. 120-121 who shall at the time of appointment be a representative of an electric membership corporation organized under Article 2 of Chapter 117 of the General Statutes and have a background in power supply resource planning and engineering.~~

~~(7) One appointed by the Governor who shall at the time of appointment have experience in economic development.~~

~~(8) One appointed by the Governor who shall at the time of appointment have expertise in determining and evaluating the costs associated with electricity generation and establishing the rates associated with electricity consumption.~~

~~(9) One appointed by the Governor who shall at the time of appointment be a person with experience in science or engineering in the manufacturing sector.~~

~~(c) Chair. – The Governor shall appoint the Chair of the Commission from among the Commission's members, and that person shall serve at the pleasure of the Governor. The Chair shall serve two-year terms. The Governor shall make:~~

~~(1) The initial appointment of the Chair no later than October 1, 2014. If the initial appointment is not made by that date, the Chair shall be elected by a vote of the membership; and~~

~~(2) Appointments of a subsequent Chair, including appointments to fill a vacancy of the Chair created by resignation, dismissal, death, or disability of the Chair, no later than 30 days after the last day of the previous Chair's term. If an appointment of a subsequent Chair is not made by that date, the Chair shall be elected by a vote of the membership.~~

~~(d) Vacancies. – Any appointment to fill a vacancy on the Commission created by the resignation, dismissal, death, or disability of a member shall be for the balance of the unexpired term. The Governor may reappoint a gubernatorial appointee of the Commission to an additional term if, at the time of the reappointment, the member qualifies for membership on the Commission under subdivisions (7) through (9) of subsection (b) of this section. Appointments by the General Assembly shall be made in accordance with G.S. 120-121, and vacancies in those appointments shall be filled in accordance with G.S. 120-122.~~

~~(e) Removal. – The Governor shall have the power to remove any member of the Commission from office for misfeasance, malfeasance, or nonfeasance in accordance with the provisions of G.S. 143B-13 of the Executive Organization Act of 1973.~~

~~(f) Powers and Duties. – The Commission shall have all of the following powers and duties:~~

~~(1) To review and approve the classification of coal combustion residuals surface impoundments required by G.S. 130A-309.213.~~

~~(2) To review and approve Coal Combustion Residuals Surface Impoundment Closure Plans as provided in G.S. 130A-309.214.~~

~~(3) To review and make recommendations on the provisions of this Part and other statutes and rules related to the management of coal combustion residuals.~~

~~(4) To undertake any additional studies as requested by the General Assembly.~~

~~(g) Reimbursement. – The members of the Commission shall receive per diem and necessary travel and subsistence expenses in accordance with the provisions of G.S. 138-5.~~

~~(h) Quorum. – Five members of the Commission shall constitute a quorum for the transaction of business.~~

~~(i) Staff. – The Commission is authorized and empowered to employ staff as the Commission may determine to be necessary for the proper discharge of the Commission's duties and responsibilities. The Chair of the Commission shall organize and direct the work of the Commission staff. The salaries and compensation of all such personnel shall be fixed in the manner provided by law for fixing and regulating salaries and compensation by other State agencies. The Chair, within allowed budgetary limits and as allowed by law, shall authorize and approve travel, subsistence, and related expenses of such personnel incurred while traveling on official business. All State agencies, including the constituent institutions of The University of North Carolina, shall provide information and support to the Commission upon request.~~

~~(j) Repealed by Session Laws 2015-9, s. 1.1, effective April 27, 2015.~~

~~(k) Covered Persons; Conflicts of Interest; Disclosure. – All members of the Commission are covered persons for the purposes of Chapter 138A of the General Statutes, the State Government Ethics Act. As covered persons, members of the Commission shall comply with the applicable requirements of the State Government Ethics Act, including mandatory training, the public disclosure of economic interests, and ethical standards for covered persons. Members of the Commission shall comply with the provisions of the State Government Ethics Act to avoid conflicts of interest. The Governor may require additional disclosure of potential conflicts of interest by members. The Governor~~

may promulgate criteria regarding conflicts of interest and disclosure thereof for determining the eligibility of persons under this subsection, giving due regard to the requirements of federal legislation, and, for this purpose, may promulgate rules, regulations, or guidelines in conformance with those established by any federal agency interpreting and applying provisions of federal law.

(l) Meetings. – The Commission shall meet at least once every two months and may hold special meetings at any time and place within the State at the call of the Chair or upon the written request of at least five members.

(m) Reports. – The Commission shall submit quarterly written reports as to its operation, activities, programs, and progress to the Environmental Review Commission. The Commission shall supplement the written reports required by this subsection with additional written and oral reports as may be requested by the Environmental Review Commission. The Commission shall submit the written reports required by this subsection whether or not the General Assembly is in session at the time the report is due.

(n) Administrative Location; Independence. – The Commission shall be administratively located in the Division of Emergency Management of the Department of Public Safety. The Commission shall exercise all of its powers and duties independently and shall not be subject to the supervision, direction, or control of the Division or Department.

(o) Terms of Members. – Members of the Commission shall serve terms of six years, beginning effective July 1 of the year of appointment.

"§ 130A-309.203. Expedited permit review.

(a) The Department shall act as expeditiously as practicable, but no later than the deadlines established under subsection (b) of this section, except in compliance with subsection (c) of this section, to issue all permits necessary to conduct activities required by this Part.

(b) Notwithstanding G.S. 130A-295.8(e), the Department shall determine whether an application for any permit necessary to conduct activities required by this Part is complete within 30 days after the Department receives the application for the permit. A determination of completeness means that the application includes all required components but does not mean that the required components provide all of the information that is required for the Department to make a decision on the application. If the Department determines that an application is not complete, the Department shall notify the applicant of the components needed to complete the application. An applicant may submit additional information to the Department to cure the deficiencies in the application. The Department shall make a final determination as to whether the application is complete within the later of (i) 30 days after the Department receives the application for the permit less the number of days that the applicant uses to provide the additional information or (ii) 10 days after the Department receives the additional information from the applicant. The Department shall issue a draft permit decision on an application for a permit within 90 days after the Department determines that the application is complete. The Department shall hold a public hearing and accept written comment on the draft permit decision for a period of not less than 30 or more than 60 days after the Department issues a draft permit decision. The Department shall issue a final permit decision on an application for a permit within 60 days after the comment period on the draft permit decision closes. If the Department fails to act within any time period set out in this subsection, the applicant may treat the failure to act as a denial of the permit and may challenge the denial as provided in Chapter 150B of the General Statutes.

(c) If the Department finds that compliance with the deadlines established under subsection (b) of this section would result in insufficient review of a permit application that would pose a risk to public health, safety, and welfare; the environment; or natural resources, the applicable deadline shall be waived for the application as necessary to allow for adequate review. If a deadline is waived pursuant to this subsection, the Secretary shall issue a written declaration, including findings of fact, documenting the need for the waiver.

(d) Notwithstanding any other provision of this section or any other provision of law, the Department shall either issue or deny a permit required for dewatering of a retired impoundment within 90 days of receipt of a completed application, in such a form and including such information as the Department may prescribe, for the dewatering activities. The Department shall accept written comment on a draft permit decision for a period of not less than 30 days or more than 60 days prior to issuance or denial of such a permit. If the Department fails to act within any time period set out in this subsection, the applicant may treat the failure to act as a denial of the permit and may challenge the denial as provided in Chapter 150B of the General Statutes.

"§ 130A-309.204. Reports.

(a) The Department shall submit quarterly written reports to the Environmental Review Commission and the Coal Ash Management Commission on its operations, activities, programs, and progress with respect to its obligations under this Part concerning all coal combustion residuals surface impoundments. At a minimum, the report shall include information concerning the status of assessment, corrective action, prioritization, and closure for each coal combustion

residuals surface impoundment and information on costs connected therewith. The report shall include an executive summary of each annual Groundwater Protection and Restoration Report submitted to the Department by the operator of any coal combustion residuals surface impoundments pursuant to G.S. 130A-309.211(d) and a summary of all groundwater sampling, protection, and restoration activities related to the impoundment for the preceding year. The report shall also include an executive summary of each annual Surface Water Protection and Restoration Report submitted to the Department by the operator of any coal combustion residuals surface impoundments pursuant to G.S. 130A-309.212(e) and a summary of all surface water sampling, protection, and restoration activities related to the impoundment for the preceding year, including the status of the identification, assessment, and correction of unpermitted discharges from coal combustion residuals surface impoundments to the surface waters of the State. The Department shall supplement the written reports required by this subsection with additional written and oral reports as may be requested by the Environmental Review Commission. The Department shall submit the written reports required by this subsection whether or not the General Assembly is in session at the time the report is due.

(b) On or before October 1 of each year, the Department shall report to each member of the General Assembly who has a coal combustion residuals surface impoundment in the member's district. This report shall include the location of each impoundment in the member's district, the amount of coal combustion residuals known or believed to be located in the impoundment, the last action taken at the impoundment, and the date of that last action.

(c) On or before October 1 of each year, a public utility generating coal combustion residuals and coal combustion products shall submit an annual summary to the Department. The annual summary shall be for the period of July 1 through June 30 and shall include all of the following:

(1) The volume of coal combustion residuals and products produced.
(2) The volume of coal combustion residuals disposed.
(3) The volume of coal combustion products used in structural fill projects.
(4) The volume of coal combustion products beneficially used, other than for structural fill.

"§ 130A-309.205. Local ordinances regulating management of coal combustion residuals and coal combustion products invalid; petition to preempt local ordinance.

(a) It is the intent of the General Assembly to maintain a uniform system for the management of coal combustion residuals and coal combustion products, including matters of disposal and beneficial use, and to place limitations upon the exercise by all units of local government in North Carolina of the power to regulate the management of coal combustion residuals and coal combustion products by means of ordinances, property restrictions, zoning regulations, or otherwise. Notwithstanding any authority granted to counties, municipalities, or other local authorities to adopt local ordinances, including those imposing taxes, fees, or charges or regulating health, environment, or land use, all provisions of local ordinances, including those regulating land use, adopted by counties, municipalities, or other local authorities that regulate or have the effect of regulating the management of coal combustion residuals and coal combustion products, including regulation of carbon burn-out plants, within the jurisdiction of a local government are invalidated and unenforceable, to the extent necessary to effectuate the purposes of this Part, that do the following:

(1) Place any restriction or condition not placed by this Part upon management of coal combustion residuals or coal combustion products within any county, city, or other political subdivision.
(2) Conflict or are in any manner inconsistent with the provisions of this Part.

(a1) As used in this section, "Commission" means the Environmental Management Commission.

(b) If a local zoning or land-use ordinance imposes requirements, restrictions, or conditions that are generally applicable to development, including, but not limited to, setback, buffer, and stormwater requirements, and coal combustion residuals and coal combustion products would be regulated under the ordinance of general applicability, the operator of the proposed activities may petition the Environmental Management Commission to review the matter. After receipt of a petition, the Commission shall hold a hearing in accordance with the procedures in subsection (c) of this section and shall determine whether or to what extent to preempt the local ordinance to allow for the management of coal combustion residuals and coal combustion products.

(c) When a petition described in subsection (b) of this section has been filed with the Environmental Management Commission, the Commission shall hold a public hearing to consider the petition. The public hearing shall be held in the affected locality within 60 days after receipt of the petition by the Commission. The Commission shall give notice of the public hearing by both of the following means:

(1) Publication in a newspaper or newspapers having general circulation in the county or counties where the activities are to be conducted, once a week for three consecutive weeks, the first notice appearing at least 30 days prior to the scheduled date of the hearing.
(2) First-class mail to persons who have requested notice. The Commission shall maintain a mailing list

of persons who request notice in advance of the hearing pursuant to this section. Notice by mail shall be complete upon deposit of a copy of the notice in a postage-paid wrapper addressed to the person to be notified at the address that appears on the mailing list maintained by the Commission in a post office or official depository under the exclusive care and custody of the United States Postal Service.

(d) Any interested person may appear before the Environmental Management Commission at the hearing to offer testimony. In addition to testimony before the Commission, any interested person may submit written evidence to the Commission for the Commission's consideration. At least 20 days shall be allowed for receipt of written comment following the hearing.

(e) A local zoning or land-use ordinance is presumed to be valid and enforceable to the extent the zoning or land-use ordinance imposes requirements, restrictions, or conditions that are generally applicable to development, including, but not limited to, setback, buffer, and stormwater requirements, unless the Environmental Management Commission makes a finding of fact to the contrary. The Commission shall determine whether or to what extent to preempt local ordinances so as to allow the project involving management of coal combustion residuals and coal combustion products no later than 60 days after conclusion of the hearing. The Commission shall preempt a local ordinance only if the Commission makes all of the following findings:

(1) That there is a local ordinance that would regulate the management of coal combustion residuals and coal combustion products.

(2) That all legally required State and federal permits or approvals have been issued by the appropriate State and federal agencies or that all State and federal permit requirements have been satisfied and that the permits or approvals have been denied or withheld only because of the local ordinance.

(3) That local citizens and elected officials have had adequate opportunity to participate in the permitting process.

(4) That the project involving management of coal combustion residuals and coal combustion products will not pose an unreasonable health or environmental risk to the surrounding locality and that the operator has taken or consented to take reasonable measures to avoid or manage foreseeable risks and to comply to the maximum feasible extent with applicable local ordinances.

(f) If the Environmental Management Commission does not make all of the findings under subsection (e) of this section, the Commission shall not preempt the challenged local ordinance. The Commission's decision shall be in writing and shall identify the evidence submitted to the Commission plus any additional evidence used in arriving at the decision.

(g) The decision of the Environmental Management Commission shall be final, unless a party to the action files a written appeal under Article 3 of Chapter 150B of the General Statutes, as modified by this section, within 30 days of the date of the decision. The record on appeal shall consist of all materials and information submitted to or considered by the Commission, the Commission's written decision, a complete transcript of the hearing, the specific findings required by subsection (e) of this section, and any minority positions on the specific findings required by subsection (e) of this section. The scope of judicial review shall be as set forth in G.S. 150B-51, except as this subsection provides regarding the record on appeal.

(h) If the court reverses or modifies the decision of the Environmental Management Commission, the judge shall set out in writing, which writing shall become part of the record, the reasons for the reversal or modification.

(i) In computing any period of time prescribed or allowed by the procedure in this section, the provisions of Rule 6(a) of the Rules of Civil Procedure, G.S. 1A-1, shall apply.

"§ 130A-309.206. Federal preemption; severability.

The provisions of this Part shall be severable, and if any phrase, clause, sentence, or provision is declared to be unconstitutional or otherwise invalid or is preempted by federal law or regulation, the validity of the remainder of this Part shall not be affected thereby.

"§ 130A-309.207. General rule making for Part.

The Environmental Management Commission shall adopt rules as necessary to implement the provisions of the Part. Such rules shall be exempt from the requirements of G.S. 150B-19.3.

"§ 130A-309.208: Reserved for future codification purposes.

"§ 130A-309.209: Reserved for future codification purposes.

"Subpart 2. Management of Coal Ash Residuals; Closure of Coal Ash Impoundments.

"§ 130A-309.210. Generation, disposal, and use of coal combustion residuals.

(a) On or after October 1, 2014, the construction of new and expansion of existing coal combustion residuals surface impoundments is prohibited.

(b) On or after October 1, 2014, the disposal of coal combustion residuals into a coal combustion residuals surface impoundment at an electric generating facility where the coal-fired generating units are no longer producing coal combustion residuals is prohibited.

(c) On or after December 31, 2018, the discharge of stormwater into a coal combustion surface impoundment at an electric generating facility where the coal-fired generating units are no longer producing coal combustion residuals is prohibited.

(d) On or after December 31, 2019, the discharge of stormwater into a coal combustion surface impoundment at an electric generating facility where the coal-fired generating units are actively producing coal combustion residuals is prohibited.

(e) On or before December 31, 2018, all electric generating facilities owned by a public utility shall convert to the disposal of "dry" fly ash or the facility shall be retired. For purposes of this subsection, the term "dry" means coal combustion residuals that are not in the form of liquid wastes, wastes containing free liquids, or sludges.

(f) On or before December 31, 2019, all electric generating facilities owned by a public utility shall convert to the disposal of "dry" bottom ash or the facility shall be retired. For purposes of this subsection, the term "dry" means coal combustion residuals that are not in the form of liquid wastes, wastes containing free liquids, or sludges.

"§ 130A-309.211. Groundwater assessment and corrective action; drinking water supply well survey and provision of alternate water supply; reporting.

(a) Groundwater Assessment of Coal Combustion Residuals Surface Impoundments. – The owner of a coal combustion residuals surface impoundment shall conduct groundwater monitoring and assessment as provided in this subsection. The requirements for groundwater monitoring and assessment set out in this subsection are in addition to any other groundwater monitoring and assessment requirements applicable to the owners of coal combustion residuals surface impoundments:

(1) No later than December 31, 2014, the owner of a coal combustion residuals surface impoundment shall submit a proposed Groundwater Assessment Plan for the impoundment to the Department for its review and approval. The Groundwater Assessment Plan shall, at a minimum, provide for all of the following:

a. A description of all receptors and significant exposure pathways.

b. An assessment of the horizontal and vertical extent of soil and groundwater contamination for all contaminants confirmed to be present in groundwater in exceedance of groundwater quality standards.

c. A description of all significant factors affecting movement and transport of contaminants.

d. A description of the geological and hydrogeological features influencing the chemical and physical character of the contaminants.

e. A schedule for continued groundwater monitoring.

f. Any other information related to groundwater assessment required by the Department.

(2) The Department shall approve the Groundwater Assessment Plan if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) No later than 10 days from approval of the Groundwater Assessment Plan, the owner shall begin implementation of the Plan.

(4) No later than 180 days from approval of the Groundwater Assessment Plan, the owner shall submit a Groundwater Assessment Report to the Department. The Report shall describe all exceedances of groundwater quality standards associated with the impoundment.

(b) Corrective Action for the Restoration of Groundwater Quality. – The owner of a coal combustion residuals surface impoundment shall implement corrective action for the restoration of groundwater quality as provided in this subsection. The requirements for corrective action for the restoration of groundwater quality set out in this subsection are in addition to any other corrective action for the restoration of groundwater quality requirements applicable to the owners of coal combustion residuals surface impoundments:

(1) No later than 90 days from submission of the Groundwater Assessment Report required by subsection (a) of this section, or a time frame otherwise approved by the Department not to exceed 180 days from submission of the Groundwater Assessment Report, the owner of the coal combustion residuals surface impoundment shall submit a proposed Groundwater Corrective Action Plan to the Department for its review and approval. The Groundwater Corrective Action Plan shall provide for the restoration of groundwater in conformance with the requirements of Subchapter L of Chapter 2 of

Title 15A of the North Carolina Administrative Code. The Groundwater Corrective Action Plan shall include, at a minimum, all of the following:

a. A description of all exceedances of the groundwater quality standards, including any exceedances that the owner asserts are the result of natural background conditions.
b. A description of the methods for restoring groundwater in conformance with the requirements of Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code and a detailed explanation of the reasons for selecting these methods.
c. Specific plans, including engineering details, for restoring groundwater quality.
d. A schedule for implementation of the Plan.
e. A monitoring plan for evaluating the effectiveness of the proposed corrective action and detecting movement of any contaminant plumes.
f. Any other information related to groundwater assessment required by the Department.

(2) The Department shall approve the Groundwater Corrective Action Plan if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) No later than 30 days from the approval of the Groundwater Corrective Action Plan, the owner shall begin implementation of the Plan in accordance with the Plan's schedule.

(c) Drinking Water Supply Well Survey and Provision of Alternate Water Supply. – No later than October 1, 2014, the owner of a coal combustion residuals surface impoundment shall conduct a Drinking Water Supply Well Survey that identifies all drinking water supply wells within one-half mile down-gradient from the established compliance boundary of the impoundment and submit the Survey to the Department. The Survey shall include well locations, the nature of water uses, available well construction details, and information regarding ownership of the wells. No later than December 1, 2014, the Department shall determine, based on the Survey, which drinking water supply wells the owner is required to sample and how frequently and for what period sampling is required. The Department shall require sampling for drinking water supply wells where data regarding groundwater quality and flow and depth in the area of any surveyed well provide a reasonable basis to predict that the quality of water from the surveyed well may be adversely impacted by constituents associated with the presence of the impoundment. No later than January 1, 2015, the owner shall initiate sampling and water quality analysis of the drinking water supply wells. A property owner may elect to have an independent third party selected from a laboratory certified by the Department's Wastewater/Groundwater Laboratory Certification program sample wells located on their property in lieu of sampling conducted by the owner of the coal combustion residuals surface impoundment. The owner of the coal combustion residuals surface impoundment shall pay for the reasonable costs of such sampling. Nothing in this subsection shall be construed to preclude or impair the right of any property owner to refuse such sampling of wells on their property. If the sampling and water quality analysis indicates that water from a drinking water supply well exceeds groundwater quality standards for constituents associated with the presence of the impoundment, the owner shall replace the contaminated drinking water supply well with an alternate supply of potable drinking water and an alternate supply of water that is safe for other household uses. The alternate supply of potable drinking water shall be supplied within 24 hours of the Department's determination that there is an exceedance of groundwater quality standards attributable to constituents associated with the presence of the impoundment. The alternate supply of water that is safe for other household uses shall be supplied within 30 days of the Department's determination that there is an exceedance of groundwater quality standards attributable to constituents associated with the presence of the impoundment. The requirement to replace a contaminated drinking water supply well with an alternate supply of potable drinking water and an alternate supply of water that is safe for other household uses set out in this subsection is in addition to any other requirements to replace a contaminated drinking water supply well with an alternate supply of potable drinking water or an alternate supply of water that is safe for other household uses applicable to the owners of coal combustion residuals surface impoundments.

(c1) Provision of Permanent Water Supply. – As soon as practicable, but no later than October 15, 2018, the owner of a coal combustion residuals surface impoundment shall establish permanent replacement water supplies for (i) each household that has a drinking water supply well located within a one-half mile radius from the established compliance boundary of a coal combustion residuals impoundment, and is not separated from the impoundment by the mainstem of a river, as that term is defined under G.S. 143-215.22G, or other body of water that would prevent the migration of contaminants through groundwater from the impoundment to a well and (ii) each household that has a drinking water supply well that is located in an area in which contamination resulting from constituents associated with the presence of a coal combustion residuals impoundment is expected to migrate, as demonstrated by groundwater modeling and hydrogeologic, geologic, and geotechnical investigations of the site, conducted in accordance with the requirements of

G.S. 130A-309.214(a)(4), and the results of other modeling or investigations that may have been submitted pursuant to G.S. 130A-309.213(b)(4). Preference shall be given to permanent replacement water supplies by connection to public water supplies; provided that (i) a household may elect to receive a filtration system in lieu of a connection to public water supplies and (ii) if the Department determines that connection to a public water supply to a particular household would be cost-prohibitive, the Department shall authorize provision of a permanent replacement water supply to that household through installation of a filtration system. For households for which filtration systems are installed, the impoundment owner shall be responsible for periodic required maintenance of the filtration system. No later than December 15, 2016, an impoundment owner shall submit information on permanent replacement water supplies proposed to be provided to each household to the Department, including, at a minimum, the type of permanent water supply proposed; the location of the household and its proximity to the nearest connection point to a public water supply; projected cost of the permanent water supply option proposed for the household; and any proposal to connect to a public water supply. The Department shall evaluate information submitted by the impoundment owner and render a final decision to approve or disapprove the plan, including written findings of fact, no later than January 15, 2017. If disapproved, an impoundment owner shall resubmit a plan for the Department's approval within 30 days. No later than April 15, 2017, an impoundment owner shall notify all residents identified in the approved plan of their eligibility for establishment of a permanent water supply. Until such time as an impoundment owner has established a permanent water supply for each household required by this subsection, the impoundment owner shall supply the household with an alternate supply of potable drinking water and an alternate supply of water that is safe for other household uses. Nothing in this section shall be construed to (i) require an eligible household to connect to a public water supply or receive a filtration system or (ii) obviate the need for other federal, State, and local permits and approvals. All State entities and local governments shall expedite any permits and approvals required for such projects. The Department may grant an impoundment owner an extension of time, not to exceed one year, to establish permanent water supplies as required by this section, if the Department determines that it is infeasible for the impoundment owner to establish a permanent water supply for a household by October 15, 2018, based on limitations arising from local government resources, including limitations on water supply capacity and staffing limitations for permitting and construction activities.

(d) Reporting. – In addition to any other reporting required by the Department, the owner of a coal combustion residuals surface impoundment shall submit an annual Groundwater Protection and Restoration Report to the Department no later than January 31 of each year. The Report shall include a summary of all groundwater monitoring, protection, and restoration activities related to the impoundment for the preceding year, including the status of the Groundwater Assessment Plan, the Groundwater Assessment Report, the Groundwater Corrective Action Plan, the Drinking Water Supply Well Survey, and the replacement of any contaminated drinking water supply wells. ~~The owner of a coal combustion residuals surface impoundment shall also submit all information required to be submitted to the Department pursuant to this section to the Coal Ash Management Commission.~~

"§ 130A-309.212. Identification and assessment of discharges; correction of unpermitted discharges.

(a) Identification of Discharges from Coal Combustion Residuals Surface Impoundments. –

(1) The owner of a coal combustion residuals surface impoundment shall identify all discharges from the impoundment as provided in this subsection. The requirements for identifying all discharges from an impoundment set out in this subsection are in addition to any other requirements for identifying discharges applicable to the owners of coal combustion residuals surface impoundments.

(2) No later than December 31, 2014, the owner of a coal combustion residuals surface impoundment shall submit a topographic map that identifies the location of all (i) outfalls from engineered channels designed or improved for the purpose of collecting water from the toe of the impoundment and (ii) seeps and weeps discharging from the impoundment that are not captured by engineered channels designed or improved for the purpose of collecting water from the toe of the impoundment to the Department. The topographic map shall comply with all of the following:

a. Be at a scale as required by the Department.

b. Specify the latitude and longitude of each toe drain outfall, seep, and weep.

c. Specify whether the discharge from each toe drain outfall, seep, and weep is continuous or intermittent.

d. Provide an average flow measurement of the discharge from each toe drain outfall, seep, and weep including a description of the method used to measure average flow.

e. Specify whether the discharge from each toe drain outfall, seep, and weep identified reaches the surface waters of the State. If the discharge from a toe drain outfall, seep, or weep reaches

the surface waters of the State, the map shall specify the latitude and longitude of where the discharge reaches the surface waters of the State.

f. Include any other information related to the topographic map required by the Department.

(b) Assessment of Discharges from Coal Combustion Residuals Surface Impoundments to the Surface Waters of the State. – The owner of a coal combustion residuals surface impoundment shall conduct an assessment of discharges from the coal combustion residuals surface impoundment to the surface waters of the State as provided in this subsection. The requirements for assessment of discharges from the coal combustion residuals surface impoundment to the surface waters of the State set out in this subsection are in addition to any other requirements for the assessment of discharges from coal combustion residuals surface impoundments to surface waters of the State applicable to the owners of coal combustion residuals surface impoundments:

(1) No later than December 31, 2014, the owner of a coal combustion residuals surface impoundment shall submit a proposed Discharge Assessment Plan to the Department. The Discharge Assessment Plan shall include information sufficient to allow the Department to determine whether any discharge, including a discharge from a toe drain outfall, seep, or weep, has reached the surface waters of the State and has caused a violation of surface water quality standards. The Discharge Assessment Plan shall include, at a minimum, all of the following:

a. Upstream and downstream sampling locations within all channels that could potentially carry a discharge.

b. A description of the surface water quality analyses that will be performed.

c. A sampling schedule, including the frequency and duration of sampling activities.

d. Reporting requirements.

e. Any other information related to the assessment of discharges required by the Department.

(2) The Department shall approve the Discharge Assessment Plan if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) No later than 30 days from the approval of the Discharge Assessment Plan, the owner shall begin implementation of the Plan in accordance with the Plan's schedule.

(c) Corrective Action to Prevent Unpermitted Discharges from Coal Combustion Residuals Surface Impoundments to the Surface Waters of the State. – The owner of a coal combustion residuals surface impoundment shall implement corrective action to prevent unpermitted discharges from the coal combustion residuals surface impoundment to the surface waters of the State as provided in this subsection. The requirements for corrective action to prevent unpermitted discharges from coal combustion residuals surface impoundments to the surface waters of the State set out in this subsection are in addition to any other requirements for corrective action to prevent unpermitted discharges from coal combustion residuals surface impoundments to the surface waters of the State applicable to the owners of coal combustion residuals surface impoundments:

(1) If the Department determines, based on information provided pursuant to subsection (a) or (b) of this section, that an unpermitted discharge from a coal combustion residuals surface impoundment, including an unpermitted discharge from a toe drain outfall, seep, or weep, has reached the surface waters of the State, the Department shall notify the owner of the impoundment of its determination.

(2) No later than 30 days from a notification pursuant to subdivision (1) of this subsection, the owner of the coal combustion residuals surface impoundment shall submit a proposed Unpermitted Discharge Corrective Action Plan to the Department for its review and approval. The proposed Unpermitted Discharge Corrective Action Plan shall include, at a minimum, all of the following:

a. One of the following methods of proposed corrective action:

1. Elimination of the unpermitted discharge.

2. Application for a National Pollutant Discharge Elimination System (NPDES) permit amendment pursuant to G.S. 143-215.1 and Subchapter H of Chapter 2 of Title 15A of the North Carolina Administrative Code to bring the unpermitted discharge under permit regulations.

b. A detailed explanation of the reasons for selecting the method of corrective action.

c. Specific plans, including engineering details, to prevent the unpermitted discharge.

d. A schedule for implementation of the Plan.

e. A monitoring plan for evaluating the effectiveness of the proposed corrective action.

f. Any other information related to the correction of unpermitted discharges required by the

Department. I/A

(3) The Department shall approve the Unpermitted Discharge Corrective Action Plan if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(4) No later than 30 days from the approval of the Unpermitted Discharge Corrective Action Plan, the owner shall begin implementation of the Plan in accordance with the Plan's schedule.

(d) Identification of New Discharges. – No later than October 1, 2014, the owner of a coal combustion residuals surface impoundment shall submit a proposed Plan for the Identification of New Discharges to the Department for its review and approval as provided in this subsection:

(1) The proposed Plan for the Identification of New Discharges shall include, at a minimum, all of the following:

a. A procedure for routine inspection of the coal combustion residuals surface impoundment to identify indicators of potential new discharges, including toe drain outfalls, seeps, and weeps.

b. A procedure for determining whether a new discharge is actually present.

c. A procedure for notifying the Department when a new discharge is confirmed.

d. Any other information related to the identification of new discharges required by the Department.

(2) The Department shall approve the Plan for the Identification of New Discharges if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) No later than 30 days from the approval of the Plan for the Identification of New Discharges, the owner shall begin implementation of the Plan in accordance with the Plan.

(e) Reporting. – In addition to any other reporting required by the Department, the owner of a coal combustion residuals surface impoundment shall submit an annual Surface Water Protection and Restoration Report to the Department no later than January 31 of each year. The Report shall include a summary of all surface water sampling, protection, and restoration activities related to the impoundment for the preceding year, including the status of the identification, assessment, and correction of unpermitted discharges from coal combustion residuals surface impoundments to the surface waters of the State. ~~The owner of a coal combustion residuals surface impoundment shall also submit all information required to be submitted to the Department pursuant to this section to the Coal Ash Management Commission.~~

"**§ 130A-309.213. Prioritization of coal combustion residuals surface impoundments.**

(a) As soon as practicable, but no later than December 31, 2015, the Department shall develop proposed classifications for all coal combustion residuals surface impoundments, including active and retired sites, for the purpose of closure and remediation based on these sites' risks to public health, safety, and welfare; the environment; and natural resources and shall determine a schedule for closure and required remediation that is based on the degree of risk to public health, safety, and welfare; the environment; and natural resources posed by the impoundments and that gives priority to the closure and required remediation of impoundments that pose the greatest risk. In assessing the risk, the Department shall evaluate information received pursuant to G.S. 130A-309.211 and G.S. 130A-309.212 and any other information deemed ~~relevant and, at a minimum, consider all of the following:~~relevant.

(1) ~~Any hazards to public health, safety, or welfare resulting from the impoundment.~~

(2) ~~The structural condition and hazard potential of the impoundment.~~

(3) ~~The proximity of surface waters to the impoundment and whether any surface waters are contaminated or threatened by contamination as a result of the impoundment.~~

(4) ~~Information concerning the horizontal and vertical extent of soil and groundwater contamination for all contaminants confirmed to be present in groundwater in exceedance of groundwater quality standards and all significant factors affecting contaminant transport.~~

(5) ~~The location and nature of all receptors and significant exposure pathways.~~

(6) ~~The geological and hydrogeological features influencing the movement and chemical and physical character of the contaminants.~~

(7) ~~The amount and characteristics of coal combustion residuals in the impoundment.~~

(8) ~~Whether the impoundment is located within an area subject to a 100-year flood.~~

(9) ~~Any other factor the Department deems relevant to establishment of risk.~~

(b) The Department shall issue a proposed classification for each coal combustion residuals surface impoundment based upon the assessment conducted pursuant to subsection (a) of this section as high-risk, intermediate-

risk, or low-risk. Within 30 days after a proposed classification has been issued, the Department shall issue a written declaration, including findings of fact, documenting the proposed classification. The Department shall provide for public participation on the proposed risk classification as follows:

(1) The Department shall make copies of the written declaration issued pursuant to this subsection available for inspection as follows:
   a. A copy of the declaration shall be provided to the local health director.
   b. A copy of the declaration shall be provided to the public library located in closest proximity to the site in the county or counties in which the site is located.
   c. The Department shall post a copy of the declaration on the Department's Web site.
   d. The Department shall place copies of the declaration in other locations so as to assure the reasonable availability thereof to the public.

(2) The Department shall give notice of the written declaration issued pursuant to this subsection as follows:
   a. A notice and summary of the declaration shall be published weekly for a period of three consecutive weeks in a newspaper having general circulation in the county or counties where the site is located.
   b. Notice of the written declaration shall be given by first-class mail to persons who have requested such notice. Such notice shall include a summary of the written declaration and state the locations where a copy of the written declaration is available for inspection. The Department shall maintain a mailing list of persons who request notice pursuant to this section.
   c. Notice of the written declaration shall be given by electronic mail to persons who have requested such notice. Such notice shall include a summary of the written declaration and state the locations where a copy of the written declaration is available for inspection. The Department shall maintain a mailing list of persons who request notice pursuant to this section.

(3) No later than 60 days after issuance of the written declaration, the Department shall conduct a public meeting in the county or counties in which the site is located to explain the written declaration to the public. The Department shall give notice of the hearing at least 15 days prior to the date thereof by all of the following methods:
   a. Publication as provided in subdivision (1) of this subsection, with first publication to occur not less than 30 days prior to the scheduled date of the hearing.
   b. First-class mail to persons who have requested notice as provided in subdivision (2) of this subsection.
   c. Electronic mail to persons who have requested notice as provided in subdivision (2) of this subsection.

(4) At least 30 days from the latest date on which notice is provided pursuant to subdivision (2) of this subsection shall be allowed for the receipt of written comment on the written declaration prior to issuance of a final risk classification. At least 20 days will be allowed for receipt of written comment following a hearing conducted pursuant to subdivision (3) of this subsection prior to issuance of a ~~final~~ preliminary risk classification.

(c) ~~Within 30 days of the receipt of all written comment as required by subdivision (4) of subsection (b) of this section, the Department shall submit a proposed classification for a coal combustion residuals surface impoundment to the Coal Ash Management Commission established pursuant to G.S. 130A-309.202. The Commission shall evaluate all information submitted in accordance with this Part related to the proposed classification and any other information the Commission deems relevant. The Commission shall only approve the proposed classification if it determines that the classification was developed in accordance with this section and that the classification accurately reflects the level of risk posed by the coal combustion residuals surface impoundment. The Commission shall issue its determination in writing, including findings in support of its determination. If the Commission fails to act on a proposed classification within 60 days of receipt of the proposed classification, the proposed classification shall be deemed approved. Parties aggrieved by a final decision of the Commission pursuant to this subsection may appeal the decision as provided under Article 3 of Chapter 150B of the General Statutes.~~

(d) No later than 30 days after expiration of the deadline set forth in G.S. 130A-309.211(c1), or any applicable extension granted by the Secretary pursuant G.S. 130A-309.211(c1), the Department shall issue a final classification for

each impoundment as follows:

(1) The Department shall classify an impoundment as low-risk if the impoundment owner satisfies both of the following criteria:

a. Has established permanent water supplies as required for the impoundment pursuant to G.S. 130A-309.211(c1).

b. Has rectified any deficiencies identified by, and otherwise complied with the requirements of any dam safety order issued by the Environmental Management Commission for the impoundment pursuant to G.S. 143-215.32. No later than July 1, 2018, the Department shall conduct the annual inspection of each dam associated with a coal combustion residuals surface impoundment required for that year, to detect any deficiencies and to ascertain, at a minimum, whether the dam is sufficiently strong, maintained in good repair and operating condition, does not pose a danger to life or property, and satisfies minimum streamflow requirements. The Department shall issue written findings of fact for each inspection and present such findings to the Environmental Management Commission. If the Department detects any deficiencies, the Commission shall issue an order directing the owner of the dam to take action as may be deemed necessary by the Commission within a time limited by the order, but not later than 90 days after issuance of the order.

(2) All other impoundments shall be classified as intermediate-risk.

(e) Parties aggrieved by a final decision of the Department issued pursuant to subsection (d) of this section may appeal the decision as provided under Article 3 of Chapter 150B of the General Statutes.

"§ 130A-309.214. Closure of coal combustion residuals surface impoundments.

(a) An owner of a coal combustion residuals surface impoundment shall submit a proposed Coal Combustion Residuals Surface Impoundment Closure Plan for the Department's approval. If corrective action to restore groundwater has not been completed pursuant to the requirements of G.S. 130A-309.211(b), the proposed closure plan shall include provisions for completion of activities to restore groundwater in conformance with the requirements of Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code. In addition, the following requirements, at a minimum, shall apply to such plans:

(1) High-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2019. A proposed closure plan for such impoundments must be submitted as soon as practicable, but no later than December 31, 2016. At a minimum, (i) impoundments located in whole above the seasonal high groundwater table shall be dewatered; (ii) impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable; and (iii) the owner of an impoundment shall either:

a. Convert the coal combustion residuals impoundment to an industrial landfill by removing all coal combustion residuals and contaminated soil from the impoundment temporarily, safely storing the residuals on-site, and complying with the requirements for such landfills established by this Article and rules adopted thereunder. At a minimum, the landfills shall have a design with a leachate collection system, a closure cap system, and a composite liner system consisting of two components: the upper component shall consist of a minimum 30-ml flexible membrane (FML), and the lower components shall consist of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second. FML components consisting of high density polyethylene (HDPE) shall be at least 60 ml thick. The landfill shall otherwise comply with the construction requirements established by Section .1624 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, and the siting and design requirements for disposal sites established by Section .0503 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except with respect to those requirements that pertain to buffers. In lieu of the buffer requirement established by Section .0503(f)(2)(iii) of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, the owner of the impoundment shall establish and maintain a 300-foot buffer between surface waters and disposal areas. After the temporarily displaced coal combustion residuals have been returned for disposal in the industrial landfill constructed pursuant to the requirements of this sub-subdivision, the owner of the landfill shall comply with the closure and post-closure requirements established

by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code. A landfill constructed pursuant to this sub-subdivision shall otherwise be subject to all applicable requirements of this Chapter and rules adopted thereunder. Prior to closure, the Department may allow the disposal of coal combustion residuals, in addition to those originally contained in the impoundment, to the landfill constructed pursuant to this sub-subdivision, if the Department determines that the site is suitable for additional capacity and that disposal of additional coal combustion residuals will not pose an unacceptable risk to public health, safety, welfare; the environment; and natural resources.

b. Remove all coal combustion residuals from the impoundment, return the former impoundment to a nonerosive and stable condition and (i) transfer the coal combustion residuals for disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill or (ii) use the coal combustion products in a structural fill or other beneficial use as allowed by law. The use of coal combustion products (i) as structural fill shall be conducted in accordance with the requirements of Subpart 3 of this Part and (ii) for other beneficial uses shall be conducted in accordance with the requirements of Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By-Products) and Section .1205 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management).

(2) Intermediate-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2024. A proposed closure plan for such impoundments must be submitted as soon as practicable, but no later than December 31, ~~2017.~~2019. At a minimum, such impoundments shall be dewatered, and the owner of an impoundment shall close the impoundment in any manner allowed pursuant to subdivision (1) of this ~~subsection.~~subsection, or, if applicable, as provided in G.S. 130A-309.216.

(3) Low-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2029. A proposed closure plan for such impoundments must be submitted as soon as practicable, but no later than December 31, ~~2018.~~2019. At a minimum, (i) impoundments located in whole above the seasonal high groundwater table shall be dewatered; (ii) impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable; and (iii) at the election of the Department, the owner of an impoundment shall either:

a. Close in any manner allowed pursuant to subdivision (1) of this ~~subsection.~~subsection;

b. Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall install and maintain a cap system that is designed to minimize infiltration and erosion in conformance with the requirements of Section .1624 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, and, at a minimum, shall be designed and constructed to (i) have a permeability no greater than 1×10^{-5} centimeters per second; (ii) minimize infiltration by the use of a low-permeability barrier that contains a minimum 18 inches of earthen material; and (iii) minimize erosion of the cap system and protect the low-permeability barrier from root penetration by use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth. In addition, the owner of an impoundment shall (i) install and maintain a groundwater monitoring system; (ii) establish financial assurance that will ensure that sufficient funds are available for closure pursuant to this subdivision, post-closure maintenance and monitoring, any corrective action that the Department may require, and satisfy any potential liability for sudden and nonsudden accidental occurrences arising from the impoundment and subsequent costs incurred by the Department in response to an incident, even if the owner becomes insolvent or ceases to reside, be incorporated, do business, or maintain assets in the State; and (iii) conduct post-closure care for a period of 30 years, which period may be increased by the Department upon a determination that a longer period is necessary to protect public health, safety, welfare; the environment; and natural resources, or decreased upon a determination that a shorter period is

sufficient to protect public health, safety, welfare; the environment; and natural resources. The Department may require implementation of any other measure it deems necessary to protect public health, safety, and welfare; the environment; and natural resources, including imposition of institutional controls that are sufficient to protect public health, safety, and welfare; the environment; and natural resources. The Department may not approve closure for an impoundment pursuant to sub-subdivision b. of subdivision (3) of this subsection unless the Department finds that the proposed closure plan includes design measures to prevent upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the ~~impoundment.~~impoundment; or

c. Comply with the closure requirements established by the United States Environmental Protection Agency as provided in 40 CFR Parts 257 and 261, "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities."

(4) Closure Plans for all impoundments shall include all of the following:

a. Facility and coal combustion residuals surface impoundment description. – A description of the operation of the site that shall include, at a minimum, all of the following:
   1. Site history and history of site operations, including details on the manner in which coal combustion residuals have been stored and disposed of historically.
   2. Estimated volume of material contained in the impoundment.
   3. Analysis of the structural integrity of dikes or dams associated with impoundment.
   4. All sources of discharge into the impoundment, including volume and characteristics of each discharge.
   5. Whether the impoundment is lined, and, if so, the composition thereof.
   6. A summary of all information available concerning the impoundment as a result of inspections and monitoring conducted pursuant to this Part and otherwise available.

b. Site maps, which, at a minimum, illustrate all of the following:
   1. All structures associated with the operation of any coal combustion residuals surface impoundment located on the site. For purposes of this sub-subdivision, the term "site" means the land or waters within the property boundary of the applicable electric generating station.
   2. All current and former coal combustion residuals disposal and storage areas on the site, including details concerning coal combustion residuals produced historically by the electric generating station and disposed of through transfer to structural fills.
   3. The property boundary for the applicable site, including established compliance boundaries within the site.
   4. All potential receptors within 2,640 feet from established compliance boundaries.
   5. Topographic contour intervals of the site shall be selected to enable an accurate representation of site features and terrain and in most cases should be less than 20-foot intervals.
   6. Locations of all sanitary landfills permitted pursuant to this Article on the site that are actively receiving waste or are closed, as well as the established compliance boundaries and components of associated groundwater and surface water monitoring systems.
   7. All existing and proposed groundwater monitoring wells associated with any coal combustion residuals surface impoundment on the site.
   8. All existing and proposed surface water sample collection locations associated with any coal combustion residuals surface impoundment on the site.

c. The results of a hydrogeologic, geologic, and geotechnical investigation of the site, including, at a minimum, all of the following:
   1. A description of the hydrogeology and geology of the site.
   2. A description of the stratigraphy of the geologic units underlying each coal combustion residuals surface impoundment located on the site.
   3. The saturated hydraulic conductivity for (i) the coal combustion residuals within any coal combustion residuals surface impoundment located on the site and (ii) the

saturated hydraulic conductivity of any existing liner installed at an impoundment, if any.

4. The geotechnical properties for (i) the coal combustion residuals within any coal combustion residuals surface impoundment located on the site, (ii) the geotechnical properties of any existing liner installed at an impoundment, if any, and (iii) the uppermost identified stratigraphic unit underlying the impoundment, including the soil classification based upon the Unified Soil Classification System, in-place moisture content, particle size distribution, Atterberg limits, specific gravity, effective friction angle, maximum dry density, optimum moisture content, and permeability.
5. A chemical analysis of the coal combustion residuals surface impoundment, including water, coal combustion residuals, and coal combustion residuals-affected soil.
6. Identification of all substances with concentrations determined to be in excess of the groundwater quality standards for the substance established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code, including all laboratory results for these analyses.
7. Summary tables of historical records of groundwater sampling results.
8. A map that illustrates the potentiometric contours and flow directions for all identified aquifers underlying impoundments (shallow, intermediate, and deep) and the horizontal extent of areas where groundwater quality standards established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code for a substance are exceeded.
9. Cross-sections that illustrate the following: the vertical and horizontal extent of the coal combustion residuals within an impoundment; stratigraphy of the geologic units underlying an impoundment; and the vertical extent of areas where groundwater quality standards established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code for a substance are exceeded.

d. The results of groundwater modeling of the site that shall include, at a minimum, all of the following:

1. An account of the design of the proposed Closure Plan that is based on the site hydrogeologic conceptual model developed and includes (i) predictions on post-closure groundwater elevations and groundwater flow directions and velocities, including the effects on and from the potential receptors and (ii) predictions at the compliance boundary for substances with concentrations determined to be in excess of the groundwater quality standards for the substance established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code.
2. Predictions that include the effects on the groundwater chemistry and should describe migration, concentration, mobilization, and fate for substances with concentrations determined to be in excess of the groundwater quality standards for the substance established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code pre- and post-closure, including the effects on and from potential receptors.
3. A description of the groundwater trend analysis methods used to demonstrate compliance with groundwater quality standards for the substance established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code and requirements for corrective action of groundwater contamination established by Subchapter L of Chapter 2 of Title 15A of the North Carolina Administrative Code.

e. A description of any plans for beneficial use of the coal combustion residuals in compliance with the requirements of Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By-Products) and Section .1205 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management).

f. All engineering drawings, schematics, and specifications for the proposed Closure Plan. If required by Chapter 89C of the General Statutes, engineering design documents should be prepared, signed, and sealed by a professional engineer.

g. A description of the construction quality assurance and quality control program to be implemented in conjunction with the Closure Plan, including the responsibilities and authorities for monitoring and testing activities, sampling strategies, and reporting requirements.

h. A description of the provisions for disposal of wastewater and management of stormwater and the plan for obtaining all required permits.

i. A description of the provisions for the final disposition of the coal combustion residuals. If the coal combustion residuals are to be removed, the owner must identify (i) the location and permit number for the coal combustion residuals landfills, industrial landfills, or municipal solid waste landfills in which the coal combustion residuals will be disposed and (ii) in the case where the coal combustion residuals are planned for beneficial use, the location and manner in which the residuals will be temporarily stored. If the coal combustion residuals are to be left in the impoundment, the owner must (i) in the case of closure pursuant to sub-subdivision (a)(1)a. of this section, provide a description of how the ash will be stabilized prior to completion of closure in accordance with closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code and (ii) in the case of closure pursuant to sub-subdivision (a)(1)b. of this section, provide a description of how the ash will be stabilized pre- and post-closure. If the coal combustion residuals are to be left in the impoundment, the owner must provide an estimate of the volume of coal combustion residuals remaining.

j. A list of all permits that will need to be acquired or modified to complete closure activities.

k. A description of the plan for post-closure monitoring and care for an impoundment for a minimum of 30 years. The length of the post-closure care period may be (i) proposed to be decreased or the frequency and parameter list modified if the owner demonstrates that the reduced period or modifications are sufficient to protect public health, safety, and welfare; the environment; and natural resources and (ii) increased by the Department at the end of the post-closure monitoring and care period if there are statistically significant increasing groundwater quality trends or if contaminant concentrations have not decreased to a level protective of public health, safety, and welfare; the environment; and natural resources. If the owner determines that the post-closure care monitoring and care period is no longer needed and the Department agrees, the owner shall provide a certification, signed and sealed by a professional engineer, verifying that post-closure monitoring and care has been completed in accordance with the post-closure plan. If required by Chapter 89C of the General Statutes, the proposed plan for post-closure monitoring and care should be signed and sealed by a professional engineer. The plan shall include, at a minimum, all of the following:

1. A demonstration of the long-term control of all leachate, affected groundwater, and stormwater.
2. A description of a groundwater monitoring program that includes (i) post-closure groundwater monitoring, including parameters to be sampled and sampling schedules; (ii) any additional monitoring well installations, including a map with the proposed locations and well construction details; and (iii) the actions proposed to mitigate statistically significant increasing groundwater quality trends.

l. An estimate of the milestone dates for all activities related to closure and post-closure.

m. Projected costs of assessment, corrective action, closure, and post-closure care for each coal combustion residuals surface impoundment.

n. A description of the anticipated future use of the site and the necessity for the implementation of institutional controls following closure, including property use restrictions, and requirements for recordation of notices documenting the presence of contamination, if applicable, or historical site use.

(b) The Department shall review a proposed Coal Combustion Residuals Surface Impoundment Closure Plan for consistency with the minimum requirements set forth in subsection (a) of this section and whether the proposed Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part. Prior to issuing a decision on a proposed Closure Plan, the Department shall provide for public participation on the proposed Closure Plan as follows:

(1) The Department shall make copies of the proposed Closure Plan available for inspection as follows:
   a. A copy of the proposed Closure Plan shall be provided to the local health director.
   b. A copy of the proposed Closure Plan shall be provided to the public library located in closest proximity to the site in the county or counties in which the site is located.
   c. The Department shall post a copy of the proposed Closure Plan on the Department's Web site.
   d. The Department shall place copies of the declaration in other locations so as to assure the reasonable availability thereof to the public.

(2) Before approving a proposed Closure Plan, the Department shall give notice as follows:
   a. A notice and summary of the proposed Closure Plan shall be published weekly for a period of three consecutive weeks in a newspaper having general circulation in the county or counties where the site is located.
   b. Notice that a proposed Closure Plan has been developed shall be given by first-class mail to persons who have requested such notice. Such notice shall include a summary of the proposed Closure Plan and state the locations where a copy of the proposed Closure Plan is available for inspection. The Department shall maintain a mailing list of persons who request notice pursuant to this section.
   c. Notice that a proposed Closure Plan has been developed shall be given by electronic mail to persons who have requested such notice. Such notice shall include a summary of the proposed Closure Plan and state the locations where a copy of the proposed Closure Plan is available for inspection. The Department shall maintain a mailing list of persons who request notice pursuant to this section.

(3) No later than 60 days after receipt of a proposed Closure Plan, the Department shall conduct a public meeting in the county or counties in which the site is located to explain the proposed Closure Plan and alternatives to the public. The Department shall give notice of the hearing at least 30 days prior to the date thereof by all of the following methods:
   a. Publication as provided in subdivision (1) of this subsection, with first publication to occur not less than 30 days prior to the scheduled date of the hearing.
   b. First-class mail to persons who have requested notice as provided in subdivision (2) of this subsection.
   c. Electronic mail to persons who have requested notice as provided in subdivision (2) of this subsection.

(4) At least 30 days from the latest date on which notice is provided pursuant to subdivision (2) of this subsection shall be allowed for the receipt of written comment on the proposed Closure Plan prior to its approval. At least 20 days will be allowed for receipt of written comment following a hearing conducted pursuant to subdivision (3) of this subsection prior to the approval of the proposed Closure Plan.

(c) The Department shall disapprove a proposed Coal Combustion Residuals Surface Impoundment Closure Plan unless the Department finds that the Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part. The Department shall provide specific findings to support its decision to approve or disapprove a proposed Closure Plan. If the Department disapproves a proposed Closure Plan, the person who submitted the Closure Plan may seek review as provided in Article 3 of Chapter 150B of the General Statutes. If the Department fails to approve or disapprove a proposed Closure Plan within 120 days after a complete Closure Plan has been submitted, the person who submitted the proposed Closure Plan may treat the Closure Plan as having been disapproved at the end of that time period. The Department may require a person who proposes a Closure Plan to supply any additional information necessary for the Department to approve or disapprove the Closure Plan.

(d) ~~Within 30 days of its approval of a Coal Combustion Residuals Surface Impoundment Closure Plan, the Department shall submit the Closure Plan to the Coal Ash Management Commission. The Commission shall evaluate all information submitted in accordance with this Part related to the Closure Plan and any other information the Commission deems relevant. The Commission shall approve the Closure Plan if it determines that the Closure Plan was developed in accordance with this section, that implementation of the Closure Plan according to the Closure Plan's schedule is technologically and economically feasible, and the Closure Plan is protective of the public health, safety, and welfare; the environment; and natural resources. In addition, the Commission may consider any impact on electricity costs and reliability, but this factor may not be dispositive of the Commission's determination. The~~

~~Commission shall issue its determination in writing, including findings in support of its determination. If the Commission fails to act on a Closure Plan within 60 days of receipt of the Closure Plan, the Closure Plan shall be deemed approved. Parties aggrieved by a final decision of the Commission pursuant to this subsection may appeal the decision as provided under Article 3 of Chapter 150B of the General Statutes.~~

(e) As soon as practicable, but no later than 60 days after a Coal Combustion Residuals Surface Impoundment Closure Plan has been approved by the ~~Coal Ash Management Commission,~~Department, the owner of the coal combustion residuals impoundment shall begin implementation of the approved plan. Modifications to an approved Closure Plan may only be allowed in conformance with the requirements of this Part, upon written request of an owner of an impoundment, with the written approval of the Department, and after public notice of the change in accordance with the requirements of subdivision (2) of subsection (b) of this section. Provided, however, minor technical modifications may be made in accordance with standard Department procedures for such minor modifications and may be made without written approval of the Department or public notice of the change.

(f) Nothing in this section shall be construed to obviate the need for sampling, remediation, and monitoring activities at the site as required by G.S. 130A-309.211 and G.S. 130A-309.310 [G.S. 130A-309.212].

"**§ 130A-309.215. Variance authority.**

(a) In recognition of the complexity and magnitude of the issues surrounding the management of coal combustion residuals and coal combustion residuals surface impoundments, the General Assembly authorizes the ~~Commission~~ Secretary to grant a variance to extend any deadline ~~for closure of an impoundment established under G.S. 130A-309.214 in conformance with the requirements of this section. To request such a variance the owner of an impoundment~~ under this act, on the Secretary's own motion, or that of an impoundment owner, on the basis that compliance with the deadline cannot be achieved by application of best available technology found to be economically reasonable at the time and would produce serious hardship without equal or greater benefits to the public.

(a1) For variances requested by an impoundment owner, the owner shall, no earlier than ~~two years~~one year prior to the applicable deadline, submit an application in a form acceptable to the Department which shall include, at a minimum, all of the following information: identification of the site, applicable requirements, and applicable deadlines for which a variance is sought, and the site-specific circumstances that support the need for the variance. The owner of the impoundment shall also provide detailed information that demonstrates (i) the owner has substantially complied with all other requirements and deadlines established by this Part; (ii) the owner has made good faith efforts to comply with the applicable deadline for closure of the impoundment; and (iii) that compliance with the deadline cannot be achieved by application of best available technology found to be economically reasonable at the time and would produce serious hardship without equal or greater benefits to the public. As soon as practicable, but no later than 60 days from receipt of an application, the Secretary shall evaluate the information submitted in conjunction with the application, and any other information the Secretary deems relevant, to determine whether the information supports issuance of a variance.~~ After such evaluation, if the Secretary finds that the information supports issuance of a variance from the deadline, the Secretary shall issue a proposed variance. Within 10 days after a proposed variance has been issued, the Secretary shall issue a written declaration, including findings of fact, documenting the proposed variance.~~

(a2) The Department shall provide for public participation on ~~the~~a proposed variance in the manner provided by G.S. 130A-309.214(b) and shall take the public input received through the process into account in its decision concerning ~~the proposed~~issuance of a variance. ~~Within 30 days of the receipt of all public input received, the Department shall submit a proposed variance to the Coal Ash Management Commission. The Commission shall evaluate all information submitted in accordance with this section and any other information the Commission deems relevant.~~ The ~~Commission~~ Department shall only approve a variance if it determines that compliance with the deadline cannot be achieved by application of best available technology found to be economically reasonable at the time and would produce serious hardship without equal or greater benefits to the public. The ~~Commission~~ Department shall issue its determination in writing, including findings in support of its determination. If the ~~Commission~~ Department fails to act on a variance request within 60 days of receipt, the variance shall be deemed denied.

(a3) Parties aggrieved by a final decision of the Commission pursuant to this subsection may appeal the decision as provided under Article 3 of Chapter 150B of the General Statutes.

(b) ~~A variance granted pursuant to this section shall not extend a deadline for closure of an impoundment more than three years beyond the date applicable to the impoundment as provided under G.S. 130A-309.214.~~

(c) ~~No more than one variance may be granted pursuant to this section per impoundment.~~

"**§ 130A-309.216. Ash beneficiation projects.**

(a) On or before January 1, 2017, an impoundment owner shall (i) identify, at a minimum, impoundments at two sites located within the State with ash stored in the impoundments on that date that is suitable for processing for

cementitious purposes and (ii) enter into a binding agreement for the installation and operation of an ash beneficiation project at each site capable of annually processing 300,000 tons of ash to specifications appropriate for cementitious products, with all ash processed to be removed from the impoundment(s) located at the sites. As soon as legally practicable thereafter, the impoundment owner shall apply for all permits necessary for the ash beneficiation projects from the Department. The Department shall expedite any State permits and approvals required for such projects. No later than 24 months after issuance of all necessary permits, operation of both ash beneficiation projects shall be commenced. An impoundment owner shall use commercially reasonable efforts to produce 300,000 tons of ash to specifications appropriate for cementitious products from each project.

(b) On or before July 1, 2017, an impoundment owner shall (i) identify an impoundment at an additional site located within the State with ash stored in the impoundment on that date that is suitable for processing for cementitious purposes and (ii) enter into a binding agreement for the installation and operation of an ash beneficiation project capable of annually processing 300,000 tons of ash to specifications appropriate for cementitious products, with all ash processed to be removed from the impoundment(s) located at the site. As soon as legally practicable thereafter, the impoundment owner shall apply for all permits necessary for the ash beneficiation project from the Department. The Department shall expedite any State permits and approvals required for such projects. No later than 24 months after issuance of all necessary permits, operation of the ash beneficiation project shall be commenced. An impoundment owner shall use commercially reasonable efforts to produce 300,000 tons of ash to specifications appropriate for cementitious products from the project.

(c) Notwithstanding any deadline for closure provided by G.S. 130A-309.214, any impoundment classified as intermediate- or low-risk that is located at a site at which an ash beneficiation project is installed, operating, and processing at least 300,000 tons of ash annually from the impoundment, shall be closed no later than December 31, 2029.

"**§ 130A-309.217: Reserved for future codification purposes.**"

SECTION 2. G.S. 62-302.1 reads as rewritten:

"**§ 62-302.1. Regulatory fee for combustion residuals surface impoundments.**

(a) Fee Imposed. – Each public utility with a coal combustion residuals surface impoundment shall pay a regulatory fee for the purpose of defraying the costs of oversight of coal combustion residuals. The fee is in addition to the fee imposed under G.S. 62-302. The fees collected under this section shall only be used to pay the expenses of the ~~Coal Ash Management Commission and the~~ Department of Environmental Quality in providing oversight of coal combustion residuals.

(b) Rate. – The combustion residuals surface impoundment fee shall be ~~three-hundredths of one percent (0.03%)~~ twenty-two thousandths of one percent (0.022%) of the North Carolina jurisdictional revenues of each public utility with a coal combustion residuals surface impoundment. For the purposes of this section, the term "North Carolina jurisdictional revenues" has the same meaning as in G.S. 62-302.

(c) When Due. – The fee shall be paid in quarterly installments. The fee is payable to the ~~Coal Ash Management Commission~~ Department of Environmental Quality on or before the 15th of the second month following the end of each quarter. Each public utility subject to this fee shall, on or before the date the fee is due for each quarter, prepare and render a report on a form prescribed by the ~~Coal Ash Management Commission.~~ Department of Environmental Quality. The report shall state the public utility's total North Carolina jurisdictional revenues for the preceding quarter and shall be accompanied by any supporting documentation that the ~~Coal Ash Management Commission~~Department of Environmental Quality may by rule require. Receipts shall be reported on an accrual basis.

(d) Use of Proceeds. – A special fund in the ~~Office of State Treasurer and the Coal Ash Management Commission~~ Department of Environmental Quality is created. The fees collected pursuant to this section ~~and all other funds received by the Coal Ash Management Commission~~ shall be deposited in the Coal Combustion Residuals Management Fund. The Fund shall be placed in an interest-bearing account, and any interest or other income derived from the Fund shall be credited to the Fund. Subject to appropriation by the General Assembly, ~~twenty-six and one-half percent (26.5%) of the moneys in the Fund shall be used by the Coal Ash Management Commission and the remainder~~ one hundred percent (100%) shall be used by the Department of Environmental Quality. ~~The Coal Ash Management Commission shall be subject to the provisions of the State Budget Act, except that no unexpended surplus of the Coal Combustion Residuals Management Fund shall revert to the General Fund.~~ All funds credited to the Fund shall be used only to pay the expenses of the ~~Coal Ash Management Commission and the~~ Department of Environmental Quality in providing oversight of coal combustion residuals.

(e) Recovery of Fee. – The North Carolina Utilities Commission shall not allow an electric public utility to recover this fee from the retail electric customers of the State."

SECTION 3.(a) Notwithstanding G.S. 130A-309.213 or G.S. 130A-309.214, as amended by Section 1 of this act, and except as otherwise preempted by the requirements of federal law, the following coal combustion residual surface impoundments shall be deemed intermediate-risk and, as soon as practicable, but no later than August 1, 2028 shall be closed in conformance with Section 3(b) of this act:

(1) Coal combustion residuals surface impoundments located at the H.F. Lee Steam Station, owned and operated by Duke Energy Progress, and located in Wayne County.

(2) Coal combustion residuals surface impoundments located at the Cape Fear Steam Station, owned and operated by Duke Energy Progress, and located in Chatham County.

(3) Coal combustion residuals surface impoundments located at the Weatherspoon Steam Station, owned and operated by Duke Energy Progress, and located in New Hanover County.

SECTION 3.(b) The impoundments identified in subsection (a) of this section shall be closed as follows:

(1) Impoundments located in whole above the seasonal high groundwater table shall be dewatered. Impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable.

(2) All coal combustion residuals shall be removed from the impoundments and transferred for (i) disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill or (ii) use in a structural fill or other beneficial use as allowed by law. The use of coal combustion products (i) as structural fill shall be conducted in accordance with the requirements of Subpart 3 of Part 2I of Article 9 of the General Statutes and (ii) for other beneficial uses shall be conducted in accordance with the requirements of Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By- Products) and Section .1200 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management), as applicable.

(3) If restoration of groundwater quality is degraded as a result of the impoundment, corrective action to restore groundwater quality shall be implemented by the owner or operator as provided in G.S. 130A-309.211.

SECTION 4. There is appropriated a sum of up to four hundred fifty thousand dollars ($450,000) to the State Water Infrastructure Authority from the Coal Combustion Residuals Management Fund cash balance on June 30, 2016, to fund grants to local governments operating public water supplies in areas surrounding coal combustion residuals impoundments to provide moneys for additional staff for permitting and construction activities as may be needed to facilitate establishment of permanent water supplies to households eligible for connection to public water supplies pursuant to G.S. 130A-309.211(c1).

SECTION 5.(a) Section 3(e) of S.L. 2014-122 is repealed.

SECTION 5.(b) Section 4(e) of S.L. 2014-122 reads as rewritten:

"**SECTION 4.(e)** All electric generating facilities owned by a public utility that produce coal combustion residuals and coal combustion products shall issue a request for proposals on or before December 31, 2014, for (i) the conduct of a market analysis for the concrete industry and other industries that might beneficially use coal combustion residuals and coal combustion products; (ii) the study of the feasibility and advisability of installation of technology to convert existing and newly generated coal combustion residuals to commercial-grade coal combustion products suitable for use in the concrete industry and other industries that might beneficially use coal combustion residuals; and (iii) an examination of all innovative technologies that might be applied to diminish, recycle or reuse, or mitigate the impact of existing and newly generated coal combustion residuals. All electric generating facilities shall present the materials and information received in response to a request for proposals issued pursuant to this section and an assessment of the materials and information, including a forecast of specific actions to be taken in response to the materials and information received, to the Environmental Management Commission ~~and the Coal Ash Management Commission~~ on or before August 1, 2016."

SECTION 6.(a) G.S. 143B-291 reads as rewritten:

"**§ 143B-291. North Carolina Mining Commission – members; selection; removal; compensation; quorum; services.**

(a) Repealed by 2014-4, s. 5(a), effective July 31, 2015.

(a1) Members, Selection. – The North Carolina Mining Commission shall consist of eight members appointed as follows:

(1) One member who is the chair of the North Carolina State University Minerals Research Laboratory Advisory ~~Committee.~~Committee, ex officio and nonvoting.

(2) The State Geologist, ex officio and nonvoting.

(3) One member appointed by the Governor subject to confirmation in conformance with Section 5(8) of Article III of the North Carolina Constitution, who is a representative of the mining industry.

(4) One member appointed by the Governor subject to confirmation in conformance with Section 5(8) of Article III of the North Carolina Constitution, who is a representative of the mining industry.

(5) One member appointed by the ~~General Assembly upon recommendation of the Speaker of the House of Representatives~~ Governor subject to confirmation in conformance with Section 5(8) of Article III of the North Carolina Constitution, who is a representative of the mining industry.

(6) One member appointed by the ~~General Assembly upon recommendation of the President Pro Tempore of the Senate~~ Governor subject to confirmation in conformance with Section 5(8) of Article III of the North Carolina Constitution, who is a representative of the mining industry.

(7) One member appointed by the General Assembly upon recommendation of the Speaker of the House of Representatives in conformance with G.S. 120-121, who is a ~~member of~~ representative of a nongovernmental conservation ~~interests.~~interest.

(8) One member appointed by the General Assembly upon recommendation of the President Pro Tempore of the Senate in conformance with G.S. 120-121, who is a ~~member of~~representative of a nongovernmental conservation ~~interests.~~interest.

(a2) Process for Appointments by the Governor. – The Governor shall transmit to the presiding officers of the Senate and the House of Representatives, within four weeks of the convening of the session of the General Assembly in the year for which the terms in question are to expire, the names of the persons to be appointed by the Governor and submitted to the General Assembly for confirmation by joint resolution. If an appointment is required pursuant to this subsection when the General Assembly is not in session, the member may be appointed and serve on an interim basis pending confirmation by the General Assembly. For the purpose of this subsection, the General Assembly is not in session only (i) prior to convening of the regular session, (ii) during any adjournment of the regular session for more than 10 days, or (iii) after sine die adjournment of the regular session.

(b) Terms. – The term of office of a member of the Commission is ~~six years.~~four years, beginning effective January 1 of the year of appointment and terminating on December 31 of the year of expiration. At the expiration of each member's term, the appointing authority shall replace the member with a new member of like qualifications for a term of ~~six~~ four years. ~~The term of the member appointed under subdivision (5) of subsection (a1) of this section shall expire on June 30 of years that precede by one year those years that are evenly divisible by six. The term of members appointed under subdivisions (3) and (6) of subsection (a1) of this section shall expire on June 30 of years that follow by one year those years that are evenly divisible by six. The term of members appointed under subdivisions (4) and (7) of subsection (a1) of this section shall expire on June 30 of years that follow by three years those years that are evenly divisible by six. Upon the expiration of a six-year term, a member may continue to serve until a successor is appointed and duly qualified as provided by G.S. 128-7.~~In order to establish regularly overlapping terms, initial appointments shall be made effective June 1, 2016, or as soon as feasible thereafter, and expire as follows:

(1) The initial appointments made by the Governor:

a. Pursuant to subdivision (a1)(3) of this section shall expire December 31, 2020.

b. Pursuant to subdivision (a1)(4) of this section shall expire December 31, 2020.

c. Pursuant to subdivision (a1)(5) of this section shall expire December 31, 2019.

d. Pursuant to subdivision (a1)(6) of this section shall expire December 31, 2019.

(2) The initial appointment made by the General Assembly upon recommendation of the Speaker of the House of Representatives pursuant to subdivision (a1)(7) of this section shall expire December 31, 2018.

(3) The initial appointment made by the General Assembly upon recommendation of the President Pro Tempore of the Senate pursuant to subdivision (a1)(8) of this section shall expire December 31, 2018.

(c) Vacancies. – In case of death, incapacity, resignation, or vacancy for any other reason in the office of any member appointed by the Governor, prior to the expiration of the member's term of office, the name of the successor shall be submitted by the Governor within four weeks after the vacancy arises to the General Assembly for confirmation by the General Assembly. In case of death, incapacity, resignation, or vacancy for any other reason in the office of any member appointed by the General Assembly, vacancies in those appointments shall be filled in accordance with G.S. 120-122. If a vacancy arises or exists when the General Assembly is not in session, and the appointment is deemed urgent by the Governor, the member may be appointed by the Governor and serve on an interim basis pending confirmation or appointment by the General Assembly, as applicable. An appointment to fill a vacancy shall be for the

unexpired balance of the term.

(d) Removal. – The Governor may remove any member of the Commission from office for misfeasance, malfeasance, or nonfeasance in accordance with the provisions of ~~G.S. 143B-13.~~ G.S. 143B-13, or for good cause.

(e) Compensation. – The members of the Commission shall receive per diem and necessary traveling and subsistence expenses in accordance with the provisions of G.S. 138-5.

(f) Quorum. – A majority of the Commission shall constitute a quorum for the transaction of business.

(g) Staff. – All clerical and other services required by the Commission shall be supplied by the Secretary of Environmental ~~Quality.~~Quality. The Commission staff shall be housed in the Department of Environmental Quality and supervised by the Secretary of Environmental Quality."

SECTION 6.(b) Notwithstanding the provisions of G.S. 143B-291(a2) and G.S. 143B-291(b), as enacted and amended by Section 6(a) of this act, initial appointments made by the Governor to the Commission shall not require confirmation by the General Assembly.

SECTION 7.(a) G.S. 143B-293.2 reads as rewritten:

"**§ 143B-293.2. North Carolina Oil and Gas Commission – members; selection; removal; compensation; quorum; services.**

(a) Repealed by Session Laws 2014-4, s. 4(a), effective July 31, 2015.

(a1) Members Selection. – The North Carolina Oil and Gas Commission shall consist of nine members appointed as follows:

(1) One appointed by the ~~General Assembly upon recommendation of the Speaker of the House of Representatives~~ Governor subject to confirmation in conformance with Section 5(8) of Article III of the North Carolina Constitution, who, at the time of initial appointment, is an elected official of a municipal government located in a region of North Carolina that has oil and gas potential. A person serving in this seat may complete a term on the Commission even if the person is no longer serving as an elected official of a municipal government but may not be reappointed to a subsequent term.

(2) One appointed by the General Assembly upon recommendation of the Speaker of the House of Representatives in conformance with G.S. 120-121, who shall be a geologist with experience in oil and gas exploration and development.

(3) One appointed by the General Assembly upon recommendation of the Speaker of the House of Representatives in conformance with G.S. 120-121, who is a ~~member~~ representative of a nongovernmental conservation interest.

(4) One appointed by the ~~General Assembly upon recommendation of the President Pro Tempore of the Senate~~ Governor subject to confirmation in conformance with Section 5(8) of Article III of the North Carolina Constitution, who, at the time of initial appointment, is a member of a county board of commissioners of a county located in a region of North Carolina that has oil and gas potential. A person serving in this seat may complete a term on the Commission even if the person is no longer serving as county commissioner but may not be reappointed to a subsequent term.

(5) One appointed by the General Assembly upon recommendation of the President Pro Tempore of the Senate in conformance with G.S. 120-121, who is a ~~member~~representative of a nongovernmental conservation interest.

(6) One appointed by the General Assembly upon recommendation of the President Pro Tempore of the Senate in conformance with G.S. 120-121, who shall be an engineer with experience in oil and gas exploration and development.

(7) One appointed by the Governor subject to confirmation in conformance with Section 5(8) of Article III of the North Carolina Constitution, who shall be a representative of a publicly traded natural gas company.

(8) One appointed by the Governor subject to confirmation in conformance with Section 5(8) of Article III of the North Carolina Constitution, who shall be a licensed attorney with experience in legal matters associated with oil and gas exploration and development.

(9) One appointed by the Governor subject to confirmation in conformance with Section 5(8) of Article III of the North Carolina Constitution, with experience in matters related to public health.

(a2) Process for Appointments by the Governor. – The Governor shall transmit to the presiding officers of the Senate and the House of Representatives, within four weeks of the convening of the session of the General Assembly in the year for which the terms in question are to expire, the names of the persons to be appointed by the Governor and submitted to the General Assembly for confirmation by joint resolution. If an appointment is required pursuant to this

subsection when the General Assembly is not in session, the member may be appointed and serve on an interim basis pending confirmation by the General Assembly. For the purpose of this subsection, the General Assembly is not in session only (i) prior to convening of the regular session, (ii) during any adjournment of the regular session for more than 10 days, or (iii) after sine die adjournment of the regular session.

(b) Terms. – The term of office of members of the Commission is three years.four years, beginning effective January 1 of the year of appointment and terminating on December 31 of the year of expiration. A member may be reappointed to no more than two consecutive three-yearfour-year terms. The term of a member who no longer meets the qualifications of their respective appointment, as set forth in subsection (a)(a1) of this section, shall terminate but the member may continue to serve until a new member who meets the qualifications is appointed. The terms of members appointed under subdivisions (1), (4), and (7) of subsection (a1) of this section shall expire on June 30 of years evenly divisible by three. The terms of members appointed under subdivisions (2), (5), and (8) of subsection (a1) of this section shall expire on June 30 of years that precede by one year those years that are evenly divisible by three. The terms of members appointed under subdivisions (3), (6), and (9) of subsection (a1) of this section shall expire on June 30 of years that follow by one year those years that are evenly divisible by three. In order to establish regularly overlapping terms, initial appointments shall be made effective June 1, 2016, or as soon as feasible thereafter, and expire as follows:

(1) The initial appointments made by the Governor:
  a. Pursuant to subdivision (a1)(1) of this section shall expire December 31, 2020.
  b. Pursuant to subdivision (a1)(4) of this section shall expire December 31, 2020.
  c. Pursuant to subdivision (a1)(7) of this section shall expire December 31, 2020.
  d. Pursuant to subdivision (a1)(8) of this section shall expire December 31, 2019.
  e. Pursuant to subdivision (a1)(9) of this section shall expire December 31, 2019.

(2) The initial appointments made by the General Assembly upon recommendation of the Speaker of the House of Representatives:
  a. Pursuant to subdivision (a1)(2) of this section shall expire December 31, 2018.
  b. Pursuant to subdivision (a1)(3) of this section shall expire December 31, 2019.

(3) The initial appointments made by the General Assembly upon recommendation of the President Pro Tempore of the Senate:
  a. Pursuant to subdivision (a1)(5) of this section shall expire December 31, 2018.
  b. Pursuant to subdivision (a1)(6) of this section shall expire December 31, 2019.

(c) Vacancies; Removal from Office. –Vacancies. – In case of death, incapacity, resignation, or vacancy for any other reason in the office of any member appointed by the Governor, prior to the expiration of the member's term of office, the name of the successor shall be submitted by the Governor within four weeks after the vacancy arises to the General Assembly for confirmation by the General Assembly. In case of death, incapacity, resignation, or vacancy for any other reason in the office of any member appointed by the General Assembly, vacancies in those appointments shall be filled in conformance with G.S. 120-122. If a vacancy arises or exists when the General Assembly is not in session and the appointment is deemed urgent by the Governor, the member may be appointed by the Governor and serve on an interim basis pending confirmation or appointment by the General Assembly, as applicable. An appointment to fill a vacancy shall be for the unexpired balance of the term.

(c1) Removal. –

(1) Any appointment by the Governor to fill a vacancy on the Commission created by the resignation, dismissal, death, or disability of a member shall be for the balance of the unexpired term. The Governor shall have the power to remove any member of the Commission from office for misfeasance, malfeasance, or nonfeasance in accordance with the provisions of G.S. 143B-13 of the Executive Organization Act of 1973.1973, or for good cause.

(2) Members appointed by the President Pro Tempore of the Senate and the Speaker of the House of Representatives shall be made in accordance with G.S. 120-121, and vacancies in those appointments shall be filled in accordance with G.S. 120-122. In accordance with Section 10 of Article VI of the North Carolina Constitution, a member may continue to serve until a successor is duly appointed.

(d) Compensation. – The members of the Commission shall receive per diem and necessary traveling and subsistence expenses in accordance with the provisions of G.S. 138-5.

(e) Quorum. – A majority of the Commission shall constitute a quorum for the transaction of business.

(f) Staff. – All staff support required by the Commission shall be supplied by the Division of Energy, Mineral, and Land Resources and the North Carolina Geological Survey. Survey, and supervised by the Secretary of Environmental Quality.

(g) Committees. – In addition to the Committee on Civil Penalty Remissions required

to be established under G.S. 143B-293.6, the chair may establish other committees from members of the Commission to address specific issues as appropriate. No member of a committee may hear or vote on any matter in which the member has an economic interest. A majority of a committee shall constitute a quorum for the transaction of business.

(h) Office May Be Held Concurrently With Others. – Membership on the Oil and Gas Commission is hereby declared to be an office that may be held concurrently with other elective or appointive offices in addition to the maximum number of offices permitted to be held by one person under G.S. 128-1.1."

SECTION 7.(b) Notwithstanding the provisions of G.S. 143B-293.2(a1) and G.S. 143B-293.2(b), as enacted and amended by Section 7(a) of this act, initial appointments made by the Governor to the Commission shall not require confirmation by the General Assembly.

SECTION 7.(c) For purposes of the rules set forth in 15A NCAC 05H (Oil and Gas Conservation Rules), modifications made to the Oil and Gas Commission under Section 7(a) of this act shall, pursuant to G.S. 150B-21.7, be construed to (1) have repealed authority to adopt such rules given to previously constituted commissions and (2) transferred the authority to adopt such rules to the Oil and Gas Commission as modified by Section 7(b) of this act. Therefore, pursuant to G.S. 150B-21.7, rules set forth in 15A NCAC 05H (Oil and Gas Conservation Rules) shall be effective until the Oil and Gas Commission, as modified Section 7(a) of this act, amends or repeals the rules.

SECTION 8. The provisions of this act shall be severable, and if any phrase, clause, sentence, or provision is declared to be unconstitutional or otherwise invalid, the validity of the remainder of this act shall not be affected thereby.

SECTION 9. Except as otherwise provided, this act is effective when it becomes law. Requirements for establishment of a permanent alternative water supply under G.S. 130A-309.211(c1), as enacted by Section 1 of this act, shall apply only to households with drinking water supply wells in existence on the date this act becomes effective.

In the General Assembly read three times and ratified this
the 1st day of July, 2016.

s/ Philip E. Berger
President Pro Tempore of the Senate

s/ Tim Moore
Speaker of the House of Representatives

s/ Pat McCrory Governor

Approved 10:55 a.m. this 14th day of July, 2016

I/A

GENERAL ASSEMBLY OF NORTH CAROLINA SESSION 2015

SESSION LAW 2015-110
SENATE BILL 716

AN ACT TO: (1) DIRECT THE NORTH CAROLINA UTILITIES COMMISSION TO RENDER AN EXPEDITED DECISION, UNDER CERTAIN CONDITIONS, ON AN APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR AN APPLICANT TO CONSTRUCT A GENERATING FACILITY THAT USES NATURAL GAS AS THE PRIMARY FUEL AND (2) MODIFY CERTAIN REQUIREMENTS UNDER THE COAL ASH MANAGEMENT ACT OF 2014 FOR COAL ASH SURFACE IMPOUNDMENTS LOCATED ON SITES AT WHICH ALL COAL-FIRED GENERATING UNITS PRESENT ON THOSE SITES WILL PERMANENTLY CEASE OPERATIONS BY JANUARY 31, 2020.

The General Assembly of North Carolina enacts:

SECTION 1. Notwithstanding G.S. 62-110.1, the Commission shall provide an expedited decision on an application for a certificate to construct a generating facility that uses natural gas as the primary fuel if the application meets the requirements of this section. A public utility shall provide written notice to the Commission of the date the utility intends to file an application under this section no less than 30 days prior to the submission of the application. When the public utility applies for a certificate as provided in this section, it shall submit to the Commission an estimate of the costs of construction of the gas-fired generating unit in such detail as the Commission may require. G.S. 62-110.1(e) and G.S. 62-82(a) shall not apply to a certificate applied for under this section. The Commission shall hold a single public hearing on the application applied for under this section and require the applicant to publish a single notice of the public hearing in a newspaper of general circulation in Buncombe County. The Commission shall render its decision on an application for a certificate, including any related transmission line located on the site of the new generation facility, within 45 days of the date the application is filed if all of the following apply:

(1) The application for a certificate is for a generating facility to be constructed at the site of the Asheville Steam Electric Generating Plant located in Buncombe County.
(2) The public utility will permanently cease operations of all coal-fired generating units at the site on or before the commercial operation of the generating unit that is the subject of the certificate application.
(3) The new natural gas-fired generating facility has no more than twice the generation capacity as the coal-fired generating units to be retired.

SECTION 2.(a) Section 3(b) of S.L. 2014-122 reads as rewritten:

"**SECTION 3.(b)** Notwithstanding G.S. 130A-309.211 or G.S. 130A-309.212, as enacted by Section 3(a) of this act, and except as otherwise preempted by the requirements of federal law, the following coal combustion residuals surface impoundments shall be deemed high-priority ~~and, as soon as practicable, but no later than August 1, 2019,~~ and shall be closed in conformance with Section 3(c) of this ~~act:~~act as follows:

(1) Coal combustion residuals surface impoundments located at the Dan River Steam Station, owned and operated by Duke Energy Progress, and located in Rockingham ~~County.~~County, as soon as practicable, but no later than August 1, 2019.
(2) Coal combustion residuals surface impoundments located at the Riverbend Steam Station, owned and operated by Duke Energy Carolinas, and located in Gaston ~~County.~~County, as soon as practicable, but no later than August 1, 2019.

(3) Coal combustion residuals surface impoundments located at the Asheville Steam Electric Generating Plant, owned and operated by Duke Energy Progress, and located in Buncombe ~~County.~~County, as soon as practicable, but no later than August 1, 2022.

(4) Coal combustion residuals surface impoundments located at the Sutton Plant, owned and operated by Duke Energy Progress, and located in New Hanover ~~County.~~County, as soon as practicable, but no later than August 1, 2019."

SECTION 2.(b) The requirements of subsections (c) through (f) of G.S. 130A-309.210 shall not apply to coal combustion residuals surface impoundments and electric generating facilities located at the Asheville Steam Electric Generating Plant in Buncombe County.

SECTION 2.(c) This section becomes effective August 1, 2016, if, on or before that date, the North Carolina Utilities Commission has issued a certificate of public convenience and necessity to Duke Energy Progress for a new natural gas-fired generating facility, pursuant to Section 1 of this act, based upon written notice submitted to the Commission from Duke Energy Progress that it will permanently cease operations of all coal-fired generating units at the Asheville Steam Electric Generating Plant located in Buncombe County no later than January 31, 2020.

SECTION 3. Except as otherwise provided, this act is effective when it becomes law.

In the General Assembly read three times and ratified this the 15th day of June, 2015.

s/ Daniel J. Forest
President of the Senate

s/ Tim Moore
Speaker of the House of Representatives

s/ Pat McCrory
Governor

Approved 10:15 a.m. this 24th day of June, 2015

I/A

THE STATE OF SOUTH CAROLINA
BEFORE THE DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

IN RE: DUKE ENERGY CAROLINAS, LLC
W.S. LEE STEAM STATION
ANDERSON COUNTY

CONSENT AGREEMENT
14 -13- HW

This Consent Agreement is entered into between the South Carolina Department of Health and Environmental Control (SCDHEC or the Department) and Duke Energy Carolinas, LLC (Duke Energy) with respect to the investigation and remediation of two ash placement areas at the William States (W.S.) Lee Steam Station located at 205 Lee Steam Road, Belton, South Carolina in Anderson County (Tax Map Number 260-00-01-003-000). The Site shall include the "Inactive Ash Basin" and the "Ash Fill Area," and all areas where ash, other coal combustion residuals, or their constituents, including contaminants, (collectively Coal Combustion Residuals or CCR or ash) may have potentially migrated from these ash placement areas, collectively referred to as the "Site."

Duke Energy is entering into this Consent Agreement to assess and address any release or threat of release of Coal Combustion Residuals or other pollutants from the Site to the environment and to provide for the final disposition of the Site. Duke Energy will take all necessary steps in compliance with all environmental laws to prevent future releases from the Site. In the interest of resolving the matters herein without delay, Duke Energy agrees to the entry of this Consent Agreement without litigation and without the admission or adjudication of any issue of fact or law, except for purposes of enforcing this agreement. Duke Energy agrees that this Consent Agreement shall be deemed an admission of fact and law only as necessary for enforcement of this Consent

Agreement by the Department or in subsequent actions relating to this Site by the Department.

FINDINGS OF FACT

Based on information known by the Department, the following findings of fact are asserted by the Department for purposes of this Consent Agreement:

1. Duke Energy owns and operates W.S. Lee Steam Station as a cycling station to supplement supply when electricity demand is high. Three (3) coal-fired units, which became operational in the 1950's, generate approximately 370 megawatts (MW) of electricity. Units 1 and 2 were introduced to service beginning in 1951 followed by Unit 3 in 1959. Two (2) combustion turbines (CTs) were added in 2007 and generate an additional approximate 84 MWs. The CTs use diesel fuel or natural gas as their fuel source and serve as emergency back-up power to Oconee Nuclear Station.
2. Prior to 1974, CCR was placed in the Inactive Ash Basin, which is an unregulated basin located south of the power plant. Constructed in 1951 and expanded in 1959, the Inactive Ash Basin was formed by an approximately 3,700 feet long rim dike that impounds approximately 19 acres. The dike has a maximum height of 60 feet above grade with a crest elevation of 690 feet above sea level.
3. CCR is believed to have been used in the past as backfill into a borrow area identified as the Ash Fill Area, which is located near the Inactive Ash Basin.
4. On May 1, 2014, Duke Energy initiated geotechnical characterization of the Inactive Ash Basin.
5. On May 30, 2014, Duke Energy submitted a plan for the geotechnical characterization on the Ash Fill Area.

CONCLUSIONS OF LAW

The Department has the authority to implement and enforce laws and related regulations pursuant to the South Carolina Hazardous Waste Management Act, S.C. Code Ann. §44-56-10, et. seq. (Rev. 2002 and Supp. 2013), the Pollution Control Act, S.C. Code Ann. §48-1-10 et seq. (Rev. 2008 and Supp. 2013) and the South Carolina Solid Waste Policy and Management Act, S.C. Code Ann. §44-96-10, et. seq. (Rev. 2002 and Supp. 2013). These Acts authorize the Department to issue orders; assess civil penalties; conduct studies, investigations, and research to abate, control and prevent pollution; and to protect the health of persons or the environment.

NOW, THEREFORE IT IS AGREED, with the consent of Duke Energy and the Department, and pursuant to the South Carolina Hazardous Waste Management Act, the Pollution Control Act, and/or the Solid Waste Policy and Management Act, that Duke Energy shall:

1. Within ninety (90) days of receipt of this fully executed Consent Agreement, submit to the Department for review and approval, an Ash Removal Plan for the Site. The Ash Removal Plan shall include a time schedule for implementation of all major activities required by the Plan. The Ash Removal Plan must include, but is not limited to, characterization of the ash, provisions for the safe removal of the ash, management of storm water during the project, and management alternatives for the ash by either beneficial reuse or disposition in a South Carolina permitted Class 3 solid waste disposal facility or a facility meeting equivalent standards outside of South Carolina. The Ash Removal Plan shall also include an evaluation of the stability of the rim dike and any other slopes impounding the CCR placement areas during ash removal activities. Any comments generated through the Department's review of the Ash Removal Plan, must be addressed in writing by Duke Energy within fifteen (15) days of Duke Energy's receipt of said comments. Upon the Department's approval of the Ash Removal Plan and the time schedule for implementation thereof, the Ash Removal Plan

and schedule shall be incorporated herein and become an enforceable part of this Consent Agreement.

2. Submit, along with but under separate cover from the Ash Removal Plan, a Health and Safety Plan (HASP) consistent with Occupational Safety and Health Administration regulations. The HASP shall be submitted to the Department in the form of one (1) electronic copy (.pdf format). Duke Energy agrees the HASP is submitted to the Department for informational purposes only. The Department expressly denies any liability that may result from Duke Energy's implementation of the HASP.

3. Begin implementation of the Ash Removal Plan described in paragraph 1 within fifteen (15) days of Duke Energy's receipt of the Department's written approval of the Ash Removal Plan.

4. Upon completion of the work approved in the Ash Removal Plan, submit an Ash Removal Report to the Department. The Ash Removal Report shall summarize the activities taken during implementation of the Ash Removal Plan and shall contain appropriate documentation that ash has been removed from the Site in accordance with the Ash Removal Plan.

5. Within thirty (30) days of approval of the Ash Removal Report, submit an Assessment Plan to the Department. The Assessment Plan shall include, but is not limited to, the following: a description of work needed for the delineation of the vertical and horizontal extent of any contamination, including an assessment of surface water, groundwater, and soil underlying the Site; an evaluation of risks to human health and the environment; and a schedule for implementation.

6. Upon completion of the activities outlined in the approved Assessment Plan, submit to the Department an Assessment Report summarizing the findings of the investigations performed pursuant to the Assessment Plan. The Department shall review the Assessment Report to

determine completion of the field investigation and sufficiency of the documentation. If the Department determines that additional field investigation is necessary, Duke Energy shall conduct additional field investigation to complete such task. Alternatively, if the Department determines the field investigation to be complete, but the conclusions in Duke Energy's Assessment Report are not approved, Duke Energy shall submit a Revision to the Assessment Report within thirty (30) days after receipt of the Department's disapproval. The Revision shall address the Department's comments.

7. Within sixty (60) days of approval of the Assessment Report, submit to the Department a Closure Plan which details the actions to be taken for the final disposition of the Site, and evaluates the need for additional remediation of soils, surface water and groundwater. If remedial actions are necessary, Duke Energy shall also submit to the Department for approval a Remedial Plan, which includes a proposed remedy, justification for the proposed remedy, the design of the proposed remedy and a schedule for implementation. The schedule of implementation must extend through full completion of the remedy. The Closure Plan and, if necessary, the Remedial Plan shall be based upon the results of the field investigation, ash removal activities and the following seven (7) criteria:

   a. Overall protection of human health and the environment;

   b. Compliance with applicable or relevant and appropriate standards;

   c. Long-term effectiveness and permanence;

   d. Reduction of toxicity, mobility or volume;

   e. Short-term effectiveness;

   f. Implementability;

   g. Costs.

8. Any comments generated through the Department's review of the Closure Plan and any required Remedial Plan must be addressed in writing by Duke Energy within fifteen (15) days of Duke Energy's receipt of said comments. This fifteen (15) day deadline may be

extended by mutual agreement of the parties if the comment resolution requires extensive revision, such as re-engineering. Upon Department approval of the Closure Plan, Remedial Plan and the implementation schedule, the Closure Plan, Remedial Plan, and implementation schedule shall be incorporated herein and become an enforceable part of this Consent Agreement.

9. Begin to implement the Closure Plan and the Remedial Plan within forty-five (45) days of the Department's approval of the Plans; and thereafter, take all necessary and reasonable steps to ensure timely completion of the Plans.

10. Upon Duke Energy's successful completion of the terms of this Consent Agreement, submit to the Department a written Final Report. The Final Report shall contain all necessary documentation supporting Duke Energy's remediation of the Site and successful and complete compliance with this Consent Agreement. Once the Department has approved the Final Report, the Department will provide Duke Energy a written approval of completion that provides a Covenant Not to Sue to Duke Energy for the response actions specifically covered in this Consent Agreement, approved by the Department and completed in accordance with the approved work plans and reports.

11. Notwithstanding any other provision of this Consent Agreement, including the Covenant Not to Sue, the Department reserves the right to require Duke Energy to perform any additional work at the Site or to reimburse the Department for additional work if Duke Energy declines to undertake such work, if: (i) conditions at the Site, previously unknown to the Department, are discovered after completion of the work approved by the Department pursuant to this Consent Agreement and warrant further assessment or remediation to address a release or threat of a release in order to protect human health or the environment, or (ii) information is received, in whole or in part, after completion of the work approved by the Department pursuant to this Consent Agreement, and these previously unknown conditions or this

information indicates that the completed work is not protective of human health and the environment. In exigent circumstances, the Department reserves the right to perform the additional work and Duke Energy will reimburse the Department for the work.

12. In consideration for the Department's Covenant Not to Sue, Duke Energy agrees not to assert any claims or causes of action against the Department arising out of response activities undertaken at the Site, or to seek any other costs, damages or attorney's fees from the Department arising out of response activities undertaken at the Site except for those claims or causes of action resulting from the intentional or grossly negligent acts or omissions of the Department. However, Duke Energy reserves all available defenses, not inconsistent with this Consent Agreement, to any claims or causes of action asserted against Duke Energy arising out of response activities undertaken at the Site by the Department.

13. Submit to the Department a written monthly progress report within thirty (30) days of the execution of this Consent Agreement and once every month thereafter until completion of the work required under this Consent Agreement. The progress reports shall include the following: (a) a description of the actions which Duke Energy has taken toward achieving compliance with this Consent Agreement during the previous month; (b) results of sampling and tests, in summary format received by Duke Energy during the reporting period; (c) description of all actions which are scheduled for the next month to achieve compliance with this Consent Agreement, and other information relating to the progress of the work as deemed necessary or requested by the Department; and (d) information regarding the percentage of work completed and any delays encountered or anticipated that may affect the approved schedule for implementation of the terms of this Consent Agreement, and a description of efforts made to mitigate delays or avoid anticipated delays.

14. Prepare all Plans and perform all activities under this Consent Agreement following appropriate DHEC and EPA guidelines. All Plans and associated reports shall be prepared

in accordance with industry standards and endorsed by a Professional Engineer (P.E.) and/or Professional Geologist (P.G.) duly-licensed in South Carolina. Unless otherwise requested, one (1) paper copy and one (1) electronic copy (.pdf format) of each document prepared under this Consent Agreement shall be submitted to the Department's Project Manager. Unless otherwise directed in writing, all correspondence, work plans and reports should be submitted to the Department's Project Manager at the following address:

Tim Hornosky
South Carolina Department of Health and Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, South Carolina 29201
hornostr@dhec.sc.gov

15. Reimburse the Department on a quarterly basis, for all past, present and future costs, direct and indirect, incurred by the Department pursuant to this Consent Agreement and as provided by law. Oversight Costs include, but are not limited to, the direct and indirect costs of negotiating the terms of this Consent Agreement, reviewing plans and reports, supervising corresponding work and activities, and costs associated with public participation. The Department shall provide documentation of its Oversight Costs in sufficient detail so as to show the personnel involved, amount of time spent on the project for each person, expenses, and other specific costs. Payments are due to the Department within thirty (30) days of the date of the Department's invoice; however, it is not a violation of this Consent Agreement if late payment is cured within thirty (30) additional days.

16. Notify the Department in writing at least five (5) days before the scheduled deadline if any event occurs which causes or may cause a delay in meeting any of the above-scheduled dates for completion of any specified activity pursuant to this Consent Agreement. Duke Energy shall describe in detail the anticipated length of the delay, the precise cause or

causes of delay, if ascertainable, the measures taken or to be taken to prevent or minimize the delay, and the timetable by which Duke Energy proposes that those measures will be implemented. The Department shall provide written notice to Duke Energy as soon as practicable that a specific extension of time has been granted or that no extension has been granted. An extension shall be granted for any scheduled activity delayed by an event of *force majeure* which shall mean any event arising from causes beyond the control of Duke Energy that causes a delay in or prevents the performance of any of the conditions under this Consent Agreement including, but not limited to: a) acts of God, fire, war, insurrection, civil disturbance, explosion; b) adverse weather conditions that could not be reasonably anticipated causing unusual delay in transportation and/or field work activities; c) restraint by court order or order of public authority; d) inability to obtain, after exercise of reasonable diligence and timely submittal of all required applications, any necessary authorizations, approvals, permits, or licenses due to action or inaction of any governmental agency or authority; and e) delays caused by compliance with applicable statutes or regulations governing contracting, procurement or acquisition procedures, despite the exercise of reasonable diligence by Duke Energy. Events which are not *force majeure* include by example, but are not limited to, unanticipated or increased costs of performance, changed economic circumstances, normal precipitation events, or failure by Duke Energy to exercise due diligence in obtaining governmental permits or performing any other requirement of this Consent Agreement or any procedure necessary to provide performance pursuant to the provisions of this Consent Agreement. Any extension shall be granted at the sole discretion of the Department, incorporated by reference as an enforceable part of this Consent Agreement, and, thereafter, be referred to as an attachment to the Consent Agreement.

17. Employees of the Department, their respective consultants and contractors will not be denied access during normal business hours or at any time work under this Consent Agreement is

being performed or during any environmental emergency or imminent threat situation, as determined by the Department or as allowed by applicable law.

IT IS AGREED THAT this Consent Agreement shall be binding upon and inure to the benefit of Duke Energy and its officers, directors, agents, receivers, trustees, heirs, executors, administrators, successors, and assigns and to the benefit of the Department and any successor agency of the State of South Carolina that may have responsibility for and jurisdiction over the subject matter of this Consent Agreement. Duke Energy may not assign its rights or obligations under this Consent Agreement without the prior written consent of the Department.

IT IS FURTHER AGREED that failure to meet any deadline or to perform the requirements of this Consent Agreement without an approved extension of time and failure to timely cure as noted below, may be deemed a violation of the Pollution Control Act, the South Carolina Hazardous Waste Management Act and/or the Solid Waste Management and Policy Act, as amended. Upon ascertaining any such violation, the Department shall notify Duke Energy in writing of any such deemed violation and that appropriate action may be initiated by the Department in the appropriate forum to obtain compliance with the provisions of this Consent Agreement and the aforesaid Acts. Duke Energy shall have thirty (30) days to cure any deemed violations of this Consent Agreement. Applicable penalties may begin to accrue after issuance of the Department's determination that the alleged violation has not been cured during that thirty (30) day period.

(Signature Page Follows)

FOR THE SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Elizabeth A. Dieck
Director of Environmental Affairs

Date: 9/29/14

Daphne G. Neel, Chief
Bureau of Land and Waste Management

Date: 9/29/14

Van Keisler, P.G., Director
Division of Compliance and Enforcement

Date: 9-29-14

Reviewed By:

Attorney
Office of General Counsel

Date: 9/29/14

WE CONSENT:

DUKE ENERGY CAROLINA, LLC

(Signature)

Date: 9/25/14

John Elnitsky, Senior Vice President, Ash Basin Strategy
(Please clearly print name and title)

Prepared by:

DUKE ENERGY

ALLEN STEAM STATION

ACTIVE ASH BASIN

RETIRED ASH BASIN

CLOSURE PLAN

OCTOBER 10, 2016

Certified by:

AECOM

1600 Perimeter Park Drive, Suite 400

Morrisville, NC 27560

Engineering Firm License Number - **C-2243**

ALL_CLOSE_PLN

Rev. 0

Duke Energy Carolinas, LLC (Duke Energy) prepared this Closure Plan for the Coal Combustion Residuals (CCR) surface impoundments at the Allen Steam Station (Allen) pursuant to the requirements of 40 C.F.R. § 257.102(b) of the Disposal of CCR from Electric Utilities rule, 80 Fed. Reg. 21302 (April 17, 2015). URS Corporation – North Carolina (AECOM) was retained by Duke Energy to certify that this Closure Plan meets the requirements of 40 C.F.R. § 257.102. The information contained in this Closure Plan will be used to assist Duke Energy in the closure of the Active Ash Basin and Retired Ash Basin (collectively, Ash Basins) located in Gaston County, North Carolina, on property owned by Duke Energy. This Closure Plan may be amended pursuant to the requirements of 40 C.F.R. § 257.102(b)(3). Presented below are:

1. A narrative of closure activities;
2. A description of the procedures to remove CCR and decontaminate the CCR units (as needed);
3. A description of the final cover system designed pursuant to with 40 C.F.R. § 257.102(d), a description of the methods and procedures to be used to install the final cover, and a discussion of how the final cover system will achieve the performance standards specified in 40 C.F.R. § 257.102(d);
4. An estimate of the in-place CCR inventory requiring closure;
5. An estimate of the largest area of the CCR units requiring a final cover;
6. A closure schedule; and
7. A written certification from a qualified professional engineer, licensed in North Carolina, that this Closure Plan meets the requirements of 40 C.F.R. § 257.102.

1 NARRATIVE OF CLOSURE ACTIVITIES

The purpose of this Closure Plan is to describe the steps necessary to close the Ash Basins consistent with recognized and generally accepted good engineering practices. Closure is designed to reduce the need for long-term maintenance, control the post-closure infiltration of liquids into the in-place CCR materials, and control the post-closure release of constituents into environmental pathways (i.e., air, surface water, and groundwater).

Although, on May 18, 2016, the North Carolina Department of Environmental Quality (NCDEQ) ranked the Ash Basins “intermediate-risk,” which would require them to be dewatered and excavated pursuant to the North Carolina Coal Ash Management Act of 2014, as amended (CAMA), Duke Energy is in the process of establishing the permanent replacement water supplies required under N.C.G.S. § 130A-309.211(c1) and performing the applicable dam safety repair work required under Dam Safety Order 16-01 issued by the state of North Carolina pursuant to the North Carolina Dam Safety Law of 1967, specifically N.C.G.S. § 143-215.32. Pursuant to N.C.G.S. § 130A-309.213(d)(1), upon Duke Energy’s completion of these tasks within the required time frame set forth in CAMA, NCDEQ must classify the Ash Basins as low-risk, which will allow closure either pursuant to 40 C.F.R. § 257.102(c) or (d). Although CAMA charges NCDEQ with making the final determination regarding closure method, because science supports closure of the Ash Basins by leaving the CCR in place, Duke Energy

contemplates that the Ash Basins will be closed in accordance with the requirements of 40 C.F.R. § 257.102(d).

The method to close the Ash Basins in place will include: removal and treatment of the bulk water/free liquids; interstitial/pore dewatering (as needed) and treatment; stabilization of remaining CCR materials sufficient to support the final cover system; grading of in-place CCR materials to promote positive drainage (no ponding) and prevent sloughing or movement of the final cover system; installation of a final cover system, including stormwater management controls; and post-closure groundwater monitoring and cover system maintenance. Typically, this involves the installation of a low permeability barrier layer and a vegetated soil cover to protect the barrier layer.

2 CCR REMOVAL AND DECONTAMINATION

There may be some areas, primarily located around the perimeter of the Ash Basins, where closure-by-removal is selected in order to enhance surface drainage and/or to allow for development of future plant infrastructure or transmission. In-place CCR from those areas will typically be dewatered (if needed), excavated, and consolidated (placed) into the remaining portion of the basin, which will be graded and closed-in-place pursuant to 40 C.F.R. § 257.102(d).

Existing appurtenant structures, such as ditches, culverts and miscellaneous piping, will be decontaminated and abandoned in place, removed and disposed in a permitted disposal facility, or removed and placed in a beneficial use facility identified at the time of closure. Decontamination procedures may consist of pressure washing, scrubbing, or other generally accepted decontamination procedures.

Pursuant to 40 C.F.R. § 257.102(c), closure will be complete when groundwater monitoring concentrations do not exceed the applicable groundwater protection standard established pursuant to 40 C.F.R. § 257.95(h) for constituents listed in appendix IV to 40 C.F.R. Part 257.

3 FINAL COVER REQUIREMENTS

The final cover system for in-place closure of the Ash Basins will be designed pursuant to 40 C.F.R. § 257.102(d). Closure of the Ash Basins will be conducted in a manner that controls, minimizes, or eliminates, to the maximum extent feasible, the post-closure infiltration of liquids into the CCR and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.

The final cover system being considered is a composite (soil and geosynthetics) cover system consisting of (from top to bottom):

- A six-inch layer of soil that is capable of sustaining native plant growth;
- An 18-inch thick protective soil cover layer;

- A geocomposite drainage layer or non-woven geotextile; and
- A 40-mil thick linear low-density polyethylene geomembrane barrier.

Alternative final cover systems are also under evaluation that would meet, or exceed, the requirements specified in 40 C.F.R. § 257.102(d)(3)(ii), which make use of the latest developments in final cover technology. The final cover system will serve to reduce erosion and post-closure maintenance. Various stormwater control measures (e.g., diversion berms, channels, downslope pipes, and/or downchutes) will convey surface run-off from the cover, then to sediment basins (as appropriate), prior to discharge until the site is stabilized by vegetation. The design of the stormwater conveyances will include armoring and energy dissipation measures, as necessary, to control erosion and reduce maintenance and repairs.

The final cover system, with an equivalent (or lower) permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 18 inches of $1x10^{-5}$ centimeters/second, will be constructed and maintained to minimize the infiltration of precipitation. By minimizing infiltration, the final cover will reduce leachate generation. The final cover system will be graded to preclude the probability of future impoundment of water, sediment, or slurry.

The Ash Basins will be closed in a manner resulting in stable slopes that prevent the sloughing or movement of the final cover system. The grades of the final cover system will be generally slight, sufficient to promote run-off while reducing the potential for sloughing. Instability potential (sliding or sloughing) is further reduced through the selection and use of cover system materials that have adequate drainage properties and sufficient internal and interface shear strengths. Construction quality assurance procedures will be completed to confirm conformance of the installed final cover system to the design.

Upon commencement of closure of the Ash Basins, final closure is anticipated to be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices. Section 6, Closure Schedule, of this Closure Plan describes estimated time frames.

3.1 FINAL COVER SYSTEM

Pursuant to 40 C.F.R. § 257.102(d)(3)(i)(A) through (D), the final cover system will be designed and constructed to meet, at a minimum, the following criteria:

(A) The permeability of the final cover system will be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} centimeters/second, whichever is less.

The final cover system options being considered for the Ash Basins will meet or exceed this criteria. The geomembrane by itself results in a lower effective infiltration rate than the required 18 inches of $1x10^{-5}$ centimeters/second soil.

(B) The infiltration of liquids through the CCR units will be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.

The geomembrane component of the final cover system results in equivalent or better infiltration performance than 18 inches of earthen material. The proposed protective cover (18 inches) and vegetative layer soil will be obtained from local borrow sites and/or portions of the dams and dikes that will be breached during closure. The gradation of the soil used in the cover will be such that it does not damage the geomembrane, provides drainage, resists erosion, and supports plant growth.

(C) The erosion of the final cover system will be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

The materials proposed for the vegetative support layer in the composite cover system option, or the protective cover component of an alternative final cover system, will provide equivalent or better performance than a six-inch-thick erosion layer. In addition, and prior to the completion of closure, stormwater run-off and wastewaters generated from areas outside the Ash Basins' drainage catchment (which had previously been routed through the basins when they were active) will be permanently diverted for treatment (as needed) and discharge at other locations within the site.

(D) The disruption of the integrity of the final cover system will be minimized through a design that accommodates settling and subsidence.

The materials proposed for the final cover systems will accommodate the amount of settlement and subsidence that is anticipated to be encountered during construction and post-closure. In addition, the cover grades and stormwater conveyance system grades will be designed to accommodate settlement during construction and post-closure care.

The methods and procedures used to install the final cover will include:

1. Completing necessary field characterizations and design analyses;
2. Obtaining necessary federal, state, and local permits;
3. Preparing bid documents and selecting a qualified contractor;
4. Mobilizing;
5. Installing erosion and sediment control measures;
6. Removing and treating (as needed) the bulk water/free liquid;
7. Decontaminating and abandoning in place, or removing the appurtenant structures within the CCR units;
8. Clearing and grubbing;
9. Constructing laydown areas and access roads;
10. Interstitial/pore dewatering and treatment (as needed);
11. Grading CCR materials to achieve design cover system subgrade elevations;
12. Installing the cover system and associated stormwater management controls;
13. Stabilizing the site with appropriate vegetation and final erosion and sediment control measures; and

14. Commencing post-closure maintenance and monitoring of the site.

3.2 DRAINAGE AND STABILIZATION

Bulk water/free liquids will be removed from the Ash Basins during the initial phases of construction. Interstitial/pore water may be removed and treated during construction (as needed) to provide a workable surface for final cover system installation. With the diversion of wastewater and the stormwater discharged to the basin from other locations on the site, the volume of interstitial/pore water within the basin is expected to further decline over time. Combined, these measures (diversion of wastewater and stormwater, bulk dewatering, selective interstitial/pore dewatering, and cover system installation) will stabilize the CCR materials sufficiently to support the final cover system.

4 ESTIMATE OF IN-PLACE CCR INVENTORY

The volumes of CCR present in the Ash Basins were calculated and are presented in Table 1 below, pursuant to 40 C.F.R. § 257.102(b)(1)(iv). The volumes are the estimated inventory of CCR that will be open (and require closure) at one time, and the estimates are based on bathymetric surveys, historical topography, and soil borings as of February 2015. The annual surface impoundment inspections completed, pursuant to 40 C.F.R. § 257.83(b), and posted to the Duke Energy CCR website, pursuant to 40 C.F.R. § 257.107(g)(5), contain the most recent estimates of CCR material in the Ash Basins.

Table 1. Estimated In-Place CCR Inventory

Basin	Quantity of CCR (cubic yards)
Active Ash Basin	8,699,607
Retired Ash Basin	4,290,000
Estimated Total	**12,989,607**

5 ESTIMATE OF LARGEST AREA REQUIRING FINAL COVER

Closure of the Ash Basins will be accomplished by leaving CCR in place pursuant to 40 C.F.R. § 257.102(d). The largest area of the CCR units that will be open (and requiring a final cover) at one time is estimated to be 262 acres.

6 CLOSURE SCHEDULE

Closure of the Ash Basins will be initiated pursuant to 40 C.F.R. § 257.102(e) and is anticipated to be completed within nine years of the commencement of closure activities. The closure time frame includes two two-year time extensions beyond the time specified in 40 C.F.R. § 257.102(f)(1)(ii) on the basis that the anticipated time required to close the Ash Basins will need to be lengthened due to:

- The Ash Basins being larger than 40 acres (estimated 169 acres for the Active Ash Basin and 93 acres for the Retired Ash Basin);

- The amount of material needed to close the Ash Basins (greater than 975,000 cubic yards of protective soil cover and vegetation cover material will need to be imported to the site);
- The volume of CCR (greater than 1.6 million cubic yards will need to be excavated and placed as grading fill);
- The volume of bulk water/free liquids to dewater (more than 64 million gallons);
- The time required, after the removal of bulk liquids, for the surface of the basin to stabilize to the point that personnel and equipment can safely access the impoundment. Given the site-specific geometry and physical characteristics of the CCR in the impoundment, the rate at which the materials will drain will likely be slow and variable. As a result, installation of instrumentation and monitoring equipment may be necessary in some instances to ensure subgrade stability is adequate, and other measures may need to be employed to stabilize the surface of the impoundment (possibly including closely-spaced well points, deep wells, trenches, etc.) in a timely manner.

The completed demonstration establishing why it is not feasible to complete closure of the Ash Basins within the five-year time frame due to factors beyond the facility's control will be prepared and placed in the facility's operating record prior to the end of any two-year period pursuant to 40 C.F.R. § 257.102(f)(2).

Prior to commencing closure construction, design documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents will include construction drawings, technical specifications, and quality assurance testing work plans. The permits required for closure construction activities will be evaluated at the time of closure and are anticipated to include permits from NCDEQ and the U.S. Army Corps of Engineers. Preliminary time frames of anticipated closure activities for the Ash Basins are included below in Table 2. We estimate that all of the closure activities for the Ash Basins will be completed by 2028.

Table 2. Estimated Time Frames for Closure Activities

Closure Activity	Time Frame (years)*
NCDEQ Closure Plan Approval	1
NCDEQ Permitting Approvals (NDPES, E&SC, Air)	1
Dewatering and Stabilization	2
CCR Grading	2
NCDEQ Dam Decommissioning Approval	0.5
Final Cover Installation	6.5

*Estimated closure activity time frames may include some overlap.

7 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Jay D Mokotoff, being a registered Professional Engineer in the state of North Carolina, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this written Closure Plan dated October 10, 2016, was developed pursuant to the requirements of 40 C.F.R. § 257.102 and has been prepared pursuant to recognized and generally accepted good engineering practices.

SIGNATURE _____ DATE 10/10/16

NORTH CAROLINA PROFESSIONAL SEAL 043997 ENGINEER JAY D. MOKOTOFF

Prepared for:
DUKE ENERGY

Allen Steam Station
253 Plant Allen Road
Belmont, North Carolina 28012

ALLEN STEAM STATION
RETIRED ASH BASIN (RAB) ASH LANDFILL – PHASE 1

CLOSURE PLAN

OCTOBER 10, 2016

Prepared by:

9751 SOUTHERN PINE BLVD
CHARLOTTE, NORTH CAROLINA 28273
PHONE: 704.523.4726
FAX: 704. 525.3953
S&ME Project No.: 7235-15-035

CLOSURE PLAN

1.0 INTRODUCTION

This Closure Plan was prepared for the Allen Steam Station (ALNSS) – Retired Ash Basin (RAB) Ash Landfill. This Closure Plan was prepared in accordance with 40 C.F.R. Part 257, Subpart D and is consistent with the requirements of 40 C.F.R. § 257.102(b) for closure of coal combustion residuals landfills. The information contained in this Closure Plan will be used to assist Duke Energy Carolinas, LLC (Duke Energy) in the closure of active waste units. The ALNSS Ash Landfill is owned and operated by Duke Energy. The landfill is located in Gaston County, North Carolina on Duke property, adjacent to the Catawba River, south of the steam station and approximately 0.5 miles southeast of the intersection of Plant Allen Road and South Point Road (NC Highway 273). Duke Energy must obtain a written certification from a qualified professional engineer, licensed in the state in which the project work is conducted, that this written Closure Plan and any amendments thereto meet the requirements of 40 C.F.R. § 257.102.

2.0 CLOSURE PLAN

2.1 Overview of Closure Approach

The purpose of the Closure Plan is to outline the steps necessary to close the landfill phases consistent with recognized and generally accepted good engineering practices. Closure is designed to minimize the need for long-term maintenance and to control the post-closure release of contaminants. The facility will be closed in accordance with the requirements of 40 C.F.R. § 257.102. Closure will occur within the time frames set out in 40 C.F.R. § 257.102(f). This Closure Plan may be amended in accordance with the requirements of 40 C.F.R. § 257.102(b)(3).

2.2 Estimated Maximum Inventory of CCR

The design of constructed cells (Phase 1, Cells 1 & 2) provides approximately 2,082,500 cubic yards of airspace available for waste placement (including operational soils).

2.3 Largest Area Requiring Cover System

The Phase 1 area of approximately 25 acres is currently the largest area that will need to be capped.

2.4 Closure Performance Standard

2.4.1 Final Cover System

The cover system has been designed to reduce infiltration into the landfill and to resist erosion. The permeability of the least permeable layer is on the order of 1×10^{-12} cm/sec. This is equal to or less than the permeability of the bottom liner system and no greater than 1×10^{-5} cm/sec.

The final cover system for the closed phase will be certified by a qualified professional engineer as being designed in accordance with the requirements of 40 C.F.R. § 257.102.

With the type of waste that has been landfilled and the controlled nature of the fill placement, no decomposition of the waste material is expected, therefore minimum, if any, settlement is expected. Due to the high allowable strain of the geomembrane and the stable nature of the waste, the final cover system will accommodate any differential settlement that may occur in the waste during the post closure care period.

The proposed final cover system will consist of the following from top to bottom and will be placed over the existing intermediate soil cover:

- a 6-inch thick vegetated erosion layer;
- an 18-inch thick soil barrier;
- a geocomposite drainage layer; and
- a 40-mil thick double-sided textured linear low density polyethylene (LLDPE) geomembrane.

2.4.2 Alternate Final Cover System

An alternate final cover system may be utilized and will consist of the following from top to bottom and will be placed over the existing intermediate soil cover:

- a 6-inch thick vegetated erosion layer;
- an 18-inch thick soil barrier;
- an 8 oz/sy non-woven geotextile for the alternate cover system); and
- a 50-mil LLDPE structured geomembrane for the alternate cover system).

2.4.3 Performance Standards

Closure of the facility will be conducted in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of uncontrolled leachate, surface runoff, or waste decomposition products to the groundwater, surface water, or the atmosphere.

The final cover system consisting of a vegetated soil layer with run-on and run-off controls will minimize the need for post-closure maintenance. The final slopes of the landfill will promote runoff. Diversion berms and downslope pipes will convey surface runoff to sediment basins designed for removal of sediment prior to discharge. A hardy stand of vegetation will be established and, along with the diversion berms and storm water conveyance channels, will minimize erosion of the final cover system.

A low-permeability final cover system will be constructed and maintained that minimizes the infiltration of precipitation into the waste mass. By minimizing infiltration, the final cover will minimize leachate generation.

The final slopes of the landfill will not be less than five percent to prevent ponding.

The CCR unit will be closed in a manner that provides for slope stability to prevent the sloughing or movement of the final cover system. In order to maintain stable slopes for the final cover, the internal and interface friction angle of all the components must be greater than the slope angle by a margin called the factor of safety. An analysis was performed to demonstrate the stability of proposed cap section during static conditions. An acceptable factor of safety is 1.5 or greater to guard against slope failure. To ensure the stability of the vegetative support layer in the final cover system, adequate drainage must be provided to prevent the soil from becoming saturated and subject to seepage forces.

An analysis was also performed to demonstrate the stability of proposed cap section during seismic conditions. An acceptable factor of safety is 1.0 or greater to guard against slope failure. The analysis was performed in accordance with the requirements of 40 C.F.R. § 257.63 and the seismic factor of safety was found to be greater than 1.0.

The final cover system will be finished within six months following the beginning of closure construction unless otherwise approved. If more than six months are necessary, steps to prevent threats to human health and the environment from the unclosed landfill unit will be undertaken.

2.5 Schedule

In accordance with 40 C.F.R. § 257.102(e), the facility will begin closure activities within 30 days after the known final receipt of waste, or if the landfill has remaining capacity and there is a reasonable likelihood that the landfill will receive additional wastes, no later than two years after the most recent receipt of wastes. Contractor mobilization will occur during the initial 30-day period after last known receipt of waste.

In accordance with 40 C.F.R. § 257.102(g), no later than the date on which closure of the CCR unit is initiated, Duke Energy shall prepare a notification of intent to close the unit, which includes the certification by a qualified professional engineer for the design of the final cover system required by § 257.102(d)(3)(iii).

In accordance with 40 C.F.R. § 257.102(h), within 30 days following completion of closure of the CCR unit, Duke Energy shall record a notation on the deed to the landfill property stating that the property has been used as a landfill and its use is restricted under the Post-Closure Plan and the post-closure care requirements as provided by 40 C.F.R. § 257.104(d)(1)(iii).

Within 30 days of recording the notation, Duke Energy shall prepare a notification stating that that the notation has been recorded and placed it into the facility's operating record. Pursuant to 40 C.F.R. § 257.106(d), Duke Energy shall send to the appropriate regulatory agency the notification of intent to close, notification of closure completion, and notification of deed notation, within 30 days of placing each such notification in the operating record.

An expected schedule for closure activities is as follows:

Time	Activity
Prior to last receipt of waste	Permitting, detailed closure design and contractor selection
Initial 30 days after last receipt of waste	Mobilization of contractor
Months 0-1 after beginning construction	Grading /preparation of intermediate cover
Months 1-4 after beginning construction	Placement of soil layer and/or flexible membrane liner, and soil protective layers
Months 4-5 after beginning construction	Installation of diversion berms and downslope pipes
Months 5-6 after beginning construction	Seed, fertilize and mulch

3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Mark Anderson Taylor, being a registered Professional Engineer in the State of North Carolina, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this Closure Plan dated October 10, 2016 was conducted in accordance with the requirements of 40 C.F.R. § 257.102, is true and correct, and has been prepared in accordance with recognized and generally accepted good engineering practices.

SIGNATURE Mark A Taylor DATE 10/10/16

NORTH CAROLINA PROFESSIONAL SEAL 10975 ENGINEER MARK A. TAYLOR

I/A

CLOSURE PLAN

CRAIG ROAD LANDFILL
BC_CRL_CLOSE_LDFL_PLN

DUKE ENERGY – BELEWS CREEK STEAM STATION

BELEWS CREEK, NORTH CAROLINA

Prepared for

Duke Energy
550 South Tryon Street
Charlotte, North Carolina 28202

October 10, 2016

TABLE OF CONTENTS

1.0 INTRODUCTION

This Closure Plan was prepared for the Belews Creek Steam Station (BCSS) Craig Road Landfill. This Closure Plan was prepared in accordance with 40 C.F.R. Part 257, Subpart D and is consistent with the requirements of 40 C.F.R. § 257.102(b) for closure of coal combustion residuals landfills. The information contained in this Closure Plan will be used to assist Duke Energy Carolinas, LLC (Duke Energy) in the closure of active waste units. The BCSS Craig Road Landfill is owned and operated by Duke Energy. The landfill is located in Stokes County, North Carolina on Duke Energy property, south of the Belews Creek Steam Plant, between the east and west arms of Belews Creek Lake near Walnut Cove. Duke Energy must obtain a written certification from a qualified professional engineer, licensed in the state in which the project work is conducted, that this written Closure Plan and any amendments thereto meet the requirements of 40 C.F.R. § 257.102.

2.0 CLOSURE PLAN

2.1 Overview of Closure Approach

The purpose of the Closure Plan is to outline the sequence for closing the landfill phases consistent with recognized and generally accepted good engineering practices. Closure is designed to minimize the need for long term maintenance and to control the post-closure release of contaminants. The facility will be closed in accordance with the requirements of 40 C.F.R. § 257.102. Closure will occur within the time frames set out in 40 C.F.R. § 257.102(f). This Closure Plan may be amended in accordance with the requirements of 40 C.F.R. § 257.102(b)(3).

2.2 Estimated Maximum Inventory of CCR

As stated in the facility's solid waste permit, the gross capacity of the constructed Phases 1 and 2 is approximately 6,322,000 cubic yards as measured from the top of the protective cover soil to the top of final cover. The current landfill design for Phases 1 through 6 provides approximately 24,622,000 cubic yards of total gross capacity.

2.3 Largest Area Requiring Cover System

As stated in the facility's solid waste permit, the largest area that will need to be capped is the 156 acres making up Phases 1 through 6. Currently, only the 66 acres of Phases 1 and 2 is constructed.

2.4 Closure Performance Standard

2.4.1 Final Cover

The cover system has been designed to reduce infiltration into the landfill and to resist erosion, and to meet the requirements of 40 C.F.R. § 257.102(d)(3)(i). The permeability of the least permeable layer (a polyethylene geomembrane) is on the order of 10^{-12} cm/s. This is equal to or less than the permeability of the polyethylene geomembrane in the bottom liner system and no greater than 1×10^{-5} cm/sec.

The final cover system for the closed phase will be certified by a professional engineer as being designed in accordance with the requirements of 40 C.F.R. § 257.102.

With the type of waste that has been landfilled and the controlled nature of the fill placement, no decomposition of the waste material is expected, therefore minimum, if any, settlement is expected. Due to the high allowable strain of the geomembrane and the stable nature of the waste, the final cover system will accommodate any differential settlement that may occur in the waste during the post closure care period.

The proposed final cover system will consist of the following from top to bottom and will be placed over the existing intermediate soil cover:

- a 6-inch thick vegetative soil cover
- an 18-inch thick final soil cover
- a geocomposite drainage layer
- a 40-mil double-sided textured linear low density polyethylene (LLDPE) geomembrane

2.4.2 Alternate Final Cover

The alternate final cover system will consist of the following from top to bottom and will be placed over the existing intermediate soil cover:

- a 6-inch thick vegetative soil cover
- an 18-inch thick final soil cover
- an 8 oz/sy non-woven geotextile
- a 50-mil LLDPE structured geomembrane

2.4.3 Performance Standards

Closure of the facility will be conducted in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of uncontrolled leachate, surface runoff, or waste decomposition products to the groundwater, surface water, or the atmosphere.

The final cover system consisting of a vegetated soil layer with run-on and run-off controls will minimize the need for post-closure maintenance. The final slopes of the landfill will promote runoff. Diversion berms and downslope pipes will convey surface runoff to conveyances with non-erodible linings or, if applicable, to sediment basins designed for removal of sediment prior to discharge. A hardy stand of vegetation will be established and, along with the diversion berms and storm water conveyance channels, will minimize erosion of the final cover system.

A low-permeability final cover system will be constructed and maintained that minimizes the infiltration of precipitation into the waste mass. By minimizing infiltration, the final cover will minimize leachate generation.

The final slopes of the landfill will be five percent or greater to prevent ponding.

2.4.4 Stability

The CCR unit will be closed in a manner that provide for slope stability to prevent the sloughing or movement of the final cover system. In order to maintain stable slopes for the final cover, the internal and interface friction angles of all the components must be greater than the slope angle by a margin called a factor of safety. Since the maximum regulatory slopes are 3:1, only materials with friction angles greater than 26.6° will be used, providing a minimum factor of safety of 1.5. To ensure the stability of the vegetative support layer in the final cover system, adequate drainage must be provided to prevent the soil from becoming saturated and subject to seepage forces.

A seismic analysis was also performed and meets the requirements for stability in accordance with 40 C.F.R. § 257.63.

2.4.5 Closure Time Frame

The final cover system will be finished within six months following the beginning of closure construction unless otherwise approved. If more than six months are necessary, steps to prevent threats to human health and the environment from the unclosed landfill unit will be undertaken.

2.5 Schedule

In accordance with 40 C.F.R. § 257.102(e), the facility will begin closure activities within 30 days after final receipt of waste, or if the landfill has remaining capacity and there is a reasonable likelihood that the landfill will receive additional wastes, no later than two years after the most recent receipt of wastes. Contractor mobilization will occur during the initial 30 day period after last receipt of waste.

In accordance with 40 C.F.R. § 257.102(f)(1), the final cover system will be completed within six months following the beginning of closure construction unless a deadline extension is approved.

In accordance with 40 C.F.R. § 257.102(g), no later than the date on which closure of the CCR unit is initiated, prepare a notification of intent to close the unit, which includes the certification

by a qualified professional engineer for the design of the final cover system required by § 257.102(d)(3)(iii).

In accordance with 40 C.F.R. § 257.102(h), within 30 days of completion of closure, Duke Energy shall record a notation on the deed to the landfill property stating that the property has been used as a landfill and its use is restricted under the Closure/Post-Closure Plan and the post-closure care requirements as provided by 40 C.F.R. § 257.104(d)(1)(iii).

Within 30 days of recording the notation, Duke Energy shall prepare a notification stating that that the notation has been recorded and placed it into the facility's operating record. Pursuant to 40 C.F.R. § 257.106(d), Duke Energy shall send to the appropriate regulatory agency the notification of intent to close, notification of closure completion, and notification of deed notation, within 30 days of placing each such notification in the operating record.

An expected schedule for closure activities is as follows:

Time	Activity
Prior to last receipt of waste	Permitting, detailed closure design and contractor selection
Initial 30 days after last receipt of waste	Mobilization of contractor
Months 0-1 after beginning construction	Grading /preparation of intermediate cover
Months 1-4 after beginning construction	Placement of soil layer and/or flexible membrane liner, and soil protective layers
Months 4-5 after beginning construction	Installation of diversion berms and downslope pipes
Months 5-6 after beginning construction	Seed, fertilize and mulch

3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Martin A. Shumpert, being a registered Professional Engineer, in accordance with the North Carolina Professional Engineer's Registration, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this plan dated October 10, 2016, was prepared in accordance with the requirements of 40 C.F.R. § 257.102, is true and correct, and has been prepared in accordance with recognized and generally accepted good engineering practices.

I/A

Prepared for:
DUKE ENERGY

Belews Creek Steam Station
3195 Pine Hall Rd.
Belews Creek, NC 27009

BELEWS CREEK STEAM STATION
FGD RESIDUE LANDFILL

CLOSURE PLAN

October 2016

NORTH CAROLINA PROFESSIONAL SEAL 034412 ENGINEER AMY R. RYDER
10/10/16

Prepared by:

JOYCE ENGINEERING
9731-F SOUTHERN PINE BLVD
CHARLOTTE, NORTH CAROLINA 28273
PHONE: 704.817.2037
FAX: 704.837.2010
JOYCE Project: 845.1502.11 Task 01

1.0 INTRODUCTION

This Closure Plan was prepared for the Belews Creek Steam Station (BCSS) – Flue Gas Desulfurization (FGD) Residue Landfill. This Closure Plan was prepared in accordance with 40 C.F.R. Part 257, Subpart D and is consistent with the requirements of 40 C.F.R. § 257.102(b) for closure of coal combustion residuals landfills. The information contained in this Closure Plan will be used to assist Duke Energy Carolinas, LLC (Duke Energy) in the closure of active waste units. The BCSS FGD Landfill is owned and operated by Duke Energy. The landfill is located in Stokes County, North Carolina on Duke property, south of BCSS, between the east and west arms of Belews Creek Lake near Walnut Cove. Duke Energy must obtain a written certification from a qualified professional engineer, licensed in the state in which the project work is conducted, that this written Closure Plan and any amendments thereto meet the requirements of 40 C.F.R. § 257.102.

2.0 CLOSURE PLAN

2.1 Overview of Closure Approach

The purpose of the Closure Plan is to outline the steps necessary to close the landfill phases consistent with recognized and generally accepted good engineering practices. Closure is designed to minimize the need for long-term maintenance and to control the post-closure release of contaminants. The facility will be closed in accordance with the requirements of 40 C.F.R. § 257.102. Closure will occur within the time frames set out in 40 C.F.R. § 257.102(f). This Closure Plan may be amended in accordance with the requirements of 40 C.F.R. § 257.102(b)(3).

2.2 Estimated Maximum Inventory of CCR

The current landfill design provides approximately 1,500,000 cubic yards of gross capacity as measured from the top of the protective cover soil to the top of final cover.

2.3 Largest Area Requiring Cover System

The Phase 1 permitted area of 22.6 acres is currently the largest area that will need to be capped.

2.4 Closure Performance Standard

2.4.1 Final Cover System

The cover system has been designed to reduce infiltration into the landfill and to resist erosion. The permeability of the least permeable layer is 1×10^{-12} cm/sec. This is equal to or less than the permeability of the bottom liner system and no greater than 1×10^{-5} cm/sec.

The final cover system for the closed phase will be certified by a qualified professional engineer as being designed in accordance with the requirements of 40 C.F.R. § 257.102.

With the type of waste that has been landfilled and the controlled nature of the fill placement, no decomposition of the waste material is expected, therefore minimum, if any, settlement is expected. Due to the high allowable strain of the geomembrane and the stable nature of the waste, the final cover system will accommodate any differential settlement that may occur in the waste during the post closure care period.

The proposed final cover system will consist of the following from top to bottom and will be placed over the existing intermediate soil cover:

- a 6-inch thick vegetated erosion layer;
- a 18-inch thick soil barrier;
- a geocomposite drainage layer;
- a 40-mil thick double-sided textured linear low density polyethylene (LLDPE) geomembrane; and
- a geocomposite layer.

2.4.2 Alternate Final Cover System (Not Applicable)

2.4.3 Performance Standards

Closure of the facility will be conducted in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of uncontrolled leachate, surface runoff, or waste decomposition products to the groundwater, surface water, or the atmosphere.

The final cover system consisting of a vegetated soil layer with run-on and run-off controls will minimize the need for post-closure maintenance. The final slopes of the landfill will promote runoff. Diversion berms and downslope pipes will convey surface runoff to sediment basins designed for removal of sediment prior to discharge. A hardy stand of vegetation will be established and, along with the diversion berms and storm water conveyance channels, will minimize erosion of the final cover system.

A low-permeability final cover system will be constructed and maintained that minimizes the infiltration of precipitation into the waste mass. By minimizing infiltration, the final cover will minimize leachate generation.

The final slopes of the landfill will not be less than five percent to prevent ponding.

The CCR unit will be closed in a manner that provides for slope stability to prevent the sloughing or movement of the final cover system. In order to maintain stable slopes for the final cover, the internal and interface friction angle of all the components must be greater than the slope angle by a margin called the factor of safety. For this final cover system, a factor of safety of 1.5 is provided. To ensure the stability of the vegetative support layer in the final cover system, adequate drainage must be provided to prevent the soil from becoming saturated and subject to seepage forces.

An analysis was also performed to demonstrate the stability of proposed cap section during seismic conditions. An acceptable factor of safety is 1.0 or greater to guard

against slope failure. The analysis was performed in accordance with the requirements of 40 C.F.R. § 257.63 and the seismic factor of safety was found to be greater than 1.0.

The final cover system will be finished within six months following the beginning of closure construction unless otherwise approved. If more than six months are necessary, steps to prevent threats to human health and the environment from the unclosed landfill unit will be undertaken.

2.5 Schedule

In accordance with 40 C.F.R. § 257.102(e), the facility will begin closure activities within 30 days after the known final receipt of waste, or if the landfill has remaining capacity and there is a reasonable likelihood that the landfill will receive additional wastes, no later than two years after the most recent receipt of wastes. Contractor mobilization will occur during the initial 30-day period after last known receipt of waste.

In accordance with 40 C.F.R. § 257.102(g), no later than the date on which closure of the CCR unit is initiated, prepare a notification of intent to close the unit, which includes the certification by a qualified professional engineer for the design of the final cover system required by § 257.102(d)(3)(iii).

In accordance with 40 C.F.R. § 257.102(h), within 30 days following completion of closure of the CCR unit, Duke Energy shall record a notation on the deed to the landfill property stating that the property has been used as a landfill and its use is restricted under the Post-Closure Plan and the post-closure care requirements as provided by 40 C.F.R. § 257.104(d)(1)(iii).

Within 30 days of recording the notation, Duke Energy shall prepare a notification stating that that the notation has been recorded and placed it into the facility's operating record. Pursuant to 40 C.F.R. § 257.106(d), Duke Energy shall send to the appropriate regulatory agency the notification of intent to close, notification of closure completion, and notification of deed notation, within 30 days of placing each such notification in the operating record.

An expected schedule for closure activities is as follows:

Time	Activity
Prior to last receipt of waste	Permitting, detailed closure design and contractor selection
Initial 30 days after last receipt of waste	Mobilization of contractor
Months 0-1 after beginning construction	Grading /preparation of intermediate cover
Months 1-4 after beginning construction	Placement of soil layer and/or flexible membrane liner, and soil protective layers

Months 4-5 after beginning construction	Installation of diversion berms and downslope pipes
Months 5-6 after beginning construction	Seed, fertilize and mulch

3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Amy Davis, being a registered Professional Engineer, in accordance with the North Carolina Professional Engineer's Registration do hereby certify to the best of my knowledge, information, and belief, that the information contained in this report dated August, 2016 was prepared in accordance with the requirements of 40 C.F.R. § 257.102, is true and correct, and has been prepared in accordance with recognized and generally accepted good engineering practices.

Prepared by:

DUKE ENERGY.

BELEWS CREEK STEAM STATION

ACTIVE ASH BASIN

CLOSURE PLAN

OCTOBER 10, 2016

Certified by:

AECOM

6000 Fairview Road, Suite 200

Charlotte, NC 28210

Engineering Firm License Number: C-2243

BC_CLOSE_PLN

Rev. 0

Duke Energy Progress, LLC (Duke Energy) prepared this Closure Plan for the Coal Combustion Residuals (CCR) surface impoundment at the Belews Creek Steam Station (Belews Creek) pursuant to the requirements of 40 C.F.R. § 257.102(b) of the Disposal of CCR from Electric Utilities rule, 80 Fed. Reg. 21302 (April 17, 2015) (CCR Rule). URS Corporation – North Carolina (AECOM) was retained by Duke Energy to certify that this Closure Plan meets the requirements of 40 C.F.R. § 257.102. The information contained in this Closure Plan will be used to assist Duke Energy in the closure of the Active Ash Basin (Ash Basin) located in Stokes County, North Carolina, on the property owned by Duke Energy. This Closure Plan may be amended pursuant to the requirements of 40 C.F.R. § 257.102(b)(3). Presented below are:

1. A narrative of closure activities;
2. A description of the procedures to remove CCR and decontaminate the CCR unit (as needed);
3. A description of the final cover system designed pursuant to 40 C.F.R. § 257.102(d), a description of the methods and procedures to be used to install the final cover, and a discussion of how the final cover system will achieve the performance standards specified in 40 C.F.R. § 257.102(d);
4. An estimate of the in-place CCR inventory requiring closure;
5. An estimate of the largest area of the CCR unit requiring a final cover;
6. A closure schedule; and
7. A written certification from a qualified professional engineer, licensed in North Carolina, that this Closure Plan meets the requirements of 40 C.F.R. § 257.102.

1 NARRATIVE OF CLOSURE ACTIVITIES

The purpose of this Closure Plan is to describe the steps necessary to close the Ash Basin consistent with recognized and generally accepted good engineering practices. Closure is designed to reduce the need for long-term maintenance, control the post-closure infiltration of liquids into the in-place CCR materials, and control the post-closure release of constituents into environmental pathways (i.e., air, surface water, and groundwater).

Although, on May 18, 2016, the North Carolina Department of Environmental Quality (NCDEQ) ranked the Ash Basin "intermediate-risk," which would require it to be dewatered and excavated pursuant to the North Carolina Coal Ash Management Act of 2014, as amended (CAMA), Duke Energy is in the process of establishing the permanent replacement water supplies required under N.C.G.S. § 130A-309.211(c1) and performing the applicable dam safety repair work required under Dam Safety Order 16-01 issued by the state of North Carolina pursuant to the North Carolina Dam Safety Law of 1967, specifically N.C.G.S. § 143-215.32. Pursuant to N.C.G.S. § 130A-309.213(d)(1), upon Duke Energy's completion of these tasks within the required time frame set forth in CAMA, NCDEQ must classify the Ash Basin as low-risk, which will allow closure either pursuant to 40 C.F.R. § 257.102(c) or (d). Although CAMA charges NCDEQ with making the final determination regarding closure method, because science supports closure of the Ash Basin by leaving the CCR in place, Duke Energy contemplates that the Ash Basin will be closed in pursuant to the requirements of 40 C.F.R. § 257.102(d).

The method to close the Ash Basin in place will include: removal and treatment of the bulk water/free liquids; interstitial/pore dewatering (as needed) and treatment; stabilization of remaining CCR materials sufficient to support the final cover system; grading of in-place CCR materials to promote positive drainage (no ponding) and prevent sloughing or movement of the final cover system; installation of a final cover system, including stormwater management controls; partial lowering of the dam; and post-closure groundwater monitoring and cover system maintenance. The final cover system will be designed to reduce infiltration; erosion; and meet, or exceed, the requirements of the final cover system specified in 40 C.F.R. § 257.102(d)(3)(i). Typically, this involves the installation of a low permeability barrier layer and a vegetated soil cover to protect the barrier layer. The existing embankments will be lowered pursuant to a NCDEQ Dam Safety permit approval. This lowering is intended to promote free drainage of stormwater from the closure area.

2 CCR REMOVAL AND DECONTAMINATION

There may be some areas, primarily located around the perimeter of the Ash Basin, where closure-by-removal is selected in order to enhance surface drainage and/or to allow for development of future plant infrastructure or transmission. In-place CCR in those areas will typically be dewatered (if needed), excavated, and consolidated (placed) into the remaining portion of the basin, which will be graded and closed-in-place pursuant to 40 C.F.R. § 257.102(d).

Existing appurtenant structures, such as ditches, culverts and miscellaneous piping, will be decontaminated and abandoned in place, removed and disposed in a permitted disposal facility, or removed and placed in a beneficial use facility identified at the time of closure. Decontamination procedures may consist of pressure washing, scrubbing, or other generally accepted decontamination procedures.

Pursuant to 40 C.F.R. § 257.102(c), closure will be complete when groundwater monitoring concentrations do not exceed the applicable groundwater protection standard established pursuant to 40 C.F.R. § 257.95(h) for constituents listed in appendix IV to 40 C.F.R. Part 257.

3 FINAL COVER REQUIREMENTS

The final cover system for in-place closure of the Ash Basin will be designed pursuant to 40 C.F.R. § 257.102(d). Closure of the Ash Basin will be conducted in a manner that controls, minimizes, or eliminates, to the maximum extent feasible, the post-closure infiltration of liquids into the CCR and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.

The final cover system being considered is a composite (soil and geosynthetics) cover system consisting of (from top to bottom):

- A six-inch layer of soil that is capable of sustaining native plant growth;
- An 18-inch thick protective soil cover layer;
- A geocomposite drainage layer or non-woven geotextile; and
- A 40-mil thick linear low-density polyethylene geomembrane barrier.

Alternative final cover systems are also under evaluation that would meet, or exceed, the requirements specified in 40 C.F.R. § 257.102(d)(3)(ii), which make use of the latest developments in final cover technology. The final cover system will serve to minimize erosion and post-closure maintenance. Various stormwater control measures (e.g., diversion berms, channels, downslope pipes, and/or downchutes) will convey surface run-off from the cover, then to sediment basins (as appropriate), prior to discharge until the site is stabilized by vegetation. The design of the stormwater conveyances will include armoring and energy dissipation measures, as necessary, to control erosion and minimize maintenance and repairs.

The final cover system, with an equivalent (or lower) permeability of any bottom liner system or natural subsoils present, or a permeability no greater than $1x10^{-5}$ centimeters/second, will be constructed and maintained to minimize the infiltration of precipitation. By minimizing infiltration, the final cover will reduce leachate generation. The final cover system will be graded to preclude the probability of future impoundment of water, sediment, or slurry.

The Ash Basin will be closed in a manner resulting in stable slopes that prevent the sloughing or movement of the final cover system. The grades of the final cover system will be generally slight, sufficient to promote run-off while reducing the potential for sloughing. Instability potential (sliding or sloughing) is further reduced through the selection and use of cover system materials that have adequate drainage properties and sufficient internal and interface shear strengths. Construction quality assurance procedures will be completed to confirm conformance of the installed final cover system to the design.

Upon commencement of closure of the Ash Basin, final closure is anticipated to be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices. Section 6, Closure Schedule, of this Closure Plan describes the estimated time frames.

3.1 FINAL COVER SYSTEM

Pursuant to 40 C.F.R. § 257.102(d)(3)(i)(A) through (D), the final cover system will be designed and constructed to meet, at a minimum, the following criteria:

(A) The permeability of the final cover system will be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} centimeters/second, whichever is less.

The final cover system options being considered for the Ash Basin will meet or exceed this criteria. The geomembrane by itself results in a lower effective infiltration rate than the required 18 inches of $1x10^{-5}$ centimeters/second soil standard.

(B) The infiltration of liquids through the Ash Basin will be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.

The geomembrane component of the final cover system results in equivalent or better infiltration performance than 18 inches of earthen material. The proposed protective cover (18 inches) and vegetative layer soil will be obtained from local borrow sites and/or portions of the dams and dikes that will be lowered during closure. The gradation of the soil used in the cover will be such that it does not damage the geomembrane, provides drainage, resists erosion, and supports plant growth.

(C) The erosion of the final cover system will be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

The materials proposed for the vegetative support layer in the composite cover system option, or the protective cover component of an alternate final cover system, will provide equivalent or better performance than a six-inch-thick erosion layer. In addition, prior to the completion of closure, stormwater run-off and wastewater generated from areas outside the Ash Basin drainage catchment (which had previously been routed through the basin when it was active) will be permanently diverted for treatment (as needed) and discharge at other locations within the site.

(D) The disruption of the integrity of the final cover system will be minimized through a design that accommodates settling and subsidence.

The materials proposed for the final cover systems will accommodate the amount of settlement and subsidence that is anticipated to be encountered during construction and post-closure. In addition, the cover grades and stormwater conveyance system grades will be designed to accommodate settlement during construction and post-closure care.

The methods and procedures used to install the final cover will include:

1. Completing necessary field characterizations and design analyses;
2. Obtaining necessary federal, state, and local permits;
3. Preparing bid documents and selecting a qualified contractor;
4. Mobilizing;
5. Installing erosion and sediment control measures;
6. Removing and treating (as needed) the bulk water/free liquid;
7. Decontaminating and abandoning in place, or removing the appurtenant structures within the Ash Basin;
8. Clearing and grubbing;
9. Constructing laydown areas and access roads;
10. Interstitial/pore dewatering and treatment (as needed);
11. Grading CCR materials to achieve design cover system subgrade elevations;

12. Installing the cover system and associated stormwater management controls;
13. Stabilizing the site with appropriate vegetation and final erosion and sediment control measures;
14. Lowering of the dam; and
15. Commencing post-closure maintenance and monitoring of the site.

3.2 DRAINAGE AND STABILIZATION

Bulk water/free liquids will be removed from the Ash Basin during the initial phases of construction. Interstitial/pore water may be removed and treated during construction as needed to provide a workable surface for final cover system installation. With the diversion of wastewater and the stormwater discharged to the basin from other locations on the site, the volume of interstitial/pore water within the basin is expected to further decline over time. The dam will be lowered following the final phase of cover system installation. Combined, these measures (diversion of wastewater and stormwater, bulk dewatering, selective interstitial/pore dewatering, cover system installation, and dam lowering) will stabilize the CCR materials sufficiently to support the final cover system.

4 ESTIMATE OF IN-PLACE CCR INVENTORY

The volume of CCR present in the Ash Basin was calculated and is presented in Table 1 below, pursuant to 40 C.F.R. § 257.102(b)(1)(iv). The volume is the estimated inventory of CCR that will be open (and require closure) at one time, and the estimate is based on bathymetric surveys, historical topography, and soil borings as of June 2014. The annual surface impoundment inspections completed, pursuant to 40 C.F.R. § 257.83(b), and posted to the Duke Energy CCR website, pursuant to 40 C.F.R. § 257.107(g)(5), contain the most recent estimates of CCR material in the Ash Basin.

Table 1. Estimated In-Place CCR Inventory

Basin	Quantity of CCR (cubic yards)
Active Ash Basin	9,859,304

5 ESTIMATE OF LARGEST AREA REQUIRING FINAL COVER

Closure of the Ash Basin will be accomplished by leaving CCR in place pursuant to 40 C.F.R. § 257.102(d). The largest area of the CCR units that will be open (and requiring a final cover) at one time is estimated to be 273 acres.

6 CLOSURE SCHEDULE

Closure of the Ash Basin will be initiated pursuant to 40 C.F.R. § 257.102(e) and is anticipated to be completed within nine years of the commencement of closure activities. The closure time frame includes two two-year time extension beyond the time specified in 40 C.F.R. §

257.102(f)(1)(ii) on the basis that the anticipated time required to close the Ash Basin will need to be lengthened due to:

- The Ash Basin being larger than 40 acres (estimated 273 acres);
- The amount of material needed to close the Ash Basin (estimated to be about 911,300 cubic yards of protective soil cover and vegetative cover material will be obtained from the dam and on-site borrow sources);
- The volume of CCR material (about 2 million cubic yards will need to be excavated and placed as grading fill);
- The volume of bulk water/free liquid to dewater (about 900 million gallons);
- The surrounding geology (the on-site soil borrow area is separated from the Ash Basin by a local highway, the need to process soils to remove rock that could damage geomembrane, etc.); and
- The time required, after the removal of bulk liquids, for the surface of the basin to stabilize to the point that personnel and equipment can safely access the impoundment. Given the site-specific geometry and physical characteristics of the CCR in the impoundment, the rate at which the materials will drain will likely be slow and variable. As a result, installation of instrumentation and monitoring equipment may be necessary in some instances to ensure subgrade stability is adequate, and other measures may need to be employed to stabilize the surface of the impoundment (possibly including closely-spaced well points, deep wells, trenches, etc.) in a timely manner.

The completed demonstration establishing why it is not feasible to complete closure of the Ash Basin within the five-year time frame due to factors beyond the facility's control will be prepared and placed in the facility's operating record prior to the end of any two-year period pursuant to 40 C.F.R. § 257.102(f)(2).

Prior to commencing closure construction, design documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents will include construction drawings, technical specifications, and quality assurance testing work plans. The permits required for closure construction activities will be evaluated at the time of closure, and are anticipated to include permits from NCDEQ and the U.S. Army Corps of Engineers. Preliminary time frames for anticipated closure activities are included below in Table 2. We estimate that all closure activities will be completed by 2028.

Table 2. Estimated Time Frames for Closure Activities

Closure Activity	Time Frame (years)*
NCDEQ Closure Plan Approval	1
NCDEQ Permitting Approvals (NDPES, E&SC, Air)	1
Dewatering and Stabilization	4
NCDEQ Dam Decommissioning Approval	0.5
CCR Grading	2
Final Cover Installation	6.5

*Estimated closure activity time frames may include some overlap.

7 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Ramachandran Kulasingam, being a registered Professional Engineer in the state of North Carolina, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this written Closure Plan dated October 10, 2016, was developed pursuant to the requirements of 40 C.F.R. § 257.102 and has been prepared in accordance with recognized and generally accepted good engineering practices.

SIGNATURE R. Kulasingam DATE 10/10/2016

NORTH CAROLINA PROFESSIONAL SEAL 036752 ENGINEER RAMACHANDRAN KULASINGAM

R. Kulasingam
10/10/2016

Prepared by:

DUKE ENERGY.

BUCK STEAM STATION

ADDITIONAL PRIMARY POND (ASH BASIN 1)

PRIMARY POND (ASH BASIN 2)

SECONDARY POND (ASH BASIN 3)

CLOSURE PLAN

June 17, 2019

Certified by:

wood.

Wood Environment & Infrastructure Solutions, Inc.

2801 Yorkmont Drive, Suite 100

Charlotte, North Carolina 28208

Engineering and Land Surveying License No. F-1253

BUC_CLOSE_PLN

Rev. 1

Duke Energy Carolinas, LLC (Duke Energy) prepared this amended Closure Plan for the Coal Combustion Residuals (CCR) surface impoundments at the Buck Steam Station (Buck) pursuant to the requirements of 40 C.F.R. § 257.102(b) of the Disposal of CCR from Electric Utilities rule, 80 Fed. Reg. 21302 (April 17, 2015). Wood Environment & Infrastructure Solutions, Inc. (Wood) was retained by Duke Energy to certify that this Closure Plan meets the requirements of 40 C.F.R. § 257.102. The information contained in this Closure Plan will be used to assist Duke Energy in the closure of the Additional Primary Pond (Ash Basin 1), Primary Pond (Ash Basin 2), and Secondary Pond (Ash Basin 3) (collectively, Ash Basins) located in Rowan County, North Carolina, on property owned by Duke Energy. This Closure Plan amends the initial Buck Closure Plan dated October 7, 2016, in accordance with 40 C.F.R. § 257.102(b)(3). Presented below are:

1. A narrative of closure activities;
2. A description of the procedures to remove CCR and decontaminate the CCR units;
3. An estimate of the in-place CCR inventory requiring closure;
4. An estimate of the largest area of the CCR units requiring a final cover (as needed);
5. A closure schedule; and
6. A written certification from a qualified professional engineer, licensed in North Carolina, that this Closure Plan meets the requirements of 40 C.F.R. § 257.102.

1 NARRATIVE OF CLOSURE ACTIVITIES

The purpose of this Closure Plan is to describe the steps necessary to close the Ash Basins consistent with recognized and generally accepted good engineering practices. Closure is designed to reduce the need for long-term maintenance and to control the post-closure release of constituents into environmental pathways (i.e., air, surface water, and groundwater).

The Ash Basins will be closed by removal of CCR pursuant to 40 C.F.R. § 257.102(c). Duke Energy will use commercially reasonable efforts to process the CCR removed from the Ash Basins at an on-site CCR beneficiation facility to produce 300,000 tons of CCR annually pursuant to North Carolina General Statutes (N.C.G.S) § 130A-309.216, as enacted by Section 1 of House Bill 630, Session Law 2016-95. To the extent that there is any remaining CCR in the Ash Basins after beneficiation operations have permanently ceased at Buck, the CCR will be moved to a permitted disposal facility located whether on-site or off-site. Procedures for CCR removal and decontamination are described in the following section.

Duke Energy has designated the Ash Basins, which formerly operated collectively as a single wastewater treatment system, as a single CCR unit for closure purposes. During closure, liquids in the Additional Primary Pond (Ash Basin 1), Primary Pond (Ash Basin 2), and Secondary Pond (Ash Basin 3) will be moved between the Ash Basins to assist in dewatering and closure of the Ash Basins. This movement of wastes between the individual units will occur throughout the closure period to facilitate CCR dewatering, conditioning, and removal activities.

2 CCR REMOVAL AND DECONTAMINATION

The procedures to remove CCR from the Ash Basins include dewatering and utilizing appropriate equipment and methods to excavate and process the CCR at an on-site CCR beneficiation facility pursuant to N.C.G.S. § 130A-309.216, and, to the extent required, move any remaining CCR to a permitted disposal facility. Dewatering will include removal of bulk water/free liquids and interstitial/pore water (as needed) to allow for safe excavation.

Select dams will be breached pursuant to a North Carolina Department of Environmental Quality (NCDEQ) Dam Safety permit approval. These breaches are intended to promote free drainage of stormwater from the closure area.

Existing appurtenant structures, such as ditches, culverts, and miscellaneous piping, will be decontaminated and abandoned in place, removed and disposed in a permitted disposal facility, or removed and placed in a beneficial use facility identified at the time of closure. Decontamination procedures may consist of pressure washing, scrubbing, or other generally accepted decontamination procedures.

Pursuant to 40 C.F.R. § 257.102(c), closure will be complete when groundwater monitoring concentrations do not exceed the applicable groundwater protection standard established pursuant to 40 C.F.R. § 257.95(h) for constituents listed in appendix IV to 40 C.F.R. Part 257.

3 ESTIMATE OF IN-PLACE CCR INVENTORY

The estimated volumes of CCR present in the Ash Basins were calculated and are presented in Table 1 below, pursuant to 40 C.F.R. § 257.102(b)(1)(iv). The volumes are the estimated inventory of CCR that will be open (and require closure) at one time and are based on bathymetric surveys, historical topography, and soil borings as of July 2015. The annual surface impoundment inspections completed, pursuant to 40 C.F.R. § 257.83(b), and posted to the Duke Energy CCR website, pursuant to 40 C.F.R. § 257.107(g)(5), contain the most recent estimates of CCR material in the Ash Basins.

Table 1. Estimated In-Place CCR Inventory

Basin	Quantity of CCR (cubic yards)*
Additional Primary Pond (Ash Basin 1)	3,155,000**
Primary Pond (Ash Basin 2)	1,665,000
Secondary Pond (Ash Basin 3)	720,000
Estimated Total	**5,540,000**

*Ash volume estimates from the *Ash Basin Closure Plan – Buck Steam Station* (HDR Engineering, Inc., 2016)
**includes both Basin 1 and Dry Ash Storage Area

4 ESTIMATE OF LARGEST AREA REQUIRING FINAL COVER

CCR will be removed from the Ash Basins pursuant to 40 C.F.R. § 257.102(c); therefore, no final cover system will be constructed in support of closure activities.

5 CLOSURE SCHEDULE

Closure of the Ash Basins was initiated on February 7, 2019, in accordance with 40 C.F.R. § 257.102(e)(1)(i). Prior to commencing closure construction, design documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents will include construction drawings, technical specifications, and quality assurance testing work plans. The permits required for closure construction activities will be evaluated at the time of closure and are anticipated to consist primarily of permits from NCDEQ. Depending on the decommissioning method chosen for the main dam and the resulting downstream impacts, additional permitting from the U.S. Army Corps of Engineers may be required. Preliminary time frames of anticipated closure activities for the Ash Basins are included below in Table 2 (based on an assumed start date of August 2019). Duke Energy estimates that the processing of CCR for beneficial use and the closure activities for the Ash Basins will be completed by December 31, 2029.

Table 2. Estimated Time Frames for Closure Activities

Closure Activity	Estimated Time Frame (years)*
NCDEQ Closure Plan Approval	1
NCDEQ Permitting Approvals (NPDES, E&SC, Air)	1
Dewatering and Stabilization	2
NCDEQ Dam Decommissioning Approval	0.5
CCR Excavation and Beneficiation Processing	10**

*Estimated closure activity time frames may include some overlap.
**Any required landfill operations would occur in this timeframe.

6 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Richard L. Hiner, being a registered Professional Engineer in the state of North Carolina, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this amended Closure Plan dated June 17, 2019, was developed pursuant to the requirements of 40 C.F.R. § 257.102 and has been prepared consistent with recognized and generally accepted good engineering practices.

02:04:22 PM 06-17-2019 (-04'00' GMT)

SIGNATURE _____ DATE June 17, 2019

NORTH CAROLINA PROFESSIONAL SEAL 29185 ENGINEER RICHARD L. HINER

Prepared by:

DUKE ENERGY.

ROGERS ENERGY COMPLEX

ACTIVE ASH BASIN

INACTIVE UNITS 1-4 BASIN

INACTIVE UNIT 5 BASIN

CLOSURE PLAN

MARCH 3, 2017

Certified by:

amec foster wheeler

Amec Foster Wheeler Environment & Infrastructure, Inc.

2801 Yorkmont Road Suite # 100

Charlotte, North Carolina 28208

License Number: F-1253

CLIFF_CLOSE_PLN

Rev. 1

Duke Energy Carolinas, LLC (Duke Energy) prepared this Closure Plan for the Coal Combustion Residuals (CCR) surface impoundments at the Rogers Energy Complex (Cliffside Steam Station) pursuant to the requirements of 40 C.F.R. § 257.102(b) of the Disposal of CCR from Electric Utilities rule, 80 Fed. Reg. 21302 (April 17, 2015). Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) was retained by Duke Energy to certify that this Closure Plan meets the requirements of 40 C.F.R. § 257.102. The information contained in this Closure Plan will be used to assist Duke Energy in the closure of the Active Ash Basin and Inactive Units 1-4 Basin, located in Cleveland County, North Carolina, and Inactive Unit 5 Basin, located in Rutherford County, North Carolina, (collectively, Ash Basins), on property owned by Duke Energy. This Closure Plan was originally posted to the Duke Energy operating record on October 17, 2016, and has been revised to update dam modification details in Section 2 and the closure initiation date for the Inactive Units 1-4 Basin in Section 6. This Closure Plan may be additionally amended pursuant to the requirements of 40 C.F.R. § 257.102(b)(3). Presented below are:

1. A narrative of closure activities;
2. A description of the procedures to remove CCR and decontaminate the CCR units;
3. A description of the final cover system designed pursuant to 40 C.F.R. § 257.102(d), a description of the methods and procedures to be used to install the final cover, and a discussion of how the final cover system will achieve the performance standards specified in 40 C.F.R. § 257.102(d);
4. An estimate of the in-place CCR inventory requiring closure;
5. An estimate of the largest area of the CCR units requiring a final cover;
6. A closure schedule; and
7. A written certification from a qualified professional engineer, licensed in North Carolina, that this Closure Plan meets the requirements of 40 C.F.R. § 257.102.

1 NARRATIVE OF CLOSURE ACTIVITIES

The purpose of this Closure Plan is to describe the steps necessary to close the Ash Basins at Cliffside Steam Station consistent with recognized and generally accepted good engineering practices. Closure is designed to reduce the need for long-term maintenance, control the post-closure infiltration of liquids into the in-place CCR materials, and control the post-closure release of constituents into environmental pathways (i.e., air, surface water, and groundwater).

The Inactive Units 1-4 Basin will be closed through the removal of CCR, and the closure will be performed pursuant to 40 C.F.R. § 257.102(c). CCR will be removed as described in the following section.

Although, on May 18, 2016, the North Carolina Department of Environmental Quality (NCDEQ) ranked the Active Ash Basin and the Inactive Unit 5 Basin “intermediate-risk,” which would require them to be dewatered and excavated pursuant to the North Carolina Coal Ash

Management Act of 2014, as amended (CAMA), Duke Energy is in the process of establishing the permanent replacement water supplies required under N.C.G.S. § 130A-309.211(c1) and performing the applicable dam safety repair work required under Dam Safety Order 16-01 issued by the state of North Carolina pursuant to the North Carolina Dam Safety Law of 1967, specifically N.C.G.S. § 143-215.32. Pursuant to N.C.G.S. § 130A-309.213(d)(1), upon Duke Energy's completion of these tasks within the required time frame set forth in CAMA, NCDEQ must classify the Active Ash Basin and the Inactive Unit 5 Basin as low-risk, which will allow closure either pursuant to 40 C.F.R. § 257.102(c) or (d). Although CAMA charges NCDEQ with making the final determination regarding closure method, because science supports closure of the Active Ash Basin and the Inactive Unit 5 Basin by leaving the CCR in place, Duke Energy contemplates that the Active Ash Basin and the Inactive Unit 5 Basin will be closed pursuant to the requirements of 40 C.F.R. § 257.102(d).

The method to close the CCR units in place will include: removal and treatment of the bulk water/free liquids; interstitial/pore dewatering (as needed) and treatment; stabilization of remaining CCR materials sufficient to support the final cover system; grading of in-place CCR materials to promote positive drainage (no ponding) and prevent sloughing or movement of the final cover system; installation of a final cover system, including storm water management controls; partial breaching/lowering or modification of the dams; and post-closure groundwater monitoring and cover system maintenance. The final cover system will be designed to minimize infiltration; and erosion in order to meet, or exceed, the requirements of the final cover system specified in 40 C.F.R. § 257.102(d)(3)(i). Typically, this involves the installation of a low permeability barrier layer and a vegetated soil cover to protect the barrier layer.

2 CCR REMOVAL AND DECONTAMINATION

The procedures to remove CCR from Inactive Units 1-4 Basin include dewatering and utilizing appropriate equipment and methods to excavate and move the CCR to an on-site permitted landfill. Dewatering will include removal of bulk water/free liquids and interstitial/pore water (as needed) to allow for safe excavation.

The existing Inactive Units 1-4 Basin embankments will be modified pursuant to a North Carolina Department of Environmental Quality (NCDEQ) Dam Safety permit approval. This modification is intended to serve as the dam for the new lined retention basin to be constructed after verification of ash removal and post closure.

There may be some areas, primarily located around the perimeter of the Active Ash Basin and the Inactive Unit 5 Basin, where closure-by-removal is selected in order to enhance surface drainage and/or to allow for development of future plant infrastructure or transmission. In-place CCR in those areas will typically be dewatered (if needed), excavated, and then consolidated (placed) into the remaining portion of the basin, which will be graded and closed-in-place pursuant to 40 C.F.R. § 257.102(d).

Existing appurtenant structures, such as ditches, culverts, and miscellaneous piping, will be decontaminated and abandoned in place, or removed and disposed in a permitted disposal facility, or placed in a beneficial use facility identified at the time of closure. Decontamination procedures may consist of pressure washing, scrubbing, or other generally accepted decontamination procedures.

Pursuant to 40 C.F.R. § 257.102(c), closure will be complete when groundwater monitoring concentrations do not exceed the applicable groundwater protection standard established pursuant to 40 C.F.R. § 257.95(h) for constituents listed in appendix IV to 40 C.F.R. Part 257.

3 FINAL COVER REQUIREMENTS

The final cover system for in-place closure of the Active Ash Basin and the Inactive Unit 5 Basin will be designed pursuant to 40 C.F.R. § 257.102(d). Closure of the Active Ash Basin and the Inactive Unit 5 Basin will be conducted in a manner that controls, minimizes, or eliminates, to the maximum extent feasible, the post-closure infiltration of liquids into the CCR and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.

The final cover system being considered is a composite (soil and geosynthetics) cover system consisting of (from top to bottom):

- A six-inch layer of soil that is capable of sustaining native plant growth;
- An 18-inch thick protective soil cover layer;
- A geocomposite drainage layer or non-woven geotextile; and
- A 40-mil thick linear low-density polyethylene geomembrane barrier.

Alternative final cover systems are also under evaluation that would meet, or exceed, the requirements specified in 40 C.F.R. § 257.102(d)(3)(ii), which make use of the latest developments in final cover technology. The final cover system will serve to reduce erosion and post-closure maintenance. Various storm water control measures (e.g., diversion berms, channels, downslope pipes, and/or downchutes) will convey surface run-off from the cover, then to sediment basins (as appropriate), prior to discharge. The design of the storm water conveyances will include armoring and energy dissipation measures, as necessary, to control erosion and reduce maintenance and repairs.

The final cover system, with an equivalent (or lower) permeability of any bottom liner system or natural subsoils present, or a permeability no greater than $1x10^{-5}$ centimeters/second, will be constructed and maintained to minimize the infiltration of precipitation. By minimizing infiltration, the final cover will reduce leachate generation. The final cover system will be graded to preclude the probability of future impoundment of water, sediment, or slurry.

The Active Ash Basin and the Inactive Unit 5 Basin will be closed in a manner resulting in stable slopes that prevent the sloughing or movement of the final cover system. The grades of the final cover system will be generally slight, sufficient to promote run-off while reducing the potential for sloughing. Instability potential (sliding or sloughing) will be further reduced through the selection and use of cover system materials that have adequate drainage properties and sufficient internal and interface shear strengths. Construction quality assurance procedures will be completed to confirm conformance of the installed final cover system to the design.

Upon commencement of closure of the Active Ash Basin and the Inactive Unit 5 Basin, final closure is anticipated to be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices. Section 6, Closure Schedule, of this Closure Plan describes the estimated time frames.

3.1 FINAL COVER SYSTEM

Pursuant to 40 C.F.R. § 257.102(d)(3)(i)(A) through (D), the final cover system will be designed and constructed to meet, at a minimum, the following criteria:

(A) The permeability of the final cover system will be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} centimeters/second, whichever is less.

The final cover system options being considered for the Active Ash Basin and the Inactive Unit 5 Basin will meet or exceed this criteria. The geomembrane by itself results in a lower effective infiltration rate than the 18 inches of $1x10^{-5}$ centimeters/second soil standard.

(B) The infiltration of liquids through the CCR units will be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.

The geomembrane component in the final cover system results in equivalent or better infiltration performance than 18 inches of earthen material. The proposed protective cover (18 inches) and vegetative layer soil will be obtained from local borrow sites and/or portions of the dams and dikes that will be partially breached/lowered or modified during closure. The gradation of the soil used in the cover will be such that it does not damage the geomembrane, provides drainage, resists erosion, and supports plant growth.

(C) The erosion of the final cover system will be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

The materials proposed for the vegetative support layer in the composite cover system option, or the protective cover component of an alternate final cover system, will provide equivalent or better performance than a six-inch-thick erosion layer. In addition, and prior to the completion of closure, storm water run-off and wastewaters generated from areas outside the Active Ash Basin's and the Inactive Unit 5 Basin's drainage catchment (which had previously been

routed through the basin when they were active) will be permanently diverted for treatment (as needed) and discharge at other locations within the site.

(D) The disruption of the integrity of the final cover system will be minimized through a design that accommodates settling and subsidence.

The materials proposed for the final cover systems will accommodate the amount of settlement and subsidence that is anticipated to be encountered during construction and post-closure. In addition, the cover grades and storm water conveyance system grades will be designed to accommodate settlement during construction and post-closure care.

The methods and procedures used to install the final cover will include:

1. Completing necessary field characterizations and design analyses;
2. Obtaining necessary federal, state, and local permits;
3. Preparing bid documents and selecting a qualified contractor;
4. Mobilizing;
5. Installing erosion and sediment control measures;
6. Removing and treating (as needed) the bulk water/free liquid;
7. Decontaminating and abandoning in place, or removing the appurtenant structures within the CCR units;
8. Clearing and grubbing;
9. Constructing laydown areas and access roads;
10. Interstitial/pore dewatering and treatment (as needed);
11. Grading CCR materials to achieve design cover system subgrade elevations;
12. Installing the cover system and associated storm water management controls;
13. Stabilizing the site with appropriate vegetation and final erosion and sediment control measures;
14. Breaching or modifying the dam; and
15. Commencing post-closure maintenance and monitoring of the site.

3.2 DRAINAGE AND STABILIZATION

Bulk water/free liquids will be removed from the Active Ash Basin during the initial phases of construction. Interstitial/pore water may be removed and treated during construction as needed to provide a workable surface for final cover system installation. With the diversion of wastewater and the storm water discharged to the basin from other locations on the site, the volume of interstitial/pore water within the basin is expected to further decline over time. The Active Ash Basin dam will be breached or modified following the final phase of cover system installation. Combined, these measures (diversion of wastewater and storm water, bulk dewatering, selective interstitial/pore dewatering, cover system installation, and dam breaching/modification) will stabilize the CCR materials sufficiently to support the final cover system.

4 ESTIMATE OF IN-PLACE CCR INVENTORY

The volumes of CCR present in the Ash Basins were calculated and are presented in Table 1 below, pursuant to 40 C.F.R. § 257.102(b)(1)(iv). The volumes are the estimated inventory of CCR that will be open (and require closure) at one time, and the estimates are based on bathymetric surveys, historical topography and soil borings as of April 2015. The annual surface impoundment inspections completed, pursuant to 40 C.F.R. § 257.83(b), and posted to the Duke Energy CCR website, pursuant to 40 C.F.R. § 257.107(g)(5), contain the most recent estimates of CCR material in the Ash Basins.

Table 1. Estimated In-Place CCR Inventory

Basin	Quantity of CCR (cubic yards)
Inactive Unit 1-4 Basin	353,000
Inactive Unit 5 Basin	1,960,000
Active Ash Basin	4,131,000
Estimated Total	**6,444,000**

5 ESTIMATE OF LARGEST AREA REQUIRING FINAL COVER

Closure of the Active Ash Basin and Inactive Unit 5 Basin will be accomplished by leaving CCR in place pursuant to 40 C.F.R. § 257.102(d). The largest area of the Active Ash Basin and Inactive Unit 5 Basin that will be open (and requiring a final cover) at one time is estimated to be a combined 112 acres (78 and 34 acres, respectively).

6 CLOSURE SCHEDULE

Closure of the Inactive Units 1-4 Basin was initiated on November 3, 2016, on which date the Inactive Units 1-4 Basin ceased receiving non-CCR waste streams pursuant to 40 C.F.R. § 257.102(e) and is anticipated to be completed by 2020, which is within five years of the commencement of closure pursuant to 40 C.F.R. § 257.102(f)(1)(ii).

Closure of the Active Ash Basin and Inactive Unit 5 Basin will be initiated pursuant to 40 C.F.R. § 257.102(e) and is anticipated to be completed within seven years of the commencement of closure pursuant to 40 C.F.R. § 257.102(f)(1)(ii) and 40 C.F.R. § 257.102(f)(2). The closure time frame includes a two-year time extension beyond the time specified in 40 C.F.R. § 257.102(f)(1)(ii) on the basis that the anticipated time required to close the Active Ash Basin and Inactive Unit 5 Basin will need to be lengthened due to:

- The Active Ash Basin and Inactive Unit 5 Basin being larger than 40 acres (estimated 86 acres for the Active Ash Basin and 46 acres for the Unit 5 Inactive Basin);
- The amount of material needed to close the Active Ash Basin and Inactive Unit 5 Basin (greater than 362,000 cubic yards of protective soil cover and vegetative cover material);

- The volume of CCR (greater than 1.1 million cubic yards will need to be excavated and placed as grading fill);
- The volume of bulk water/free liquids to dewater (more than 290 million gallons);
- The surrounding geology (shallow rock resulting in limited soil volume per given area, limited availability of soil meeting the permeability requirements outlined in the CCR Rule, need to process soils to remove rock that could damage geomembrane, etc.); and
- The time required, after the removal of bulk liquids, for the surface of the basin to stabilize to the point that personnel and equipment can safely access the impoundment. Given the site-specific geometry and physical characteristics of the CCR in the impoundment, the rate at which the materials will drain will likely be slow and variable. As a result, installation of instrumentation and monitoring equipment may be necessary in some instances to ensure subgrade stability is adequate, and other measures may need to be employed to stabilize the surface of the impoundment (possibly including closely-spaced well points, deep wells, trenches, etc.) in a timely manner.

The completed demonstration establishing why it is not feasible to complete closure of the Active Ash Basin and Inactive Unit 5 Basin within the five-year time frame due to factors beyond the facility's control will be prepared and placed in the facility's operating record prior to the end of any two-year period pursuant to 40 C.F.R. § 257.102(f)(2).

Prior to commencing closure construction, design documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents will include construction drawings, technical specifications, and quality assurance testing work plans. The permits required for closure construction activities will be evaluated at the time of closure and are anticipated to include permits from NCDEQ and the U.S. Army Corps of Engineers. Preliminary time frames of anticipated closure activities for the Ash Basins are included below in Table 2. We estimate that all of the closure activities for the Active Ash Basin and Inactive Unit 5 Basin will be completed by 2026.

Table 2. Estimated Time Frames for Closure Activities

Closure Activity	**Time Frame (years)***	
	Inactive Units 1-4 Basin	**Active Ash Basin and Inactive Unit 5 Basin**
NCDEQ Closure Plan Approval	1	1
NCDEQ Permitting Approvals (NDPES, E&SC, Air)	1	1
Dewatering and Stabilization	2.5	4.5
NCDEQ Dam Decommissioning Approval	0.5	0.5
CCR Grading and/or Excavation	1	2
Final Cover Installation	-	3.5

*Estimated closure activity time frames may include some overlap.

7 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Joshua M. Bell, being a registered Professional Engineer in the state of North Carolina, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this written Closure Plan dated March 3, 2017, was developed pursuant to the requirements of 40 C.F.R. § 257.102 and has been prepared in accordance with recognized and generally accepted good engineering practices.

SIGNATURE _____ DATE_____

Prepared for:
DUKE ENERGY

Rogers Energy Complex CCP Landfill
573 Duke Power Road
Mooresboro, NC 28114

ROGERS ENERGY COMPLEX
(Cliffside Steam Station)
COAL COMBUSTION PRODUCTS (CCP) LANDFILL

CLOSURE PLAN

OCTOBER 2016

Prepared by:

5400 GLENWOOD AVENUE, SUITE 400
RALEIGH, NORTH CAROLINA 27612
PHONE: 919.325.3500
FAX: 919.781.5730

CDM Smith Project: 48509-115273

CLIFF_CLOSE_LDFL_PLN

CLOSURE PLAN

1.0 INTRODUCTION

This Closure Plan was prepared for the Rogers Energy Complex (REC) Coal Combustion Products (CCP) Landfill. This Closure Plan was prepared in accordance with 40 C.F.R. Part 257, Subpart D and is consistent with the requirements of 40 C.F.R. § 257.102(b) for closure of coal combustion residuals landfills. The information contained in this Closure Plan will be used to assist Duke Energy Carolinas, LLC (Duke Energy) in the closure of active waste units. The REC CCP Landfill is owned and operated by Duke Energy. The landfill is located in Rutherford County, North Carolina on Duke property, south of the REC Plant. Duke Energy must obtain a written certification from a qualified professional engineer, licensed in the state in which the project work is conducted, that this written Closure Plan and any amendments thereto meet the requirements of 40 C.F.R. § 257.102.

2.0 CLOSURE PLAN

2.1 Overview of Closure Approach

The purpose of the Closure Plan is to outline the steps necessary to close the landfill phases consistent with recognized and generally accepted good engineering practices. Closure is designed to minimize the need for long-term maintenance and to control the post-closure release of contaminants. The facility will be closed in accordance with the requirements of 40 C.F.R. § 257.102. Closure will occur within the time frames set out in 40 C.F.R. § 257.102(f). This Closure Plan may be amended in accordance with the requirements of 40 C.F.R. § 257.102(b)(3).

The final cover system has been designed to minimize the amount of storm water infiltration into the landfill and to resist erosive forces. The final cover system consists of an erosion layer, protective soil layer, drainage layer, and barrier layer.

2.2 Estimated Maximum Inventory of CCR

The current landfill design provides approximately 13,343,000 cubic yards of gross capacity as measured from the top of the protective cover soil to the top of final cover.

2.3 Largest Area Requiring Cover System

The construction of the landfill will occur in 5 phases. Phases I and II are 23 and 15 acres, respectively. Thusly, Phases I and II would be the largest closure to date, covering an area of approximately 38 acres.

2.4 Closure Performance Standard

2.4.1 Final Cover System

The cover system has been designed to reduce infiltration into the landfill and to resist erosion. The permeability of the least permeable layer is 1×10^{-13} cm/sec. This is equal to or less than the permeability of the bottom liner system and no greater than 1×10^{-5} cm/sec.

The final cover system for the closed phase will be certified by a qualified professional engineer as being designed in accordance with the requirements of 40 C.F.R. § 257.102.

With the type of waste that has been landfilled and the controlled nature of the fill placement, no decomposition of the waste material is expected, therefore minimal, if any, settlement is expected. Due to the high allowable strain of the geomembrane and the stable nature of the waste, the final cover system will accommodate any differential settlement that may occur in the waste during the post closure care period.

The proposed final cover system will consist of the following from top to bottom and will be placed over the existing intermediate soil cover:

- a 6-inch thick vegetated erosion layer;
- an 18-inch thick protective soil layer;
- a geocomposite drainage layer;
- a 40-mil thick, double-sided textured linear low density polyethylene (LLDPE) geomembrane; and
- a geocomposite gas collection layer (if determined necessary).

The proposed final cover system shall be installed by methods and procedures that will not damage the geosynthetic layers. The following methods and procedures shall be implemented.

Geosynthetic Subgrade: The subgrade shall be inspected and approved by the Engineer prior to placement of the barrier layer. The subgrade shall be smooth and free of rocks and debris that may damage the LLDPE geomembrane.

LLDPE Geomembrane: The LLDPE geomembrane shall be inspected and approved by the Engineer prior to deployment. The LLDPE geomembrane shall be installed in accordance with the quality control procedures outlined in the project specifications and under the direction of the Engineer and per manufacturer's guidelines.

Geocomposite Drainage Layer: The drainage geocomposite shall be inspected and approved by the Engineer prior to deployment which shall only occur after acceptance of the LLDPE barrier layer by the Engineer. The geocomposite shall be installed in accordance with the quality control procedures outlined in the project specifications and under the direction of the Engineer and per manufacturer's guidelines.

Protective Soil Layer: The protective soil layer shall be installed over the geocomposite which shall be compacted utilizing only low-ground pressure equipment approved by the Engineer. Protective soils and shall meet the requirements of the project specifications and shall be approved by the Engineer prior to installation. No protective soil shall be installed prior to acceptance of the geocomposite. Depth of the infiltration layer shall be confirmed in the field by the Engineer.

Vegetated Erosion Layer: The vegetated erosion layer shall be installed and compacted only utilizing low-ground pressure equipment after acceptance of the protective soil layer

by the Engineer. The vegetated erosion layer soils shall meet the requirements of the project specifications and shall be approved by the engineer prior to installation. The depth of the vegetated erosion layer shall be confirmed in the field by the engineer. Vegetation shall be established on the vegetated erosion layer by methods outlined in the project specifications and approved by the Engineer. Appropriate erosion controls shall be utilized to protect sloped areas and promote vegetation.

2.4.2 Alternate Final Cover System

No alternative final cover is being considered.

2.4.3 Performance Standards

Closure of the facility will be conducted in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of uncontrolled leachate, surface runoff, or waste decomposition products to the groundwater, surface water, or the atmosphere.

The final cover system consisting of a vegetated soil layer with run-on and run-off controls will minimize the need for post-closure maintenance. The final slopes of the landfill will promote runoff. Diversion berms and downslope pipes will convey surface runoff to sediment basins designed for removal of sediment prior to discharge. A hardy stand of vegetation will be established and, along with the diversion berms and storm water conveyance channels, will minimize erosion of the final cover system.

A low-permeability final cover system will be constructed and maintained that minimizes the infiltration of precipitation into the waste mass. By minimizing infiltration, the final cover will minimize leachate generation.

The final slopes of the landfill will not be less than five percent to prevent ponding.

The CCR unit will be closed in a manner that provides for slope stability to prevent the sloughing or movement of the final cover system. In order to maintain stable slopes for the final cover, the internal and interface friction angle of all the components must be greater than the slope angle by a margin called the factor of safety. Since the maximum regulatory slopes are 3 to 1 (horizontal to vertical), only materials with friction angles greater than 26.6^{o} will be used, providing a minimum factor of safety of 1.5. To ensure the stability of the vegetative support layer in the final cover system, adequate drainage must be provided to prevent the soil from becoming saturated and subject to seepage forces.

An analysis was also performed to demonstrate the stability of proposed cap section during seismic conditions. An acceptable factor of safety is 1.0 or greater to guard against slope failure. The analysis was performed in accordance with the requirements of 40 C.F.R. § 257.63 and the seismic factor of safety was found to be greater than 1.0.

The final cover system will be finished within six months following the beginning of closure construction unless otherwise approved. If more than six months are necessary, steps to prevent threats to human health and the environment from the unclosed landfill unit will be undertaken.

2.5 Schedule

In accordance with 40 C.F.R. § 257.102(e), the facility will begin closure activities within 30 days after the known final receipt of waste, or if the landfill has remaining capacity and there is a reasonable likelihood that the landfill will receive additional wastes, no later than two years after the most recent receipt of wastes. Contractor mobilization will occur during the initial 30-day period after last known receipt of waste.

In accordance with 40 C.F.R. § 257.102(f)(1)], closure of the CCR unit must be completed within six months of commencing closure activities, or by an approved extension deadline.

In accordance with 40 C.F.R. § 257.102(g), no later than the date on which closure of the CCR unit is initiated, prepare a notification of intent to close the unit, which includes the certification by a qualified professional engineer for the design of the final cover system required by § 257.102(d)(3)(iii).

In accordance with 40 C.F.R. § 257.102(h), within 30 days following completion of closure of the CCR unit, Duke Energy shall record a notation on the deed to the landfill property stating that the property has been used as a landfill and its use is restricted under the Post-Closure Plan and the post-closure care requirements as provided by 40 C.F.R. § 257.104(d)(1)(iii).

Within 30 days of recording the notation, Duke Energy shall prepare a notification stating that that the notation has been recorded and placed it into the facility's operating record. Pursuant to 40 C.F.R. § 257.106(d), Duke Energy shall send to the appropriate regulatory agency the notification of intent to close, notification of closure completion, and notification of deed notation, within 30 days of placing each such notification in the operating record.

An expected schedule for closure activities is as follows:

Time	Activity
Prior to last receipt of waste	Permitting, detailed closure design and contractor selection
Initial 30 days after last receipt of waste	Mobilization of contractor
Months 0-1 after beginning construction	Grading /preparation of intermediate cover
Months 1-4 after beginning construction	Placement of soil layer and/or geomembrane liner, and soil protective layers
Months 4-5 after beginning construction	Installation of diversion berms and downslope pipes
Months 5-6 after beginning construction	Seed, fertilize and mulch

3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Kenton J. Yang, being a registered Professional Engineer, in accordance with the North Carolina Professional Engineer's Registration do hereby certify to the best of my knowledge, information, and belief, that the information contained in this report dated October 10, 2016 was conducted in accordance with the requirements of 40 C.F.R. § 257.102, is true and correct, and has been prepared in accordance with recognized and generally accepted good engineering practices.

Prepared by:

DUKE ENERGY.

DAN RIVER STEAM STATION

PRIMARY ASH BASIN

SECONDARY ASH BASIN

CLOSURE PLAN

MARCH 3, 2017

Certified by:

amec foster wheeler

Amec Foster Wheeler Environment & Infrastructure, Inc.

2801 Yorkmont Road Suite # 100

Charlotte, NC 28208

License Number: F-1253

DR_CLOSE_PLN

Rev. 1

Duke Energy Carolinas, LLC (Duke Energy) prepared this Closure Plan for the Coal Combustion Residuals (CCR) surface impoundments at the Dan River Steam Station (Dan River) pursuant to the requirements of 40 C.F.R. § 257.102(b) of the Disposal of CCR from Electric Utilities rule, 80 Fed. Reg. 21302 (April 17, 2015). Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) was retained by Duke Energy to certify that this Closure Plan meets the requirements of 40 C.F.R. § 257.102. The information contained in this Closure Plan will be used to assist Duke Energy in the closure of the Primary Ash Basin and Secondary Ash Basin (Ash Basins) located in Rockingham County, North Carolina, on property owned by Duke Energy. This Closure Plan was originally posted to the Duke Energy operating record on October 17, 2016, and has been revised to update the closure initiation date in Section 5. This Closure Plan may be additionally amended pursuant to the requirements of 40 C.F.R. § 257.102(b)(3). Presented below are:

1. A narrative of closure activities;
2. A description of the procedures to remove CCR and decontaminate the CCR units;
3. An estimate of the in-place CCR inventory requiring closure;
4. An estimate of the largest area of the CCR units requiring a final cover (as needed);
5. A closure schedule; and
6. A written certification from a qualified professional engineer, licensed in North Carolina, that this Closure Plan meets the requirements of 40 C.F.R. § 257.102.

1 NARRATIVE OF CLOSURE ACTIVITIES

The purpose of this Closure Plan is to describe the steps required to close the Ash Basins at Dan River consistent with recognized and generally accepted good engineering practices. Closure of the Ash Basins will be designed to reduce the need for long-term maintenance and control the post-closure release of constituents into environmental pathways (i.e., air, surface water, and groundwater).

The Ash Basins will be closed through the removal of CCR, and the closure will be performed pursuant to 40 C.F.R. § 257.102(c). CCR will be removed as described in the following section.

2 CCR REMOVAL AND DECONTAMINATION

The procedures to remove CCR from the Ash Basins include dewatering and utilizing appropriate equipment and methods to excavate and move the CCR to off-site and/or on-site permitted landfills. Dewatering will include removal of bulk water/free liquids and interstitial/pore water (as needed) to allow for safe excavation.

The existing embankments will be breached pursuant to a North Carolina Department of Environmental Quality (NCDEQ) Dam Safety permit approval. This breach is intended to promote free drainage of storm water from the closure area.

Existing appurtenant structures, such as ditches, culverts, and miscellaneous piping, will be decontaminated and abandoned in place, removed and disposed in a permitted disposal facility, or removed placed in a beneficial use facility identified at the time of closure. Decontamination procedures may consist of pressure washing, scrubbing, or other generally accepted decontamination procedures.

Pursuant to 40 C.F.R. § 257.102(c), closure will be complete when groundwater monitoring concentrations do not exceed the applicable groundwater protection standard established pursuant to 40 C.F.R. § 257.95(h) for constituents listed in appendix IV to 40 C.F.R. Part 257.

3 ESTIMATE OF IN-PLACE CCR INVENTORY

The volumes of CCR present in the Ash Basins were calculated and are presented in Table 1 below, pursuant to 40 C.F.R. § 257.102(b)(1)(iv). The volumes are the estimated inventory of CCR that will be open (and require closure) at one time, and the estimates are based on bathymetric surveys and historical topography as of July 2014. The annual surface impoundment inspections completed, pursuant to 40 C.F.R. § 257.83(b), and posted to the Duke Energy CCR website, pursuant to 40 C.F.R. § 257.107(g)(5), contain the most recent estimates of CCR material in the Ash Basins.

Table 1. Estimated In-Place CCR Inventory

Basin	Quantity of CCR (cubic yards)
Primary Ash Basin	1,012,000
Secondary Ash Basin	324,000
Estimated Total	**1,336,000**

4 ESTIMATE OF LARGEST AREA REQUIRING FINAL COVER

CCR will be removed from the Ash Basins pursuant to 40 C.F.R. § 257.102(c); therefore, no final cover system will be constructed in support of closure activities.

5 CLOSURE SCHEDULE

Closure of the Ash Basins will be initiated when the Ash Basins cease receiving non-CCR waste streams pursuant to 40 C.F.R. § 257.102(e) and will be completed by August 2019 pursuant to 40 C.F.R. § 257.102(f)(1)(ii).

Prior to commencing closure construction, design documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents will include construction drawings, technical specifications, and quality assurance testing work plans. The permits required for closure construction activities will be evaluated at the time of closure and are anticipated to include permits from NCDEQ and the U.S. Army Corps of Engineers. Preliminary time frames of anticipated closure activities for the Ash Basins

are included below in Table 2. Duke Energy estimates that all of the closure activities for the Ash Basins will be completed by 2019.

Table 2. Estimated Time Frames for Closure Activities

Closure Activity	Time Frame (years)*
NCDEQ Closure Plan Approval	1
NCDEQ Permitting Approvals (NDPES, E&SC, Air)	1
Dewatering and Stabilization	2
NCDEQ Dam Decommissioning Approval	0.5
CCR Grading and Excavation	1.5
NCDEQ Landfill Approval	1.5

*Estimated closure activity time frames may include some overlap.

6 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Kenneth R. Daly, being a registered Professional Engineer in the state of North Carolina, do hereby certify to the best of my knowledge, information and belief, that the information contained in this written Closure Plan dated March 3, 2017, was developed pursuant to the requirements of 40 C.F.R. § 257.102 and has been prepared in accordance with recognized and generally accepted good engineering practices.

NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER KENNETH R. DALY
3/3/17

SIGNATURE _____ DATE_____

I/A

CLOSURE PLAN

DAN RIVER LANDFILL

DUKE ENERGY – DAN RIVER STEAM STATION

EDEN, NORTH CAROLINA

Prepared for

Duke Energy
550 South Tryon Street
Charlotte, North Carolina 28202

May 18, 2017

NORTH CAROLINA PROFESSIONAL SEAL 036320 ENGINEER CEDRIC H. RUHL

TABLE OF CONTENTS

1.0 INTRODUCTION

This Closure Plan was prepared for the Dan River Steam Station, Dan River Landfill. This Closure Plan was prepared in accordance with 40 C.F.R. Part 257, Subpart D and is consistent with the requirements of 40 C.F.R. § 257.102(b) for closure of coal combustion residuals landfills. The information contained in this Closure Plan will be used to assist Duke Energy Carolinas, LLC (Duke Energy) in the closure of active waste units. The Dan River Landfill is owned and operated by Duke Energy. The landfill is located in Rockingham County, North Carolina on Duke property, east of the Dan River Combined Cycle Station on the northeastern end of the property. Duke Energy must obtain a written certification from a qualified professional engineer, licensed in the state in which the project work is conducted, that this written Closure Plan and any amendments thereto meet the requirements of 40 C.F.R. § 257.102.

2.0 CLOSURE PLAN

2.1 Overview of Closure Approach

The purpose of the Closure Plan is to outline the sequence for closing the landfill phases consistent with recognized and generally accepted good engineering practices. Closure is designed to minimize the need for long term maintenance and to control the post-closure release of contaminants. The facility will be closed in accordance with the requirements of 40 C.F.R. § 257.102. Closure will occur within the time frames set out in 40 C.F.R. § 257.102(f). This Closure Plan may be amended in accordance with the requirements of 40 C.F.R. § 257.102(b)(3).

2.2 Estimated Maximum Inventory of CCR

The current landfill design provides approximately 2,265,000 cubic yards of gross capacity as measured from the top of the protective cover soil to the top of final cover.

2.3 Largest Area Requiring Cover System

The total permitted area of 23.3 acres is currently the largest area that will need to be capped.

2.4 Closure Performance Standard

2.4.1 Final Cover

The cover system has been designed to reduce infiltration into the landfill and to resist erosion, and to meet the requirements of 40 C.F.R. § 257.102(d)(3)(i). The permeability of the least permeable layer (a polyethylene geomembrane) is on the order of 10^{-12} cm/s. This is equal to or less than the permeability of the polyethylene geomembrane in the bottom liner system and no greater than 1×10^{-5} cm/sec.

The final cover system for the closed phase will be certified by a qualified professional engineer as being designed in accordance with the requirements of 40 C.F.R. § 257.102.

With the type of waste that has been landfilled and the controlled nature of the fill placement, no decomposition of the waste material is expected, therefore minimum, if any, settlement is expected. Due to the high allowable strain of the geomembrane and the stable nature of the waste, the final cover system will accommodate any differential settlement that may occur in the waste during the post closure care period.

The proposed final cover system will consist of the following from top to bottom and will be placed over the existing intermediate soil cover:

- a 6-inch thick vegetated erosion layer;
- an 18-inch thick final soil cover;
- a geocomposite drainage layer; and
- a 40-mil thick double-sided textured linear low density polyethylene (LLDPE) geomembrane.

2.4.2 Alternate Final Cover

The alternate final cover system will consist of the following from top to bottom and will be placed over the existing intermediate soil cover:

- a 6-inch thick vegetative soil cover
- an 18-inch thick final soil cover
- an 8 oz/sy non-woven geotextile
- a 50-mil LLDPE structured geomembrane

2.4.3 Performance Standards

Closure of the facility will be conducted in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of uncontrolled leachate, surface runoff, or waste decomposition products to the groundwater, surface water, or the atmosphere.

The final cover system consisting of a vegetated soil layer with run-on and run-off controls will minimize the need for post-closure maintenance. The final slopes of the landfill will promote runoff. Diversion berms and downslope pipes will convey surface runoff to conveyances with non-erodible linings or, if applicable, to sediment basins designed for removal of sediment prior to discharge. A hardy stand of vegetation will be established and, along with the diversion berms and storm water conveyance channels, will minimize erosion of the final cover system.

A low-permeability final cover system will be constructed and maintained that minimizes the infiltration of precipitation into the waste mass. By minimizing infiltration, the final cover will minimize leachate generation.

The final slopes of the landfill will be five percent or greater to prevent ponding.

2.4.4 Stability

The CCR unit will be closed in a manner that provides for slope stability to prevent the sloughing or movement of the final cover system. In order to maintain stable slopes for the final cover, the internal and interface friction angle of all the components must be greater than the slope angle by a margin called the factor of safety. Since the maximum regulatory slopes are 3:1, only materials with friction angles greater than 26.6° will be used, providing a minimum factor of safety of 1.5. To ensure the stability of the vegetative support layer in the final cover system, adequate drainage must be provided to prevent the soil from becoming saturated and subject to seepage forces.

A seismic analysis was also performed and meets the requirements for stability in accordance with 40 C.F.R. § 257.63.

2.4.5 Closure Time Frame

The final cover system will be finished within six months following the beginning of closure construction unless otherwise approved. If more than six months are necessary, steps to prevent threats to human health and the environment from the unclosed landfill unit will be undertaken.

2.5 Schedule

In accordance with 40 C.F.R. § 257.102(e), the facility will begin closure activities within 30 days after final receipt of waste, or if the landfill has remaining capacity and there is a reasonable likelihood that the landfill will receive additional wastes, no later than two years after the most recent receipt of wastes. Contractor mobilization will occur during the initial 30 day period after last receipt of waste.

In accordance with 40 C.F.R. § 257.102(f)(1), the final cover system will be completed within six months following the beginning of closure construction unless a deadline extension is approved.

In accordance with 40 C.F.R. § 257.102(g), no later than the date on which closure of the CCR unit is initiated, prepare a notification of intent to close the unit, which includes the certification by a qualified professional engineer for the design of the final cover system required by § 257.102(d)(3)(iii).

In accordance with 40 C.F.R. § 257.102(h), within 30 days of completion of closure, Duke Energy shall record a notation on the deed to the landfill property stating that the property has been used as a landfill and its use is restricted under the Closure/Post-Closure Plan and the post-closure care requirements as provided by 40 C.F.R. § 257.104(d)(1)(iii).

Within 30 days of recording the notation, Duke Energy shall prepare a notification stating that that the notation has been recorded and placed it into the facility's operating record. Pursuant to 40 C.F.R. § 257.106(d), Duke Energy shall send to the appropriate regulatory agency the notification of intent to close, notification of closure completion, and notification of deed notation, within 30 days of placing each such notification in the operating record.

An expected schedule for closure activities is as follows:

Time	Activity
Prior to last receipt of waste	Permitting, detailed closure design and contractor selection
Initial 30 days after last receipt of waste	Mobilization of contractor
Months 0-1 after beginning construction	Grading /preparation of intermediate cover
Months 1-4 after beginning construction	Placement of soil layer and/or flexible membrane liner, and soil protective layers
Months 4-5 after beginning construction	Installation of diversion berms and downslope pipes
Months 5-6 after beginning construction	Seed, fertilize and mulch

3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Cedric Ruhl, being a registered Professional Engineer, in accordance with the North Carolina Professional Engineer's Registration do hereby certify to the best of my knowledge, information, and belief, that the information contained in this report dated May 18, 2017 was prepared in accordance with the requirements of 40 C.F.R. § 257.102, is true and correct, and has been prepared in accordance with recognized and generally accepted good engineering practices.

Prepared by:

DUKE ENERGY.

MARSHALL STEAM STATION

ACTIVE ASH BASIN

CLOSURE PLAN

OCTOBER 10, 2016

REV 1 JUNE 11, 2019

Certified by:

AECOM

1600 Perimeter Park Drive, Ste 400

Morrisville, NC 27560

Engineering Firm License Number: C-2243

MAR_CLOSE_PLN
Rev. 1

I/A

MAR_CLOSE_PLN
Rev. 1

Duke Energy Carolinas, LLC (Duke Energy) prepared this Closure Plan for the Coal Combustion Residuals (CCR) surface impoundment at the Marshall Steam Station (Marshall) pursuant to the requirements of 40 C.F.R. § 257.102(b) of the Disposal of CCR from Electric Utilities rule, 80 Fed. Reg. 21302 (April 17, 2015) (CCR Rule). AECOM Technical Services of North Carolina, Inc. (AECOM) was retained by Duke Energy to certify that this Closure Plan meets the requirements of 40 C.F.R. § 257.102(b) of the CCR Rule. The information contained in this Closure Plan will be used to assist Duke Energy in the closure of the Active Ash Basin (Ash Basin) located in Catawba County, North Carolina, on property owned by Duke Energy. Pursuant to 40 C.F.R. § 257.102(b)(3), this Closure Plan amends the initial closure plan dated October 10, 2016. Presented below are:

1. The narrative of closure activities;
2. A description of the procedures to remove CCR and decontaminate the CCR unit (as needed);
3. A description of the final cover system designed pursuant to 40 C.F.R. § 257.102(d), a description of the methods and procedures to be used to install the final cover, and a discussion of how the final cover system will achieve the performance standards specified in 40 C.F.R. § 257.102(d);
4. An estimate of the in-place CCR inventory requiring closure;
5. An estimate of the largest area of the CCR unit requiring a final cover;
6. A closure schedule; and
7. A written certification from a qualified professional engineer, licensed in North Carolina, that this Closure Plan meets the requirements of 40 C.F.R. § 257.102(b).

1 NARRATIVE OF CLOSURE ACTIVITIES

The purpose of this Closure Plan is to describe the steps necessary to close the Ash Basin consistent with recognized and generally accepted good engineering practices. Closure is designed to reduce the need for long-term maintenance, control the post-closure infiltration of liquids through the top of the final cover system into the in-place CCR, and control the post-closure release of constituents to surface waters, the ground, or the atmosphere.

Although, on May 18, 2016, the North Carolina Department of Environmental Quality (NCDEQ) ranked the Ash Basin "intermediate-risk," which would require it to be dewatered and excavated pursuant to the North Carolina Coal Ash Management Act of 2014, as amended (CAMA), Duke Energy established the permanent replacement water supplies required under N.C.G.S. § 130A-309.211(c1) and performed the applicable dam safety repair work required under Dam Safety Order 16-01 issued by the state of North Carolina pursuant to the North Carolina Dam Safety Law of 1967, specifically N.C.G.S. § 143-215.32. As a result of Duke Energy's completion of these tasks within the required time frames set out in CAMA, on November 14, 2018, pursuant to N.C.G.S. § 130A-309.213(d)(1), NCDEQ classified the Ash Basin as low-risk. Pursuant to N.C.G.S. § 130A-309.214(a)(3), an impoundment determined to be low-risk shall be closed by removal of CCR, closed in place, or closed using a hybrid approach. Because science supports closure of the Ash Basin by leaving the CCR in-place, Duke Energy contemplates that the Ash

Basin will be closed in accordance with the requirements of state law and 40 C.F.R. § 257.102(d).[1] The constructed wetlands treatment system, which is not entirely within the boundaries of the Ash Basin but formerly operated in conjunction with the contiguous Ash Basin as a single wastewater treatment system at Marshall, will be closed coincident therewith.

The method to close the CCR unit in-place will include: removal (decanting) and treatment of the bulk water/free liquids; interstitial/pore water dewatering (as needed) and treatment; stabilization of remaining CCR sufficient to support the final cover system; grading of in-place CCR to promote positive drainage (no ponding) and prevent sloughing or movement of the final cover system; installation of a final cover system, including stormwater management controls; and post-closure groundwater monitoring and cover maintenance. The final cover system will be designed to minimize infiltration; erosion; and meet, or exceed, the requirements of the final cover system specified in 40 C.F.R. § 257.102(d)(3)(i). Typically, this involves the installation of a low permeability barrier layer and a vegetated soil cover to protect the barrier layer. A small portion of the Ash Basin will be subject to closure-by-removal. The steps necessary to close the contiguous constructed wetlands include decanting and dewatering each of the wetland cells, as necessary, to excavate and transport the material to an appropriate landfill. Some material within the footprint of the Ash Basin may be left in place and graded and/or mixed with CCR material as appropriate.

2 CCR REMOVAL AND DECONTAMINATION

There are areas, primarily the area of the Ash Basin where the Industrial Landfill Phases 2-4 are proposed to be constructed, that closure-by-removal is selected in order allow for development of future plant infrastructure or transmission. In-place CCR in those areas will typically be dewatered (if needed), excavated, and then consolidated (placed) into the major portion of the basin which will be graded and closed-in-place pursuant to 40 C.F.R. § 257.102(d).

Existing appurtenant structures, such as ditches, culverts and miscellaneous piping, will be decontaminated and abandoned in-place, removed and disposed in a permitted disposal facility, or removed and placed in a beneficial use facility identified at the time of closure. Decontamination procedures may consist of pressure washing, scrubbing, or other generally accepted decontamination procedures.

Pursuant to 40 C.F.R. § 257.102(c), closure will be complete when groundwater monitoring concentrations do not exceed the applicable groundwater protection standard established pursuant to 40 C.F.R. § 257.95(h) for constituents listed in appendix IV to 40 C.F.R. Part 257.

[1] On April 1, 2019, NCDEQ issued a determination directing Duke Energy to excavate the CCR in the Ash Basin pursuant to N.C.G.S. § 130A-309.214(a)(3)a. On April 26, 2019, Duke Energy filed a Petition for Contested Case Hearing before the North Carolina Office of Administrative Hearings appealing this determination.

3 FINAL COVER REQUIREMENTS

The final cover system for in-place closure of the Ash Basin will be designed pursuant to 40 C.F.R. § 257.102(d). Closure of the Ash Basin will be conducted in a manner that controls, minimizes, or eliminates, to the maximum extent feasible, the post-closure infiltration of liquids into the CCR and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.

The final cover system being considered is a composite (soil and geosynthetics) cover system consisting of (from top to bottom):

- A six-inch layer of soil that is capable of sustaining native plant growth;
- An 18-inch thick protective soil cover layer;
- A geocomposite drainage layer or non-woven geotextile; and
- A 40-mil thick linear low-density polyethylene geomembrane barrier.

Alternative final cover systems are also under evaluation that would meet, or exceed, the requirements specified in 40 C.F.R. § 257.102(d)(3)(ii), which make use of the latest developments in final cover technology. The final cover system will serve to minimize erosion and post-closure maintenance. Various stormwater control measures (e.g., diversion berms, channels, downslope pipes, and/or downchutes) will convey surface run-off from the cover, then to sediment basins (as appropriate), prior to discharge until the site is stabilized by vegetation. The design of the stormwater conveyances will include armoring and energy dissipation measures, as necessary, to control erosion and reduce maintenance and repairs.

The final cover system, with an equivalent (or lower) permeability of any bottom liner system or natural subsoils present, or a permeability no greater than $1x10^{-5}$ centimeters/second, will be constructed and maintained to minimize the infiltration of precipitation. By minimizing infiltration, the final cover will reduce leachate generation. The final cover system will be graded to preclude the probability of future impoundment of water, sediment, or slurry.

The Ash Basin will be closed in a manner resulting in stable slopes that prevent the sloughing or movement of the final cover system. The grades of the final cover system will be generally slight, sufficient to promote run-off while reducing the potential for sloughing. Instability potential (sliding or sloughing) is further reduced through the selection and use of cover system materials that have adequate drainage properties and sufficient internal and interface shear strengths. Construction quality assurance procedures will be completed to confirm conformance of the installed final cover system to the design.

Upon commencement of closure of the Ash Basin, final closure is anticipated to be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices. Section 6, Closure Schedule, of this Closure Plan describes the estimated time frames.

3.1 FINAL COVER SYSTEM

Pursuant to 40 C.F.R. § 257.102(d)(3)(i)(A) through (D), the final cover system will be designed and constructed to meet, at a minimum, the following criteria:

(A) The permeability of the final cover system will be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} centimeters/second, whichever is less.

The final cover system options being considered for the Ash Basin will meet or exceed this criteria. The geomembrane by itself results in a lower effective infiltration rate than the 18 inches of $1x10^{-5}$ centimeters/second soil standard.

(B) The infiltration of liquids through the CCR unit will be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.

The geomembrane component of the final cover system results in equivalent or better infiltration performance than 18 inches of earthen material. The proposed protective cover (18 inches) and vegetative layer soil will be obtained from local borrow sites. The gradation of the soil used in the cover will be such that it does not damage the geomembrane, provides the required level of drainage to maintain final cover function, resists erosion, and supports plant growth.

(C) The erosion of the final cover system will be reduced by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

The materials proposed for the vegetative support layer in the composite cover system option, or the protective cover component of an alternate final cover system, will provide equivalent or better performance than a six-inch-thick erosion layer. In addition, and prior to the completion of closure, stormwater run-off and wastewaters generated from areas outside the Ash Basin's drainage catchment (which had previously been routed through the basin when it was active) will be permanently diverted for treatment (as needed) and discharged at other locations within the site.

(D) The disruption of the integrity of the final cover system will be minimized through a design that accommodates settling and subsidence.

The materials proposed for the final cover system will accommodate the amount of settlement and subsidence that is anticipated to be encountered during construction and post-closure. In addition, the cover grades and stormwater conveyance system grades will be designed to accommodate settlement during construction and post-closure care.

The methods and procedures used to install the final cover will include:

1. Completing necessary field characterizations and design analyses;
2. Obtaining necessary federal, state, and local permits;
3. Preparing bid documents and selecting a qualified contractor;
4. Mobilizing;

5. Installing erosion and sediment control measures;
6. Removing and treating (as needed) the bulk water/free liquid;
7. Decontaminating and abandoning in-place, or removing the appurtenant structures within the CCR unit;
8. Clearing and grubbing;
9. Constructing laydown areas and access roads;
10. Where needed, interstitial/pore water dewatering and treatment;
11. Grading CCR to achieve design cover system subgrade elevations;
12. Installing the cover system and associated stormwater management controls;
13. Stabilizing the site with appropriate vegetation and final erosion and sediment control measures; and
14. Commencing post-closure maintenance and monitoring of the site.

3.2 DRAINAGE AND STABILIZATION

Bulk water/free liquids will be removed from the Ash Basin during the initial phases of construction. To provide a stable platform for installation of the cover system, interstitial/pore water may be removed and treated during construction. With the diversion of wastewater and stormwater generated from areas outside of the Ash Basin drainage catchment (which had previously been routed through the basin when it was active), the volume of interstitial/pore water within the basin is expected to further decline over time. The stormwater outlet will be constructed following the final phase of cover system installation. Combined, these measures (diversion of wastewater and stormwater, bulk dewatering, selective interstitial/pore water dewatering, cover system installation, and stormwater outlet construction) will stabilize the CCR sufficiently to support the final cover system.

4 ESTIMATE OF IN-PLACE CCR INVENTORY

The volume of CCR present in the Ash Basin was calculated and is presented in Table 1 below, pursuant to 40 C.F.R. § 257.102(b)(1)(iv). The volume is the estimated inventory of CCR that will be open (and require closure) at one time, and the estimate is based on bathymetric surveys, historical topography and soil borings as of December 2015, as adjusted based on estimated volumes of bottom ash sluiced to the Ash Basin as well as scaled tonnages of CCR excavated/removed for beneficial use since the last survey. The annual surface impoundment inspections completed, in general accordance with 40 C.F.R. § 257.83(b), and posted to the Duke Energy CCR Rule Compliance Data and Information Web site, in accordance with 40 C.F.R. § 257.107(g)(5), contain the most recent estimates of CCR in the Ash Basin.

Table 1. Estimated In-Place CCR Inventory

Basin	Quantity of CCR (cubic yards)
Ash Basin	14,033,000

5 ESTIMATE OF LARGEST AREA REQUIRING FINAL COVER

CCR will undergo closure-in-place in the Ash Basin pursuant to 40 C.F.R. § 257.102(d). The largest area of the CCR unit that will be open (and requiring a final cover) at one time is estimated to be 320 acres.

6 CLOSURE SCHEDULE

Closure of the Ash Basin was initiated on April 10, 2019, pursuant to 40 C.F.R. § 257.102(b)(1), and is anticipated to be completed within approximately 11 years. The closure time frame includes three two-year time extensions beyond the time specified in 40 C.F.R. § 257.102(f)(1)(ii) on the basis that the anticipated time required to close the Ash Basin will need to be lengthened due to:

- The Ash Basin being larger than 40 acres (estimated 394 acres);
- The amount of material needed to close the Ash Basin (estimated to be about 2.7 million cubic yards);
- Volume of bulk water/free liquids to dewater (greater than 179 million gallons);
- The surrounding geology (shallow rock resulting in limited soil volume per given area, limited availability of soil meeting the permeability requirements outlined in the CCR Rule, rocks in the soil that could damage the geomembrane would need to be removed, etc.); and
- The time required, after the removal of bulk liquids, for the surface of the basin to stabilize to the point that personnel and equipment can safely access the impoundment. Given the site-specific geometry and physical characteristics of the CCR in the impoundment, the rate at which the materials will drain will likely be slow and variable. As a result, installation of instrumentation and monitoring equipment may be necessary in some instances to ensure subgrade stability is adequate, and other measures may need to be employed to stabilize the surface of the impoundment (possibly including closely-spaced well points, deep wells, trenches, etc.) in a timely manner.

The completed demonstration establishing why it is not feasible to complete closure of the Ash Basin within the five-year time frame due to factors beyond the facility's control will be prepared and placed in the facility's operating record prior to the end of any two-year period pursuant to 40 C.F.R. § 257.102(f)(2).

Prior to commencing closure construction, design documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents will include construction drawings, technical specifications, and quality assurance testing work plans. The permits required for closure construction activities will be evaluated at the time of closure and are anticipated to include permits from NCDEQ and the U.S. Army Corps of Engineers. Preliminary time frames of anticipated closure activities for the Ash Basin are included below in Table 2. We estimate that all of the closure activities for the Ash Basin will be completed by 2029.

Table 2. Estimated Time Frames for Closure Activities

Closure Activity	Time Frame (years)*
NCDEQ Closure Plan Approval	1
NCDEQ Permitting Approvals (NDPES, E&SC, Air, Dam Safety)	1
Dewatering and Stabilization	3
CCR Grading and Excavation	2.5
Final Cover Installation	7

*Estimated closure activity time frames may include some overlap.

7 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, John A. Bove, being a registered Professional Engineer in the State of North Carolina, do hereby certify to the best of my knowledge, information and belief, that the information contained in this written Rev 01 Closure Plan dated June 11, 2019, was developed in general accordance with the requirements of 40 C.F.R. § 257.102(b) and has been prepared in general accordance with recognized and generally accepted good engineering practices.

NORTH CAROLINA PROFESSIONAL SEAL 19391 ENGINEER JOHN A. BOVE

6/11/19

SIGNATURE _____ DATE 6/11/2019

Prepared for:
DUKE ENERGY

Marshall Steam Station
8320 Highway 150 East
Terrell, North Carolina 28682

MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1

CLOSURE PLAN
Revision 1

FEBRUARY 23, 2018

Prepared by:

9751 SOUTHERN PINE BLVD
CHARLOTTE, NORTH CAROLINA 28273
PHONE: 704.523.4726
FAX: 704.525.3953
S&ME Project No.: 7235-17-013

CLOSURE PLAN

1.0 INTRODUCTION

This Closure Plan was prepared for the Marshall Steam Station (MARSS) – Industrial Landfill No. 1. This Closure Plan was prepared in accordance with 40 C.F.R. Part 257, Subpart D and is consistent with the requirements of 40 C.F.R. § 257.102(b) for closure of coal combustion residuals landfills. The information contained in this Closure Plan will be used to assist Duke Energy Carolinas, LLC (Duke Energy) in the closure of active waste units. The MARSS Industrial Landfill No. 1 is owned and operated by Duke Energy. The landfill is located in Catawba County, North Carolina on Duke property, approximately 1.5 miles north of the Marshall Steam Station, in part within the footprint of an inactive ash basin. Duke Energy must obtain a written certification from a qualified professional engineer, licensed in the state in which the project work is conducted, that this written Closure Plan and any amendments thereto meet the requirements of 40 C.F.R. § 257.102.

2.0 CLOSURE PLAN

2.1 Overview of Closure Approach

The purpose of the Closure Plan is to outline the steps necessary to close the landfill phases consistent with recognized and generally accepted good engineering practices. Closure is designed to minimize the need for long-term maintenance and to control the post-closure release of contaminants. The facility will be closed in accordance with the requirements of 40 C.F.R. § 257.102. Closure will occur within the time frames set out in 40 C.F.R. § 257.102(f). This Closure Plan may be amended in accordance with the requirements of 40 C.F.R. § 257.102(b)(3).

2.2 Estimated Maximum Inventory of CCR

The design of constructed Phase 1 (Cells 1 through 4) provides approximately 3,829,000 cubic yards of airspace available for waste placement (including operational soils).

2.3 Largest Area Requiring Cover System

The landfill area of constructed cells (Phase 1, Cells 1 through 4) covers approximately 35 acres and is currently the largest area that will need to be capped.

2.4 Closure Performance Standard

2.4.1 Final Cover System

The cover system has been designed to reduce infiltration into the landfill and to resist erosion. The permeability of the least permeable layer is on the order of 1×10^{-12}

cm/sec. This is equal to or less than the permeability of the bottom liner system and no greater than 1×10^{-5} cm/sec.

The final cover system for the closed phase will be certified by a qualified professional engineer as being designed in accordance with the requirements of 40 C.F.R. § 257.102.

With the type of waste that has been landfilled and the controlled nature of the fill placement, no decomposition of the waste material is expected, therefore minimum, if any, settlement is expected. Due to the high allowable strain of the geomembrane and the stable nature of the waste, the final cover system will accommodate any differential settlement that may occur in the waste during the post closure care period.

The proposed final cover system will consist of the following from top to bottom and will be placed over the existing intermediate soil cover:

- a 6-inch thick vegetated erosion layer;
- an 18-inch thick soil barrier;
- a geocomposite drainage layer; and
- a 40-mil thick double-sided textured linear low density polyethylene (LLDPE) geomembrane.

2.4.2 Alternate Final Cover System

No alternate final cover system is proposed.

2.4.3 Performance Standards

Closure of the facility will be conducted in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of uncontrolled leachate, surface runoff, or waste decomposition products to the groundwater, surface water, or the atmosphere.

The final cover system consisting of a vegetated soil layer with run-on and run-off controls will minimize the need for post-closure maintenance. The final slopes of the landfill will promote runoff. Diversion berms and downslope pipes will convey surface runoff to sediment basins designed for removal of sediment prior to discharge. A hardy stand of vegetation will be established and, along with the diversion berms and storm water conveyance channels, will minimize erosion of the final cover system.

A low-permeability final cover system will be constructed and maintained that minimizes the infiltration of precipitation into the waste mass. By minimizing infiltration, the final cover will minimize leachate generation.

The final slopes of the landfill will not be less than five percent to prevent ponding.

The CCR unit will be closed in a manner that provides for slope stability to prevent the sloughing or movement of the final cover system. In order to maintain stable slopes for

the final cover, the internal and interface friction angle of all the components must be greater than the slope angle by a margin called the factor of safety. An analysis was performed to demonstrate the stability of proposed cap section during static conditions. An acceptable factor of safety is 1.5 or greater to guard against slope failure. To ensure the stability of the vegetative support layer in the final cover system, adequate drainage must be provided to prevent the soil from becoming saturated and subject to seepage forces.

An analysis was also performed to demonstrate the stability of proposed cap section during seismic conditions. An acceptable factor of safety is 1.0 or greater to guard against slope failure. The analysis was performed in accordance with the requirements of 40 C.F.R. § 257.63 and the seismic factor of safety was found to be greater than 1.0.

The final cover system will be finished within six months following the beginning of closure construction unless otherwise approved. If more than six months are necessary, steps to prevent threats to human health and the environment from the unclosed landfill unit will be undertaken.

2.5 Schedule

In accordance with 40 C.F.R. § 257.102(e), the facility will begin closure activities within 30 days after the known final receipt of waste, or if the landfill has remaining capacity and there is a reasonable likelihood that the landfill will receive additional wastes, no later than two years after the most recent receipt of wastes. Contractor mobilization will occur during the initial 30-day period after last known receipt of waste.

In accordance with 40 C.F.R. § 257.102(g), no later than the date on which closure of the CCR unit is initiated, Duke Energy shall prepare a notification of intent to close the unit, which includes the certification by a qualified professional engineer for the design of the final cover system required by § 257.102(d)(3)(iii).

In accordance with 40 C.F.R. § 257.102(h), within 30 days following completion of closure of the CCR unit, Duke Energy shall record a notation on the deed to the landfill property stating that the property has been used as a landfill and its use is restricted under the Post-Closure Plan and the post-closure care requirements as provided by 40 C.F.R. § 257.104(d)(1)(iii).

Within 30 days of recording the notation, Duke Energy shall prepare a notification stating that the notation has been recorded and placed it into the facility's operating record. Pursuant to 40 C.F.R. § 257.106(d), Duke Energy shall send to the appropriate regulatory agency the notification of intent to close, notification of closure completion, and notification of deed notation, within 30 days of placing each such notification in the operating record.

An expected schedule for closure activities is as follows:

Time	Activity
Prior to last receipt of waste	Permitting, detailed closure design and contractor selection
Initial 30 days after last receipt of waste	Mobilization of contractor

Months 0-1 after beginning construction	Grading /preparation of intermediate cover
Months 1-4 after beginning construction	Placement of soil layer and/or flexible membrane liner, and soil protective layers
Months 4-5 after beginning construction	Installation of diversion berms and downslope pipes
Months 5-6 after beginning construction	Seed, fertilize and mulch

3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Stephen J. Loskota, being a registered Professional Engineer in the State of North Carolina, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this Closure Plan dated February 23, 2018 was conducted in accordance with the requirements of 40 C.F.R. § 257.102, is true and correct, and has been prepared in accordance with recognized and generally accepted good engineering practices.

SIGNATURE Stephen J Loskota DATE 2-23-2018

NORTH CAROLINA PROFESSIONAL SEAL 033606 ENGINEER STEPHEN J. LOSKOTA

Prepared by:

DUKE ENERGY.

W.S. LEE STEAM STATION

PRIMARY ASH BASIN

SECONDARY ASH BASIN

CLOSURE PLAN

November 21, 2017

Certified by:

AECOM

6000 Fairview Road, Suite 200

Charlotte, North Carolina 28210

License Number: South Carolina 934

WSLEE_CLOSE_PLN

Rev. 1

Duke Energy Carolinas, LLC (Duke Energy) prepared this Closure Plan for the Coal Combustion Residuals (CCR) surface impoundments at the W.S. Lee Steam Station (W.S. Lee) pursuant to the requirements of 40 C.F.R. § 257.102(b) of the Disposal of CCR from Electric Utilities rule, 80 Fed. Reg. 21302 (April 17, 2015). URS Corporation – North Carolina (AECOM) was retained by Duke Energy to certify that this Closure Plan meets the requirements of 40 C.F.R. § 257.102. The information contained in this Closure Plan will be used to assist Duke Energy in the closure of the Primary Ash Basin and Secondary Ash Basin (Ash Basins) located in Anderson County, South Carolina, on property owned by Duke Energy. This Closure Plan may be amended pursuant to the requirements of 40 C.F.R. § 257.102(b)(3). Presented below are:

1. A narrative of closure activities;
2. A description of the procedures to remove CCR and decontaminate the CCR units;
3. An estimate of the in-place CCR inventory requiring closure;
4. An estimate of the largest area of the CCR units requiring a final cover (as needed);
5. A closure schedule; and
6. A written certification from a qualified professional engineer, licensed in South Carolina, that this Closure Plan meets the requirements of 40 C.F.R. § 257.102.

1 NARRATIVE OF CLOSURE ACTIVITIES

The purpose of this Closure Plan is to describe the steps required to close the Ash Basins at W.S. Lee consistent with recognized and generally accepted good engineering practices. Closure of the Ash Basins will be designed to reduce the need for long-term maintenance and control the post-closure release of constituents into environmental pathways (i.e., air, surface water, and groundwater).

The Ash Basin will be closed through the removal of CCR, and the closure will be performed pursuant to 40 C.F.R § 257.102(c). CCR will be removed as described in the following section.

2 CCR REMOVAL AND DECONTAMINATION

The procedures to remove CCR from the Ash Basins include dewatering and utilizing appropriate equipment and methods to excavate and move the CCR to a permitted on-site landfill. Dewatering will include removal of bulk water/free liquids and interstitial/pore water (as needed) to allow for safe excavation.

The existing embankments will be breached pursuant to a South Carolina Department of Health and Environmental Control (SCDHEC) Dam Safety permit approval. This breach is intended to promote free drainage of storm water from the closure area.

Existing appurtenant structures, such as ditches, culverts, and miscellaneous piping, will be decontaminated and abandoned in place, removed and disposed in a permitted disposal facility, or removed and placed in a beneficial use facility identified at the time of closure.

Decontamination procedures may consist of pressure washing, scrubbing, or other generally accepted decontamination procedures.

Pursuant to 40 C.F.R. § 257.102(c), closure will be complete when groundwater monitoring concentrations do not exceed the applicable groundwater protection standard established pursuant to 40 C.F.R. § 257.95(h) for constituents listed in appendix IV to 40 C.F.R. Part 257.

3 ESTIMATE OF IN-PLACE CCR INVENTORY

The volumes of CCR present in the Ash Basins were calculated and are presented in Table 1 below, pursuant to 40 C.F.R. § 257.102(b)(1)(iv). The volumes are the estimated inventory of CCR that will be open (and require closure) at one time, and the estimates are based on bathymetric surveys, historical topography, soil borings, and CPT results (completed in April 2017). The annual surface impoundment inspections completed, pursuant to 40 C.F.R. § 257.83(b), and posted to the Duke Energy CCR website, pursuant to 40 C.F.R. § 257.107(g)(5), contain the most recent estimates of CCR material in the Ash Basins.

Table 1. Estimated In-Place CCR Inventory

Basin	Quantity of CCR (cubic yards)
Primary Ash Basin	1,810,000
Secondary Ash Basin	24,000
Estimated Total	**1,834,000**

4 ESTIMATE OF LARGEST AREA REQUIRING COVER SYSTEM

CCR will be removed from the Ash Basins pursuant to 40 C.F.R. § 257.102(c); therefore no final cover system will be required in support of closure activities.

5 CLOSURE SCHEDULE

Closure of the Ash Basins will be initiated pursuant to 40 C.F.R. § 257.102(e) and is expected to be completed within seven years of the commencement of closure activities. The closure time frame includes a two-year time extension beyond the time specified in 40 C.F.R. § 257.102(f)(1)(ii) on the basis that the anticipated time required to close the Ash Basins will need to be lengthened due to:

- The Primary Ash Basin being larger than 40 acres (estimated 48 acres);
- The volume of bulk water/free liquids to dewater (estimated 74.7 million gallons in the Secondary Ash Basin); and
- The compliance activities required for permitting the on-site landfill.

The completed demonstration establishing why it is not feasible to complete closure of the Ash Basins within the five-year time frame due to factors beyond the facility's control will be prepared and placed in the facility's operating record prior to the end of any two-year period pursuant to 40 C.F.R. § 257.102(f)(2).

Prior to commencing closure construction, design documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents will include construction drawings, technical specifications, and quality assurance testing work plans. The permits required for closure construction activities will be evaluated at the time of closure and are anticipated to include permits from the SCDHEC and the U.S. Army Corps of Engineers. Preliminary time frames of anticipated closure activities for the Ash Basins are included below in Table 2. Duke Energy estimates that all of the closure activities for the Ash Basins will be completed by 2024.

Table 2. Estimated Time Frame for Closure Activities

Closure Activity	Time Frame (years)*
SCDHEC Closure Plan Approval	1
SCDHEC Permitting Approvals (NDPES, E&SC, Air)	1
Dewatering and Stabilization	3
CCR Grading and Excavation	3
SCDHEC Dam Decommissioning Approval	0.5
SCDHEC Landfill Approval	1.5

*Estimated closure activity time frames may include some overlap.

6 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, John D. Priebe, being a licensed Professional Engineer in the state of South Carolina, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this written Closure Plan dated November 21, 2017, was developed pursuant to the requirements of 40 C.F.R. § 257.102 and has been prepared in accordance with recognized and generally accepted good engineering practices.

SIGNATURE _____ DATE 11/21/17

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 33516 JOHN D. PRIEBE

SOUTH CAROLINA URS CORPORATION No. C00934 CERTIFICATE OF AUTHORIZATION

Allen Steam Station Ash Basin Closure Options Analysis

Summary Report

This summary report (Report) presents the Closure Options evaluation for the Ash Basins located at Duke Energy Carolinas, LLC's (Duke Energy's) Allen Steam Station, located in Gaston County, North Carolina. The Closure Options Evaluation involved developing ash basin closure strategies and evaluating these options relative to one another to determine which option to advance to more detailed engineering and closure plan development. The strategies discussed in the Closure Options evaluation are representative of the range of possible approaches for basin closure, and do not constitute final closure plans as described in N.C. Gen. Stat. sec. 130A-309.214(a)(4). Final closure plans will be submitted in 2019, as required by law, supported by detailed engineering designs and any necessary updates to groundwater modeling and related analysis.

Duke Energy developed programmatic guidance for the closure analysis effort in early 2016 to provide fleet-wide consistency to ash basin closure plan development. Duke Energy developed a relative weighting and scoring system with input from the National Ash Management Advisory Board. Using this system, Duke Energy evaluated and scored the alternatives using an options analysis framework designed to identify the best solution that balances environmental protection, cost, schedule and local community impacts. It is noted that internal working draft versions of these 2015-2016 Options Analyses for Allen, Belews Creek, Cliffside, Marshall, Mayo, and Roxboro were provided to NCDEQ at its request in May and June 2018.

The 2016 internal working draft Options Analysis identified Closure-In-Place as the preferred solution for Allen that is protective of the environment, safely closes the Ash Basins, minimizes the other associated risks, and was the least cost to customers. A permit-level design was developed for that option in 2016. The company then paused that work, pending determination that the site would meet the requirements for a low-risk impoundment classification pursuant to CAMA, as amended by House Bill 630. Duke Energy has completed those requirements at the Allen site for a low-risk classification and now has updated this analysis.

This updated Closure Options Evaluation includes updates to the Closure-In-Place option per the most recent design. In addition, unit costs and material quantities have been updated where appropriate for all options.

SITE BACKGROUND

Allen Station is located along the west shore of Lake Wylie, a man-made reservoir created by the impoundment of the Catawba River. Allen Station is a five-unit, 1,140 megawatts, coal-fired generating facility. Allen Station began commercial operation in 1957 with units 1 and 2. Unit 3 began operation in 1959, unit 4 in 1960, and unit 5 in 1961.

Allen Station historically wet sluiced coal combustion residual (CCR) products into two surface impoundments located on the property. These surface impoundments are known as the Retired Ash Basin (RAB) which is also referred to as the Inactive Ash Basin (IAB) and Active Ash Basin (AAB), which are impounded by the following dams:

I/A

Allen Steam Station
Belmont, Gaston County, North Carolina

I. Site History

The Allen Steam Station ("Allen") is a Duke Energy Carolinas, LLC ("DE Carolinas" or the "Company") coalfired generation facility that began commercial operations in 1957. The Company has operated five coalfired units at Allen, the newest of which was built in 1961.

Allen has two onsite ash basins that were constructed to receive sluiced coal combustion residuals ("CCR") from the coal-fired units at the plant. The first ash basin, referred to as the Retired Ash Basin, was constructed in 1957 and received sluiced CCR until 1973. The second ash basin, known now as the Active Ash Basin, was constructed in 1972. Additionally, there are four dry ash storage areas onsite, which are designated as Distribution of Residual Solids ("DORS"). The DORS areas received dry ash from 1995 through 2006. The DORS areas are located above the west portion of the Retired Ash Basin. The CCR contained in the DORS areas were dredged from the Active Ash Basin in order to extend the useful life of the Active Ash Basin.

In 2009, the Allen Plant replaced its fly ash sluicing operation with a flue gas desulfurization ("FGD") facility. Also in 2009, DE Carolinas received a permit from the North Carolina Department of Environmental Quality ("NC DEQ") to construct an onsite, lined landfill on top of the Retired Ash Basin. This landfill, known as the RAB Ash Landfill, receives dry fly ash generated by the Allen Plant's coal-fired units. The Active Ash Basin ceased receiving CCR from the coal fired units in March of 2019. An aerial view of the Allen ash basins, DORS areas (ash fills), and landfill (collectively, the "CCR Units") is provided in **Figure 1** below.

Figure 1 – Aerial showing CCR Units at Allen

II. Regulatory History

The CCR Units at Allen have been regulated by a combination of state agencies during the operational history of the plant. The North Carolina Department of Environmental Quality ("DEQ") regulated the wet storage of ash in ash basins through the National Pollutant Discharge Elimination System ("NPDES") permit program and the dry ash storage and beneficial reuse of CCR through the state's solid waste permitting program. Power plant dams were regulated by the North Carolina Utilities Commission (the "Commission") until January 1, 2010, when that authority was transferred to DEQ.

Following the Tennessee Valley Authority coal ash spill in 2008, EPA was prompted to assess coal ash impoundments across the country. In 2010, EPA proposed, for the first time, comprehensive regulations and federal minimum standards to address the disposal and long-term storage of CCR. The final CCR Rule was signed in December 2014 and published in April 2015. The CCR Rule applies to and requires the closure of the ash basins at Allen.

In 2014, the North Carolina General Assembly passed the Coal Ash Management Act ("CAMA") to establish new state standards for the disposal of CCR from coal-fired electric generation facilities. CAMA, and its later amendments, complement and overlap with the federal CCR Rule. DEQ designated Allen as an "intermediate risk" site. Under CAMA, "intermediate risk" sites are required to be excavated; however, "intermediate risk" sites are eligible for a downgraded risk designation – to "low-risk" – if the Company undertakes certain actions that are independently required by CAMA, including the provision of a permanent water supply to residents within a half mile and dam repair work. Receiving a "low-risk" classification, in turn, makes the site eligible for cap-in-place closure (or closure-in-place), pending DEQ's approval of the closure plan. In November 2018, DEQ approved the "low-risk" classification for Allen.

Cap-in-place is the Company's preferred closure method for Allen, because it is environmentally protective, unobtrusive, and economical. DE Carolinas prepared and submitted to DEQ a comprehensive options analysis for Allen to compare and contrast the closure methods available for Allen, including excavation, cap-in-place, or a combination of excavation and cap-in-place. That options analysis supports DE Carolinas' preference for cap-in-place closure at Allen.

On April 1, 2019, DEQ issued an order requiring DE Carolinas to excavate the ash basins at Allen ("DEQ Order"). DE Carolinas expected DEQ's closure decision to come in 2020 following the submission of the Company's closure plan for Allen by the CAMA-imposed deadline of December 31, 2019. The Company disagrees with the DEQ Order and filed an appeal, which is pending before the North Carolina Office of Administrative Hearings. That appeal will ultimately resolve how the ash basins at Allen will be closed.

III. Site Closure Activities – January 1, 2015 through December 31, 2017

The Company immediately began complying with its new state and federal regulatory requirements affecting its storage of CCR as they became effective. These compliance activities at Allen included installing and monitoring groundwater wells, connecting neighbors to permanent water supplies, satisfying the CCR Rule's reporting requirements, stabilizing the ash basin dams, and constructing an alternate spillway for the impoundments. Relating to CCR Unit closure, the Company's activities have been preliminary in nature because, under CAMA, the final closure method is dependent on DEQ's

approval, which was not expected until 2020. Those preliminary activities involved preparing engineering reports, performing engineering planning and design work, and obtaining environmental permits.
The activities described above and costs associated with those activities were the subject of DE Carolinas' 2017 rate case before the Commission (Docket No. E-7, Sub 1146). In that docket, the Commission determined that DE Carolinas' coal ash basin closure costs for Allen were reasonable, prudent, and recoverable. (*Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction*, Docket No. E-7, Sub 1146, pp. 266-269).

IV. Site Closure Activities – January 1, 2018 through January 31, 2020

The Company has continued to meet its obligations under state and federal law and is performing the preliminary work necessary to close the CCR Units at Allen. Understanding that the closure method for Allen may not be finalized until 2020, the Company deliberately avoided incurring costs that would be solely related to either cap-in-place or excavation. With limited exceptions, the activities performed since January 1, 2018 and scheduled to be performed through January 31, 2020 would have been required regardless of whether the CCR Units at Allen were to be capped-in-place or excavated. Those activities include:

- Performing engineering design and site assessments to evaluate closure options;
- Developing and finalizing draft closure plans;
- Operating and maintaining the CCR Units;
- Obtaining environmental permits;
- Installing groundwater monitoring wells;
- Monitoring and analyzing approximately 760 groundwater samples;
- Planning, designing, and installing permanent water supplies to neighbors;
- Constructing a water treatment system to treat the water generated from decanting and dewatering the Active Ash Basin; and
- Dewatering the Active Ash Basin.

The tasks that DE Carolinas has performed and will perform from January 1, 2018 through January 31, 2020 are a continuation of the activities for which costs were approved in the prior DE Carolinas rate case. These activities and associated costs continue to be necessary, appropriate, and consistent with applicable regulatory requirements.

I/A

Belews Creek Steam Station
Stokes County, North Carolina

I. Site History

The Belews Creek Steam Station ("Belews Creek") is a Duke Energy Carolinas, LLC ("DE Carolinas" or the "Company") coal-fired generation facility that has been in service since 1974. Belews Creek has one impoundment, the Active Ash Basin, which has historically been used to store sluiced coal combustion residuals ("CCR"). The Active Ash Basin was constructed between 1970 and 1972 and became operational in 1974 when the coal-fired units came online.

In 1984, Belews Creek converted to dry handling of fly ash and began disposing the fly ash in the onsite Pine Hall Road Landfill. The Company continued to sluice bottom ash to the Active Ash Basin. Disposal of fly ash continued at the Pine Hall Road Landfill until it reached capacity in 2003 and was closed. From 2003 to 2007, dry fly ash was disposed of the Structural Fill nearby the Pine Hall Road Landfill. In 2007, the Company constructed the Craig Road Landfill, which then began receiving the plant's dry fly ash. In 2008, flue gas desulphurization ("FGD") residue, or gypsum, began to be produced as a byproduct of FGD technology. The gypsum byproduct is disposed of in the Craig Road Landfill or, if it meets specifications, is sold to the drywall industry. An aerial image depicting the CCR storage areas ("CCR Units") at Belews Creek is provided in **Figure 1** below.

Active Ash Basin

Pine Hall Rd Landfill

Structural Fill

Gypsum/FGD Landfill

Craig Road Landfill

Figure 1 – Aerial showing CCR Units at Belews Creek

II. Regulatory History

The CCR Units at Belews Creek have been regulated by a combination of state agencies during the operational history of the plant. The North Carolina Department of Environmental Quality ("DEQ") regulated the wet storage of ash in ash basins through the National Pollutant Discharge Elimination System ("NPDES") permit program and the dry storage and beneficial reuse of ash through the state's solid waste permitting program. Power plant dams were regulated by the North Carolina Utilities Commission (the "Commission") until January 1, 2010, when that authority was transferred to DEQ.

Following the Tennessee Valley Authority coal ash spill in 2008, EPA was prompted to assess coal ash impoundments across the country. In 2010, EPA proposed, for the first time, comprehensive regulations and federal minimum standards to address the disposal and long-term storage of CCR. The final CCR Rule was signed in December 2014 and published in April 2015. The CCR Rule applies to and requires the closure of the Active Ash Basin at Belews Creek.

In 2014, the North Carolina General Assembly passed the Coal Ash Management Act ("CAMA") to establish new state standards for the disposal of CCR from coal-fired electric generation facilities. CAMA, and its later amendments, complement and overlap with the federal CCR Rule. DEQ designated Belews Creek as an "intermediate risk" site. Under CAMA, "intermediate risk" sites are required to be excavated; however, "intermediate risk" sites are eligible for a downgraded risk designation – to "low-risk" – if the Company takes certain actions that are independently required by CAMA, including the provision of a permanent water supply to residents within a half mile and dam repair work. Receiving a "low-risk" classification, in turn, makes the site eligible for cap-in-place closure (or closure-in-place), pending DEQ's approval of the closure plan. In November 2018, DEQ approved the "low-risk" classification for Belews Creek.

Cap-in-place is the Company's preferred closure method for Belews Creek, because it is environmentally protective, unobtrusive, and economical. DE Carolinas prepared and submitted to DEQ a comprehensive options analysis for Belews Creek to compare and contrast the closure methods available for Belews Creek, including excavation, cap-in-place, or a combination of excavation and cap-in-place. That options analysis supports DE Carolinas' preference for cap-in-place closure at Belews Creek.

On April 1, 2019, DEQ issued an order requiring DE Carolinas to excavate the ash basin at Belews Creek ("DEQ Order"). DE Carolinas expected DEQ's closure decision to come in 2020 following the submission of the Company's closure plan for Belews Creek by the CAMA-imposed deadline of December 31, 2019. The Company disagrees with the DEQ Order and filed an appeal, which is pending before the North Carolina Office of Administrative Hearings. That appeal will ultimately resolve how the ash basin at Belews Creek will be closed.

III. Site Closure Activities – January 1, 2015 through December 31, 2017

The Company immediately began complying with its new state and federal regulatory requirements affecting its storage of CCR as they became effective. These compliance activities at Belews Creek included installing and monitoring groundwater wells, connecting neighbors to permanent water supplies, satisfying the CCR Rule's reporting requirements, and stabilizing the ash basin dams and constructing an alternate spillway for the impoundments. Relating to CCR Unit closure, the Company's activities have

been preliminary in nature because, under CAMA, the final closure method is dependent on DEQ's approval, which was not expected until 2020. Those preliminary activities involved preparing engineering reports, performing engineering planning and design work, and obtaining certain environmental permits that will be necessary to begin closure activities.

The activities described above and costs associated with those activities were the subject of DE Carolinas' 2017 rate case before the Commission (Docket No. E-7, 1146). In that docket, the Commission determined that DE Carolinas' coal ash basin closure costs for Belews Creek were reasonable, prudent, and recoverable. (*Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction*, Docket No. E-7, Sub 1146, pp. 266-269).

IV. Site Closure Activities – January 1, 2018 through January 31, 2020

The Company has continued to meet its compliance obligations under state and federal law and is perform the preliminary work necessary to close the CCR Units at Belews Creek. Understanding that the closure method for Belews Creek may not be finalized until 2020, the Company deliberately avoided incurring costs that would be solely related to either cap-in-place or excavation. With limited exceptions, the activities performed since January 1, 2018 and scheduled to be performed through January 31, 2020 would have been required regardless of whether the CCR Units at Belews Creek were to be capped-inplace or excavated. Those activities include:

- Performing engineering design and site assessments to evaluate closure options;
- Developing and finalizing draft closure plans;
- Operating and maintaining the CCR Units;
- Obtaining environmental permits;
- Installing groundwater wells;
- Monitoring and analyzing groundwater samples;
- Planning, designing, and installing permanent water supplies to neighbors;
- Constructing a water treatment system to treat the water generated from decanting and dewatering the Active Ash Basin; and
- Dewatering and decanting the Active Ash Basin.

The tasks that DE Carolinas has performed and will perform from January 1, 2018 through January 31, 2020 are a continuation of the activities for which costs approved in the prior DE Carolinas rate case. These activities and associated costs continue to be necessary, appropriate, and consistent with applicable regulatory requirements.

Cliffside Steam Station (Rogers Energy Complex)
Cleveland and Rutherford Counties, North Carolina

I. Site History

The Cliffside Steam Station ("Cliffside") is a Duke Energy Carolinas, LLC's ("DE Carolinas" or the "Company") coal-fired generation facility that has been in operation since 1940. The Company originally operated four coal-fired generation units ("Units 1 through 4") at the station. Unit 5 came on line in 1972, followed by Unit 6 – a clean-coal unit – in 2012. Units 1 through 4 were retired from service in 2011. Currently, only Units 5 and 6 are in operation.

Coal combustion residuals ("CCR") from Cliffside have been stored in a combination of onsite ash basins and an onsite landfill. The oldest ash basin, referred to as the Units 1-4 Inactive Ash Basin, was constructed in 1957 to receive sluiced CCR from Units 1 through 4. The Units 1-4 Inactive Ash Basin was retired in 1977 when it reached capacity. It has since been excavated and repurposed for use as a stormwater basin.

The plant's second ash basin, referred to as the Unit 5 Inactive Ash Basin, was constructed in 1970 in advance of Unit 5 coming on line. The Unit 5 Inactive Ash Basin received sluiced CCR from 1972 until it reached capacity in 1980.

The plant's third ash basin, referred to as the Active Ash Basin, was constructed in 1975 to also receive CCR from Unit 5. The Active Ash Basin was later expanded in 1980 to its modern footprint; sluicing to this basin ceased in August, 2018. An additional dry ash storage area is located within the northwestern portion of the Active Ash Basin's waste boundary. This dry ash storage area provided additional capacity for sluiced ash.

DE Carolinas also operates the onsite Coal Combustion Products ("CCP") Landfill, which began receiving CCR in October 2010 as Phase 1 of the landfill. The CCP Landfill was constructed with an engineered liner and is permitted to receive fly ash, bottom ash, and other CCR. Phase 2 of the CCP Landfill was placed into service in 2016 and Phases 3 and 4 are being designed for future use. An aerial image depicting the CCR storage areas ("CCR Units") at Cliffside is provided in **Figure 1** below.

[The remainder of this page has been intentionally left blank]

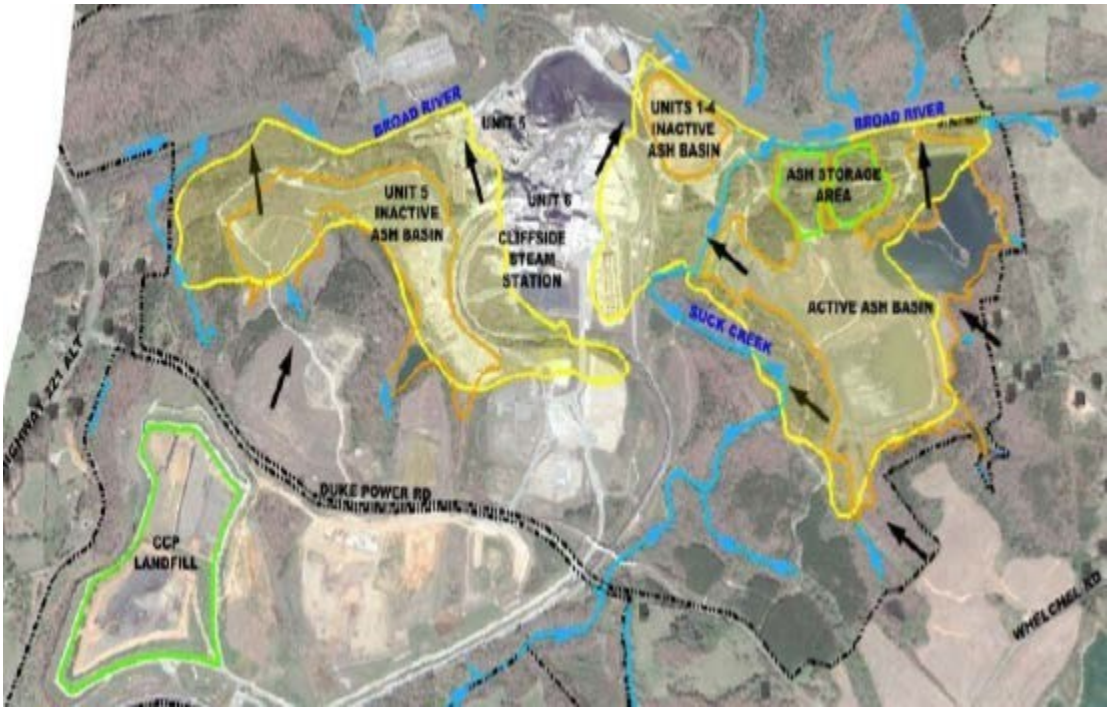


Figure 1 – Aerial showing CCR Units at Cliffside

II. Regulatory History

The CCR Units at Cliffside have been regulated by a combination of state agencies during the operational history of the plant. The North Carolina Department of Environmental Quality ("DEQ") regulated the wet storage of ash in ash basins through the National Pollutant Discharge Elimination System ("NPDES") permit program and the dry storage and beneficial reuse of ash through the state's solid waste permitting program. Power plant dams were regulated by the North Carolina Utilities Commission (the "Commission") until January 1, 2010, when that authority was transferred to DEQ.

Following the Tennessee Valley Authority coal ash spill in 2008, EPA was prompted to assess coal ash impoundments across the country. In 2010, EPA proposed, for the first time, comprehensive regulations and federal minimum standards to address the disposal and long-term storage of CCR. The final CCR Rule was signed in December 2014 and published in April 2015. The CCR Rule applies to and requires the closure of the ash basins at Cliffside.

In 2014, the North Carolina General Assembly passed the Coal Ash Management Act ("CAMA") to establish new state standards for the disposal of CCR from coal-fired electric generation facilities. CAMA, and its later amendments, complement and overlap with the federal CCR Rule. DEQ designated Cliffside as an "intermediate risk" site. Under CAMA, "intermediate risk" sites are required to be excavated; however, "intermediate risk" sites are eligible for a downgraded risk designation – to "low-risk" – if the Company takes certain actions that are independently required by CAMA, including the provision of a permanent water supply to residents within a half mile and dam repair work. Receiving a "low-risk" classification, in turn, makes the site eligible for cap-in-place closure (or closure-in-place), pending DEQ's approval of the closure plan. In November 2018, DEQ approved the "low-risk" classification for Cliffside.

Cap-in-place is the Company's preferred closure method for the Active Ash Basin and Unit 5 Ash Basin at Cliffside, because it is environmentally protective, unobtrusive, and economical. CCR from the Units 1-4 Ash Basin have already been excavated and placed in the CCP Landfill. DE Carolinas prepared and submitted to DEQ a comprehensive options analysis for Cliffside to compare and contrast the closure methods available for Cliffside, including excavation, cap-in-place, or a combination of excavation and cap-in-place. That options analysis supports DE Carolinas' preference for cap-in-place closure at Cliffside.

On April 1, 2019, DEQ issued an order requiring DE Carolinas to excavate the ash basins at Cliffside ("DEQ Order"). DE Carolinas expected DEQ's closure decision to come in 2020 following the submission of the Company's closure plan for Cliffside by the CAMA-imposed deadline of December 31, 2019. The Company disagrees with the DEQ Order and filed an appeal, which is pending before the North Carolina Office of Administrative Hearings. That appeal will ultimately resolve how the ash basins at Cliffside will be closed.

III. Site Closure Activities – January 1, 2015 through December 31, 2017

The Company immediately began complying with its new state and federal regulatory requirements affecting its storage of CCR as they became effective. These compliance activities at Cliffside included installing and monitoring groundwater wells, connecting neighbors to permanent water supplies, satisfying the CCR Rule's reporting requirements, and stabilizing the Ash Basin dam and constructing an auxiliary spillway for the ash basins. Relating to CCR Unit closure, the Company's activities have been preliminary in nature because, under CAMA, the final closure method is dependent on DEQ's approval, which was not expected until 2020. Those preliminary activities involved preparing engineering reports, performing engineering planning and design work, and obtaining certain environmental permits that will be necessary to begin closure activities.

The activities described above and costs associated with those activities were the subject of DE Carolinas' 2017 rate case before the Commission (Docket No. E-7, 1146). In that docket, the Commission determined that DE Carolinas' coal ash basin closure costs for Cliffside were reasonable, prudent, and recoverable. (*Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction*, Docket No. E7, Sub 1146, pp. 266-269).

IV. Site Closure Activities – January 1, 2018 through January 31, 2020

The Company has continued to meet its compliance obligations under state and federal law and perform the preliminary work necessary to close the CCR Units at Cliffside. Understanding that the closure method for Cliffside may not be finalized until 2020, the Company deliberately avoided incurring costs that would be solely related to either cap-in-place or excavation. With limited exceptions, the activities performed since January 1, 2018 and scheduled to be performed through January 31, 2020 would have been required regardless of whether the CCR Units at Cliffside were to be capped-in-place or excavated. Those activities include:

- Performing engineering design and site assessments to evaluate closure options;
- Developing and finalizing draft closure plans;
- Operating and maintaining the CCR Units;
- Installing groundwater wells;
- Monitoring and analyzing groundwater samples;

- Planning, designing, and installing permanent water supplies to neighbors;
- Constructing a water treatment system to treat the water generated from decanting and dewatering the Active Ash Basin; and
- Decanting the Active Ash Basin.

The tasks that DE Carolinas has performed and will perform from January 1, 2018 through January 31, 2020 are a continuation of the activities for which costs were approved in the prior DE Carolinas rate case. These activities and associated costs continue to be necessary, appropriate, and consistent with applicable regulatory requirements.

Marshall Steam Station
Catawba County, North Carolina

I. Site History

The Marshall Steam Station ("Marshall") is a Duke Energy Carolinas, LLC ("DE Carolinas" or the "Company") coal-fired generation facility that has been in operation since 1965. Marshall has one impoundment, referred to as the Ash Basin, which was put into service in 1965 to receive sluiced coal combustion residuals ("CCR") from station's coal-fired generation units. Three additional coal-fired units were added in 1966, 1969, and 1970. The Ash Basin consists of a single cell that was impounded by constructing an earthen dike at the historic confluence of Holdsclaw Creek and the Catawba River.

In approximately 1984, Marshall's generation units were converted to produce dry fly ash as a byproduct of burning coal. Subsequently, the Company constructed the Dry Ash Landfill at Marshall to receive the dry fly ash. Phase 1, Cell 1 of the Dry Ash Landfill was completed in approximately 1984 and was closed in 1986. Phase 2 of the Dry Ash Landfill was also completed at the same time as Phase 1 and was closed in 2001. An onsite structural fill area also received dry fly ash from approximately 1999 through 2013. The Ash Basin has only received sluiced bottom ash since 1984.

In 2010, the Company constructed the onsite Industrial Landfill, which was designed for five phases with thirteen separate cells. The Industrial Landfill is permitted to receive fly ash, bottom ash, flue gas desulfurization ("FGD") residuals (i.e. gypsum), and other CCR. Phase 1 is currently in operation with Cells 1, 2, 3 and 4. FGD residuals have also been stored in the FGD Landfill. An aerial image depicting the CCR storage areas ("CCR Units") at Marshall is provided in **Figure 1** below.

Figure 1 – Aerial showing the CCR Units at Marshall

II. Regulatory History

The CCR Units at Marshall have been regulated by a combination of state agencies throughout the operational history of the plant. The North Carolina Department of Environmental Quality ("DEQ") regulated the wet storage of ash in ash basins through the National Pollutant Discharge Elimination System ("NPDES") permit program and the dry storage and beneficial reuse of ash through the state's solid waste permitting program. Power plant dams were regulated by the North Carolina Utilities Commission (the "Commission") until January 1, 2010, when that authority was transferred to DEQ.

Following the Tennessee Valley Authority coal ash spill in 2008, EPA was prompted to assess coal ash impoundments across the country. In 2010, EPA proposed, for the first time, comprehensive regulations and federal minimum standards to address the disposal of CCR. The final CCR Rule was signed in December 2014 and published in April 2015. The CCR Rule applies to and requires the closure of the ash basin at Marshall.

In 2014, the North Carolina General Assembly passed the Coal Ash Management Act ("CAMA") to establish new state standards for the disposal of CCR from coal-fired electric generation facilities. CAMA, and its later amendments, complement and overlap with the federal CCR Rule. DEQ designated Marshall as an "intermediate risk" site. Under CAMA, "intermediate risk" sites are required to be excavated; however, "intermediate risk" sites are eligible for a downgraded risk designation – to "low-risk" – if the Company takes certain actions that are independently required by CAMA, including the provision of a permanent water supply to residents within a half mile and dam repair work. Receiving a "low-risk" classification, in turn, makes the site eligible for cap-in-place closure (or closure-in-place), pending DEQ's approval of the closure plan. In November 2018, DEQ approved the "low-risk" classification for Marshall.

Cap-in-place is the Company's preferred closure method for Ash Basin and FGD Landfill at Marshall, because it is environmentally protective, unobtrusive, and economical. DE Carolinas prepared and submitted to DEQ a comprehensive options analysis for Marshall to compare and contrast the closure methods available for Marshall, including excavation, cap-in-place, or a combination of excavation and cap-in-place. That options analysis supports DE Carolinas' preference for cap-in-place closure at Marshall.

On April 1, 2019, DEQ issued an order requiring DE Carolinas to excavate the ash basins at Marshall ("DEQ Order"). DE Carolinas expected DEQ's closure decision to come in 2020 following the submission of the Company's closure plan for Marshall by the CAMA-imposed deadline of December 31, 2019. The Company disagrees with the DEQ Order and filed an appeal, which is pending before the North Carolina Office of Administrative Hearings. That appeal will ultimately resolve how the ash basin at Marshall will be closed.

III. Site Closure Activities – January 1, 2015 through December 31, 2017

The Company immediately began complying with its new state and federal regulatory requirements affecting its storage of CCR as they became effective. These compliance activities at Marshall included installing and monitoring groundwater wells, connecting neighbors to permanent water supplies, satisfying the CCR Rule's reporting requirements, and stabilizing the Ash Basin dam and constructing an alternate spillway for the Ash Basin. Relating to CCR Unit closure, the Company's activities have been preliminary in nature because, under CAMA, the final closure method is dependent on DEQ's approval, which was not expected until 2020. Those preliminary activities involved preparing engineering reports,

performing engineering planning and design work, and obtaining certain environmental permits that will be necessary to begin closure activities.

The activities described above and costs associated with those activities were the subject of DE Carolinas' 2017 rate case before the Commission (Docket No. E-7, 1146). In that docket, the Commission determined that DE Carolinas' coal ash basin closure costs for Marshall were reasonable, prudent, and recoverable. (*Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction*, Docket No. E7, Sub 1146, pp. 266-269).

IV. Site Closure Activities – January 1, 2018 through January 31, 2020

The Company has continued to meet its compliance obligations under state and federal law and is performing the preliminary work necessary to close the CCR Units at Marshall. Understanding that the closure method for Marshall may not be finalized until 2020, the Company deliberately avoided incurring costs that would be solely related to either cap-in-place or excavation. With limited exceptions, the activities performed since January 1, 2018 and scheduled to be performed through January 31, 2020 would have been required regardless of whether the CCR Units at Marshall were to be capped-in-place or excavated. Those activities include:

- Performing engineering design and site assessments to evaluate closure options;
- Developing and finalizing draft closure plans;
- Operating and maintaining the CCR Units;
- Constructing a lined stormwater retention basin;
- Rerouting stormwater;
- Installing groundwater wells;
- Monitoring and analyzing groundwater samples;
- Installing a geomembrane liner over the FGD Landfill;
- Planning, designing, and installing permanent water supplies to neighbors;
- Constructing a water treatment system to treat the water generated from decanting and dewatering the Ash Basin; and
- Dewatering the Ash Basin.

The tasks that DE Carolinas has performed and will perform from January 1, 2018 through January 31, 2020 are a continuation of the activities for which costs were approved in the prior DE Carolinas rate case. These activities and associated costs continue to be necessary, appropriate, and consistent with applicable regulatory requirements.

I/A

Buck Steam Station
Rowan County, North Carolina

I. Site Details

Buck Steam Station ("Buck") was Duke Energy Carolinas, LLC's ("DE Carolinas" or the "Company") first large capacity coal-fired electric generation station built in the Carolinas. Buck began commercial operations in 1926. All of the coal-fired units at Buck have been retired. The Company currently operates a 620 MW natural gas facility at Buck, which came on line in 2011.

The first coal combustion residuals ("CCR") basin at the Buck Plant, referred to as the Primary Ash Basin, was formed in 1956 by constructing a dam across a tributary to the Yadkin River. In 1977, the Company increased its CCR storage capacity at Buck by raising the main dam that formed the Primary Ash Basin and constructing a divider dam across the basin to create what is referred to as the Secondary Ash Basin. In 1982, DE Carolinas began construction on the Additional Primary Ash Basin to provide more storage for sluiced CCR. In 2009, approximately 200,000 cubic yards of CCR was excavated from the Additional Primary Ash Basin and placed within an onsite dry ash storage area to create additional capacity for sluiced coal ash. DE Carolinas ceased sluicing CCR to the ash basins at Buck in 2013. An aerial view depicting the CCR storage areas ("CCR Units") at Buck is provided in **Figure 1** below.

Figure 1 – Aerial showing the CCR Units at Buck

II. Regulatory History

The CCR Units at the Buck have been regulated by a combination of state agencies over the operational history of the plant. The North Carolina Department of Environmental Quality ("DEQ") regulated the wet storage of ash in ash basins through the National Pollutant Discharge Elimination System ("NPDES") permit program and the dry storage and beneficial reuse of ash through the state's solid waste permitting program. Power plant dams were regulated by the North Carolina Utilities Commission (the "Commission") until January 1, 2010, when that authority was transferred to DEQ.

Following the Tennessee Valley Authority coal ash spill in 2008, EPA was prompted to assess coal ash impoundments across the country. In 2010, EPA proposed, for the first time, comprehensive regulations and federal minimum standards to address the disposal and permanent storage of CCR. The final CCR Rule was signed in December 2014 and published in April 2015. The CCR Rule applies to and requires the closure of the ash basins at the Buck.

In 2014, the North Carolina General Assembly passed the Coal Ash Management Act ("CAMA") to establish new state standards for the disposal of CCR from coal-fired electric generation facilities. CAMA, and its later amendments, complement and overlap with the federal CCR Rule. Buck was originally designated as an "intermediate-risk" site; however, in 2018, DEQ determined that Buck had achieved a "low-risk" ranking.

In 2016, the North Carolina General Assembly passed amendments to CAMA. *See* N.C. Gen. Stat. § 130A309.216. Among other things, the amendments required the Company to select three sites to construct an onsite beneficiation facility capable of processing 300,000 tons of CCR annually. The Company evaluated technologies that were capable of meeting these requirements and selected The SEFA Group's STAR® technology. The Company then selected Buck and Duke Energy Progress, LLC's H.F. Lee Steam Station and Cape Fear Steam Station as the three sites to comply with the CAMA amendments. These sites were selected based on several factors, including the quantity of CCR, the quality of CCR, the proximity of the sites to transportation corridors, and the proximity of the sites to markets for the processed CCR.

III. Site Closure Activities – January 1, 2015 through December 31, 2017

The Company immediately began complying with its new state and federal regulatory requirements affecting its storage of CCR at Buck as they became effective. These compliance activities included installing and monitoring groundwater wells, connecting neighbors to permanent water supplies, satisfying the CCR Rule's reporting requirements, preparing engineering reports, performing engineering planning and design work, developing a closure plan, obtaining certain environmental permits.

The activities described above and costs associated with those activities were the subject of DE Carolinas' 2017 rate case before the Commission (Docket No. E-7, 1146). In that docket, the Commission determined that DE Carolinas' coal ash basin closure costs for Buck were reasonable, prudent, and recoverable. (*Order*

Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction, Docket No. E-7, Sub 1146, pp. 266-269).

IV. Site Closure Activities – January, 2018 through January 31, 2020

As of January 1, 2018, DE Carolinas had already entered into extensive contracts with engineering contractors to perform the necessary site assessments, construct the onsite beneficiation facility, and develop and execute excavation and closure plans. Costs related to those contracts and activities performed pursuant to those contracts through December 31, 2017 have already been approved by the Commission. DE Carolinas has continued its efforts to execute the excavation and closure plans for Buck and to comply with state and federal regulatory requirements.

From January 1, 2018 through January 31, 2020, DE Carolinas has completed or plans to complete the following tasks to support site closure:

- Develop and finalize excavation and closure plans;
- Perform engineering analysis to support closure activities;
- Obtain environmental permits necessary to execute closure and operate the beneficiation facility;
- Construct erosion control measures and a sedimentation basin;
- Install piling and the concrete foundation for the beneficiation facility;
- Install above-grade structures for the beneficiation facility;
- Dewater the ash basins;
- Perform activities to prepare for processing CCR through the beneficiation facility;
- Install and monitor groundwater wells and analyze over 640 groundwater samples;
- Connect neighboring properties to permanent water supplies; and
- Complete dam stability work.
- Constructing a water treatment system to treat the water generated from decanting and dewatering the Ash Basins; and
- Dewatering the Ash Basins.

The tasks that DE Carolinas has performed and will perform from January 1, 2018 through January 31, 2020 are a continuation of the activities for which costs were approved in the prior DE Carolinas rate case. These activities and associated costs continue to be necessary, appropriate, and consistent with applicable regulatory requirements.

Buck Steam Station

Coal Ash Excavation Plan

DUKE ENERGY®

2018

Contents

Exhibits

I. Statement of Purpose

Pursuant to N.C.G.S. § 130A-309.214, Duke Energy Carolinas, LLC (Duke Energy or the Company) is required to close the three coal combustion residuals (CCR) surface impoundments (Ash Basins or Basins) located at the Buck Steam Station (Buck or Plant) by a date to be determined pursuant to N.C.G.S. § 130A-309.213.

Buck was chosen on October 5, 2016, as an ash beneficiation site required by NC House Bill 630. Pursuant to NC House Bill 630, 300,000 tons of ash from the site must be beneficiated to specifications appropriate for cementitious products each year. NC House Bill 630 also requires that sites with ash beneficiation products shall be closed no later than December 31, 2029.

Duke Energy is further directed by the Settlement Agreement and Release in *Yadkin Riverkeeper, Inc. and Waterkeeper Alliance, Inc. v. Duke Energy Carolinas, LLC*, Case No. 1:14-cv-753 to complete excavation of the Buck Basins by the statutory deadline.

This Coal Ash Excavation Plan (Plan) represents activities to satisfy the requirements outlined in N.C.G.S. § 130A-309.214 and the direction set forth in the NC Department of Environment Quality's (NCDEQ) November 4, 2016 letter and attachment titled "CCR Surface Impoundment Closure Guidelines for Protection of Groundwater" (NCDEQ Guidelines).

The NCDEQ Guidelines specifically require the following:

> *A stand-alone Excavation Soil Sampling Plan (Plan) generated for closure of a CCR surface impoundment shall be developed to ensure the proposed excavation design is comprehensive enough in scope to meet the performance standards for closure. This Plan shall be submitted to DEQ as part of an Excavation Plan, with details to show how the sample analytical results and related modeling will incorporate the data collected as part of the final overall closure plan for approval, as dictated by §130A-309.214.*

This Plan provides the general scope of work, schedule milestones, permitting requirements, dewatering, excavation, transportation, and beneficial use of the ash from Buck. This Plan is also being prepared and provided pursuant to NCDEQ request in its letter dated October 31, 2017 with subject "*Clarification on Excavation Plan Submittals.*" No future updates to this Plan are intended. Duke Energy will prepare and submit its proposed Coal Combustion Residuals Surface Impoundment Closure Plan (Closure Plan) for Buck no later than the deadline set out in N.C.G.S. § 130A-309.214, as determined pursuant to the process set out in N.C.G.S. § 130A-309.213.

The scope of work in excavating the Ash Basins has been determined by applicable laws, rules, permits, and approvals that control the activities to be performed under the Plan. The Act contains no requirement for the submittal of an excavation plan of the kind presented here. Thus, while the development of this Plan will assist in Duke Energy's work to close the Ash Basins, its approval is an action not specifically required by statutory, regulatory, or other applicable

authority. The submittal of this Plan notwithstanding, external and internal factors, including site-specific considerations, may affect the work performed under the Plan. Accordingly, Duke Energy submits this Plan to NCDEQ with the proviso that it may be necessary to take actions that deviate from the Plan, and the Company reserves the right to make such changes.

II. General Facility Description

Buck is located in Salisbury, North Carolina on the Yadkin River. The six-unit plant began operation in 1926 with two units, added a unit in 1941, another in 1942, and the final two in 1953. At its peak, the generating facility had a capacity of 440 megawatts. Units 1 and 2 were retired in 1979. In May 2011, Units 3 and 4 were retired, and in April 2013, Units 5 and 6 were retired.

The CCR from Buck's coal combustion operations was historically processed into one of three Ash Basins located on the property. Buck has been decommissioned, thus no active ash placement or sluicing is occurring within the Ash Basin system.

Duke Energy's Coal Combustion Residuals Removal Verification Procedure (Removal Verification Procedure) will be used to verify that primary source ash has been removed from the Basins. Subsequent to removal of the ash pursuant to the Removal Verification Procedure, Duke Energy will implement its Excavation Soil Sampling Plan (ESSP), which was developed for the purpose of meeting the applicable performance standards. Although not required under the Coal Ash Management Act of 2014, as amended by NC House Bill 630, Sess. L. 2016-95 (CAMA, Coal Ash Act, or Act), NCDEQ Guidelines published in November 2016 provide that an ESSP should be submitted to NCDEQ as part of a site's excavation plan. In accordance with this request, a copy of the ESSP is attached as **Exhibit "A"** to this Plan.

Ash Basin System Information

The 150-acre Ash Basin system at Buck consists of three Basins, associated earthen dikes, discharge structures, and two canals. The Basins are designated as Primary Pond (also referred to as Basin 2 – 57.5 acres), the Additional Primary Pond (also referred to as Basin 1 – 71 acres), and the Secondary Pond (also referred to as Basin 3 – 21.5 acres). The Ash Basin system operates under NPDES Permit No. NC0004774. All three of the Basins are subject to the CCR rule and CAMA.

Basin 1 contains approximately 3.6 million tons of ash, Basin 2 contains approximately 2 million tons of ash, and Basin 3 contains approximately 864,000 tons of ash. An ash fill area also exists, containing approximately 235,200 tons of ash.

Construction on the original Ash Basin adjacent to the Yadkin River began in 1956. Over the years, several modifications were added to increase the storage capacity. In 1977, the eastern portion of the main dam was increased by 10 feet, and a divider dam was added to divide the Ash Basin into a Primary Pond (Basin 2) and a Secondary Pond (Basin 3). In 1982, construction

began on the Additional Primary Ash Basin (Basin 1) located upgradient of Basins 2 and 3 to provide additional capacity for sluiced CCR. The construction included the Additional Primary Dam, a canal leading from Basin 1 to Basin 2, and the Basin 1 to Basin 2 dam and associated discharge structure. The CCR slurry pipes were relocated from Basin 2 to the northeast corner of Basin 1 after construction.

There are five dams regulated by the NCDEQ Dam Safety Program that are associated with the Buck Ash Basin complex. The Basin 2 and 3 Main Dam (ROWAN-047) has a design crest Elevation of approximately 690 feet for Basin 2 and a design crest elevation of approximately 680 feet for Basin 3. The maximum structure height is approximately 70 feet, with a crest length of approximately 1400 feet and a crest width of approximately 15 feet.

The Basin 1 Additional Primary Dam (ROWAN-068) has a design crest elevation of approximately 710 feet. The maximum structure height is approximately 72 feet, with a crest length of approximately 2000 feet and a crest width of approximately 10 feet.

The Basin 1 to Basin 2 Dam (ROWAN-069) has a design crest elevation of approximately 710 feet. The maximum structure height is approximately 25 feet, with a crest length of approximately 280 feet and a crest width of approximately 20 feet.

The Basin 2 to Basin 3 Dam (ROWAN-070) has a design crest Elevation of approximately 690 feet. The maximum structure height is approximately 20 feet, with a crest length of approximately 130 feet and a crest width of approximately 15 feet.

The Basin 2 and 3 Divider Dam (ROWAN-071) has a design crest Elevation of approximately 690 feet. The maximum structure height is approximately 10 feet, with a crest length of approximately 1400 feet and a crest width of approximately 15 feet.

In 2016, Duke Energy permanently removed the original riser outfall structure from service and installed a new alternative spillway from Basin 3 discharging into the unnamed cove off the Yadkin River (NPDES Outfall 002). In 2017 Duke Energy sought a new NPDES Outfall 007 discharging directly from Basin 3 into the main body of the Yadkin River. This new NPDES Outfall (007) was installed during 2018.

III. Project Scope

Buck was chosen on October 5, 2016, as an ash beneficiation site required by NC House Bill 630. Excavation of ash from the Buck site for beneficial use will occur over multiple years. Activities started in April 2017 and will continue until approximately February 2031, including final site restoration. The proposed ash excavation for beneficial use is planned in multiple phases. The estimated scope of work under each phase is presented below. Phase I primarily consists of obtaining required permits, development of site infrastructure, and equipment mobilization. During the subsequent phase(s), ash will be safely excavated from the Basins concurrently with dewatering and maintaining the infrastructure. Approximately 430,000 tons of ash per year will

be excavated from the Basins and hauled to the ash processing unit. The final phase of the project will include dam breach and decommissioning, as well as site restoration and closeout.

Phase I Scope

1. Submit and obtain necessary permits for Phase I activities
2. Install Erosion and Sediment Control (E&SC) measures
3. Construct haul roads within and outside of the Ash Basins
4. Construct truck staging areas
5. Construct pump station for water trucks to control dusting
6. Clear vegetation from within the Ash Basins
7. Install drainage features and detention sumps within the Ash Basins
8. Obtain power to the Ash Basins
9. Install a wheel wash station
10. Install ash screening equipment within the Ash Basins
11. Construct stockpile and load out areas within the Ash Basins
12. Mobilize ash excavation and processing equipment

Subsequent Phase(s) Scope

1. Submit and obtain any additional permits
2. Excavate and transport ash from the Ash Basins for beneficial use
3. Maintain Erosion and Sediment Control measures
4. Relocate haul roads, working pads, screening locations, etc. within the Ash Basins as work progresses
5. Install and operate interstitial water treatment (if required)
6. Following ash beneficiation, excavate and haul any remaining ash to a permitted CCR landfill
7. Gain knowledge and opportunities for continuous program improvement
8. Complete the ESSP and confirm closure by removal
9. Complete closure activities for the Ash Basins as outlined in Sections 3.(a) and 3.(b) of the Coal Ash Act, as amended by NC House Bill 630
10. Complete dam breach and dam decommissioning
11. Complete site restoration and project closeout

IV. Critical Milestone Dates

Critical milestones within the Plan are summarized in the table below.

MILESTONE	TARGET DATE	STATUS
Site Selected for Beneficial Reuse pursuant to NC House Bill 630	10/05/2016 (A)	Complete
Mobilization for Beneficiation Plant Construction	05/30/2018 (A)	Complete
Stopping Discharge of Conveyed Stormwater into Basins	12-31-2018	On Track
Begin Ash Basin Decanting (Special Order by Consent)	Q1 2019	On Track
Submit CAMA Closure Plans	Q4 2019	On Track
Begin Ash Basin Excavation and Stockpiling for Beneficiation Plant Feed	Q3 2019	On Track
Complete Beneficiation Plant Construction and Commissioning	Q1 2020	On Track
Complete Ash Basin Decanting (Special Order by Consent)	Q1 2020	On Track
Beneficiation Plant Placed In-Service	Q2 2020	On Track
Begin Hauling to a Permitted CCR Landfill (In parallel due to CAMA time constraints)	Q1 2024	On Track
Complete Hauling to a Permitted CCR Landfill	Q3 2029	On Track
Complete Ash Basin Excavation	Q3 2029	On Track
Complete Beneficiation Plant Operations	Q4 2029	On Track
Complete Closure per CAMA/NC House Bill 630	Q4 2029	On Track
Complete Final Site Restoration	Q1 2031	On Track

V. Erosion and Sediment Control Plan

The E&SC plans for the excavation of the Ash Basins will be developed and submitted to NCDEQ at a later date. Modifications to E&SC plans for subsequent phase(s) will be approved by NCDEQ prior to installation and initiation of subsequently phase work. The approved contractor will install the E&SC measures indicated in the plans. All control measures will be maintained through the project in accordance with the E&SC plans. When possible, portions of the E&SC plans will be closed out at the approval of NCDEQ as areas become stabilized.

VI. Dewatering Plan

Decanting is currently scheduled to begin in January 2019 and targeted to complete by Q1 2020. Upon completion, additional maintenance decanting will be performed as needed to maintain the Basin in a decanted state.

Management of contact and interstitial water during the initial phase will be performed, to the extent possible, within the Ash Basins and through diversion and the conditioning of ash. Moisture conditioning will be achieved through windrowing and tilling to facilitate evaporation, infiltration, and gravity drainage of water. Basin water will be re-used for dust control within the Ash Basins. Dewatering and interstitial water treatment (if required) will be managed in accordance with the NPDES permit.

VII. Location(s) for Removed Ash

The Plan includes the excavation of approximately 6.7 million tons of ash from the Ash Basins. Ash removed from the site is being beneficiated by SEFA, with whom Duke Energy has entered into an agreement to process and sell ash from the Buck Ash Basins for use in the concrete industry. It is currently estimated that approximately 4.3 million tons of ash will be beneficiated, with the remaining 2.4 million tons to be placed into a permitted CCR landfill. Pursuant to NC House Bill 630, 300,000 tons of ash from the site must be beneficiated to specifications appropriate for cementitious products each year. NC House Bill 630 also requires that sites with ash beneficiation projects be closed no later than December 31, 2029.

VIII. Transportation Plan

Beneficiated ash becomes the property of SEFA when SEFA's trucks are loaded at the sale silo after processing. Output from the sale silo will average 40-60 truckloads daily. For ash that is not processed through the reprocessing unit, ash will be loaded onto trucks and sent to a permitted CCR landfill. Ownership of the ash will transfer to a third-party vendor when the trucks are loaded at the site. A more detailed transportation plan will be developed in the future.

IX. Environmental and Dam Safety Permitting Plan

NCDEQ has indicated that an NPDES Industrial Stormwater Permit is required to transport ash. The Company will pursue an Individual or General Industrial Stormwater Permit to support ash removal and beneficiation at the site. Pursuant to the requirements of the Industrial Stormwater Permit, a Stormwater Pollution Prevention Plan (SPPP) incorporating best management practices will be created and implemented. Future modifications to the permit/plan will be managed as necessary. Buck will hold applicable Construction Stormwater Permits for ash removal, if required

Contact and/or interstitial water that is encountered will be managed in accordance with the NPDES Permit. An updated NPDES Wastewater Permit application was submitted on February 26, 2016 to facilitate the closure of the Ash Basins. The Buck Site received a NPDES Wastewater Permit on September 18, 2018, effective on November 1, 2018. Decanting, dewatering, and ash beneficiation are included in the NPDES Wastewater Permit.

There could be impacts to jurisdictional wetlands/streams associated with the removal of dams from the Ash Basins. During the final phase, dam breach and dam decommissioning, further evaluation will be required to determine if there will be any wetlands impacts. Buck ash is a non-hazardous material.

All necessary Dam Safety approvals will be or have been obtained to cover activities on or around jurisdictional dams. Breaching of the dam will require Dam Safety approval. Any impacted wells or piezometers will be abandoned in accordance with NCDEQ requirements. Fugitive dust will be managed to mitigate impacts to neighboring areas. Additional site specific or local requirements will be secured, as needed.

Permit Matrix

MEDIA	PERMIT	RECEIVED DATE (R) TARGET DATE (T)	COMMENTS
Water	NPDES Wastewater Permit	November 1, 2018 (R) (effective date)	Required for Decanting / Dewatering
	Well Abandonment	TBD	To be determined following Closure Plan approval
	Industrial Stormwater	Q2 2019 (T)	Required for ash hauling
Dam Safety	Ash Basin Dam Decommissioning Request Approval	Q1 2030 (T)	None

Land Quality	Erosion & Sediment Control	July 6, 2018 (R)	Phase I of beneficiation facility
Other Requirements	Site-specific Nuisance/Noise/ Odor/Other Requirements, including DOT Requirements	TBD	

X. Contracting Strategy

The Ash Management Program strategy is to engage multiple contractors, drive competition, create systemwide innovation, and develop a collection of best practices. Duke Energy has engaged contractor(s) who are experienced in coal ash excavation, transportation and disposal, and continues to evaluate other potential contractors. The Company provides in-depth oversight, coordination, and monitoring of the contractors to ensure the work is performed appropriately. Duke Energy's core values include safety, quality, and protection of the environment, which are incorporated into our contracts. The Company continues to evaluate alternate approaches, methods, and contracting solutions and will adjust its strategy, as necessary.

XI. Environmental, Health, and Safety Plan

The Company is committed to the health, safety, and welfare of employees, contractors, and the public, and to protecting the environment and natural resources. During all phases of the project work, the Company and its contractors will follow the Duke Energy Safe Work Practices Manual, the Environmental, Health & Safety supplement document, and any additional requirements. Occupational health and safety expectations include oversight and continuous improvement throughout the project. The project includes comprehensive environmental, health, and safety plans encompassing all aspects of the project work. In addition to adhering to all applicable environmental, health, and safety rules and regulations, Duke Energy and its contractors will focus on ensuring the safety of the public and protection of the environment during each phase of the project.

XII. Communications Plan

The project team will continue to coordinate with Duke Energy's Corporate Communications Department to develop a comprehensive external communications plan tailored to the specific needs of each phase of the project. Many different external stakeholders, including neighbors, government officials, and media have an interest in this project. The Company is committed to

providing information by proactively communicating about the project activities to potentially affected parties and responding to inquiries in a timely manner.

XIII. Glossary

TERM	DEFINITION
Ash Basin	Synonymous with Coal Combustion Residual Impoundment. A topographic depression, excavation, or dammed area that is primarily formed from earthen materials; without a base liner approved for use by Article 9 of Chapter 130A of the North Carolina General Statutes or rules adopted thereunder for a combustion products landfill or coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill; and an area that is designed to hold accumulated coal combustion residuals in the form of liquid wastes, wastes containing free liquids, or sludge, and that is not backfilled or otherwise covered during periods of deposition.
Beneficial Use	Projects promoting public health and environmental protection, offering equivalent success relative to other alternatives, and preserving natural resources
Bottom Ash	The agglomerated, angular ash particles formed in pulverized coal furnaces that are too large to be carried in the flue gases and collect on the furnace walls. Bottom ash falls through open grates to an ash hopper at the bottom of the furnace.
Coal Ash Excavation Plan	Plan requested by NCDEQ pursuant to its issuance of CCR Surface Impoundment Closure Guidelines for Protection of Groundwater on November 4, 2016.
Coal Ash Management Act	North Carolina Session Law 2014-122 (as amended by NC House Bill 630, Sess. L. 2016-95)
Coal Combustion Residuals (CCR)	Residuals, including fly ash, bottom ash, boiler slag, mill rejects, and flue gas desulfurization residue produced by a coal-fired generating unit
Decanting	The act of removing bulk / free water from the Ash Basin
Dewatering	The act of removing entrapped/interstitial water from the ash
Duke Energy Safe Work Practices Manual	Document detailing the Duke Energy safety guidelines
Entrapped Water	Flowable water below the ash surface, which creates hydrostatic pressure on the dam

Excavation Plan	Refer to Coal Ash Excavation Plan
Fly Ash	Very fine, powdery material, composed mostly of silica with nearly all particles spherical in shape, which is a product of burning finely ground coal in a boiler to produce electricity and is removed from the plant exhaust gases by air emission control devices.
NPDES	National Pollutant Discharge Elimination System
NPDES Permit	A permit that regulates the direct discharge of wastewater to surface waters
Permit	Federal, state, county, or local government authorizing document

XIV. Reference Documents

REF	DOCUMENT	DATE
1	Coal Ash Management Act, as amended by NC House Bill 630, Sess. L. 2016-95	July 14, 2016
2	Settlement Agreement and Release *Yadkin Riverkeeper, Inc. and Waterkeeper Alliance, Inc. v. Duke Energy Carolinas, LLC* Case No. l:14-cv-753	September 28, 2016
3	CCR Surface Impoundment Closure Guidelines for Protection of Groundwater	November 4, 2016
4	NCDEQ Letter with subject Clarification on Excavation Plan Submittals	October 31, 2017

Dan River Steam Station
Rockingham County, North Carolina

I. Site History

The Dan River Steam Station ("Dan River Station") was a Duke Energy Carolinas, LLC ("DE Carolinas" or the "Company") coal-fired generation station that began operations in 1949. The Company operated three coal-fired units at the station, which were retired in 2012. The coal-fired units have been replaced with a 620-MW natural gas facility.

Coal combustion residuals ("CCR") from the coal-fired units were stored onsite in four areas: Primary Ash Basin, Secondary Ash Basin, Ash Fill 1, and Ash Fill 2 (collectively, the "CCR Units"). The single ash basin at the Dan River Station was constructed in 1956 to receive sluiced coal combustion residuals ("CCR") for storage and disposal. In 1968, the Company expanded the original ash basin to cover the area later occupied by the Primary and Secondary Ash Basins. Approximately eight years later, the Company modified the original basin to form the two basins known as the Primary and Secondary Ash Basins. These modifications were made to increase the storage capacity at the site and to improve the water quality of the effluent being discharged from the basins. In 1980, the Company constructed two onsite dry storage areas, Ash Fill 1 and Ash Fill 2, north of the Primary and Secondary Ash Basins. These ash fill areas served as a place for ash to be relocated from the Primary and Secondary Basins to extend their service life. An aerial view of the Dan River Station that shows the locations of the CCR Units is provided in **Figure 1** below.

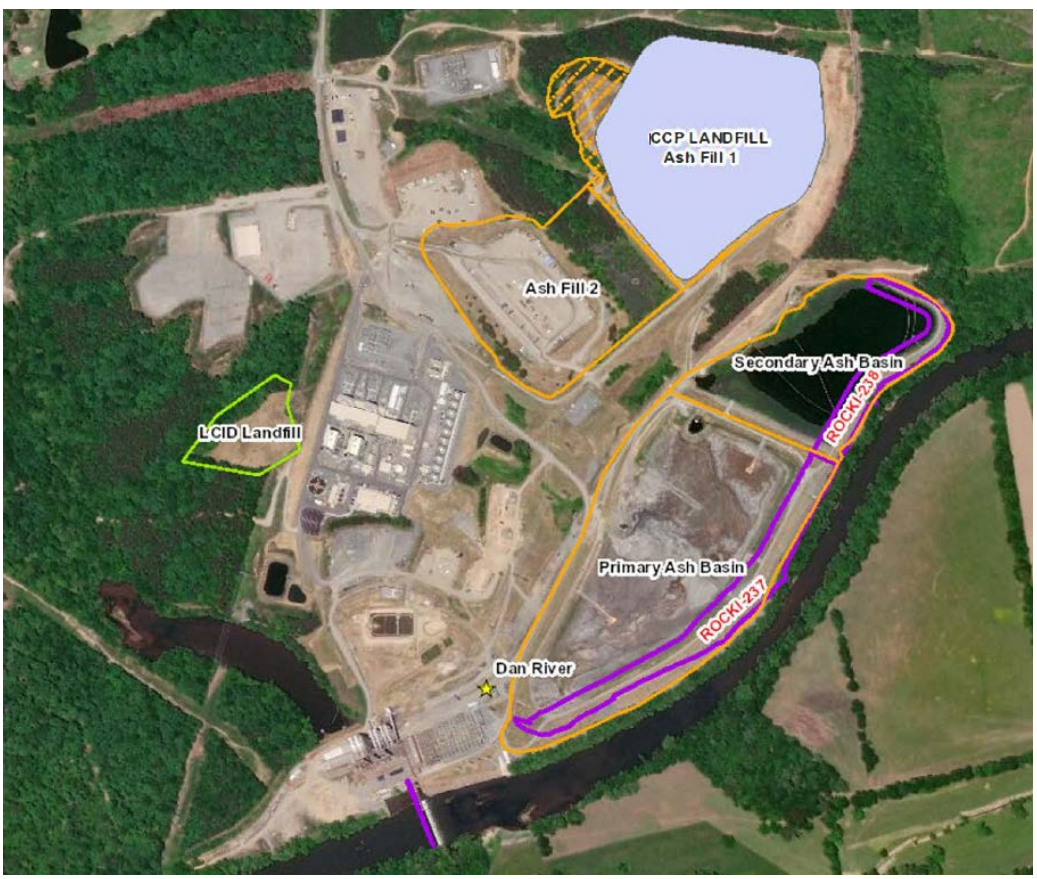


Figure 1 – Aerial showing the CCR Units at Dan River

II. Regulatory History

The CCR Units at the Dan River Station have been regulated by a combination of state agencies during the operational history of the plant. The North Carolina Department of Environmental Quality ("DEQ") regulated the wet storage of ash in ash basins through the National Pollutant Discharge Elimination System ("NPDES") permit program and the dry storage and beneficial reuse of ash through the state's solid waste permitting program. Power plant dams were regulated by the North Carolina Utilities Commission (the "Commission") until January 1, 2010, when that authority was transferred to DEQ.

Following the Tennessee Valley Authority coal ash spill in 2008, EPA was prompted to assess coal ash impoundments across the country. In 2010, EPA proposed, for the first time, comprehensive regulations and federal minimum standards to address the disposal and permanent storage of CCR. The final CCR Rule was signed in December 2014 and published in April 2015. The CCR Rule applies to and requires the closure of the ash basins at the Dan River Station.

In 2014, the North Carolina General Assembly passed the Coal Ash Management Act ("CAMA") to establish new state standards for the disposal of CCR from coal-fired electric generation facilities. CAMA, and its later amendments, complement and overlap with the federal CCR Rule. CAMA designated Dan River as a "high priority site" and required that its ash impoundments be closed by August 1, 2019.

III. Site Closure Activities – January 1, 2015 through December 31, 2017

The Company began closure activities at Dan River in response to the new federal and state requirements. Those activities included:

- Selecting location(s) for disposal of excavated ash;
- Developing closure plans and other engineering reports;
- Obtaining environmental permits from State and Federal agencies;
- Installing erosion and sediment control measures;
- Installing groundwater monitoring wells;
- Constructing site infrastructure for loading rail cars, trucks and hauling CCR;
- Dewatering the Primary and Secondary Ash Basins;
- Rerouting inflows away from the ash basins;
- Developing and constructing the onsite CCR landfill; and
- Excavating ash from the Primary Ash Basin, Secondary Ash Basin, and Ash Stack areas.

The activities described above and costs associated with those activities were the subject of DE Carolinas' 2017 rate case before the Commission (Docket No. E-7, 1146). In that docket, the Commission determined that DE Carolinas' coal ash basin closure costs for the Dan River Station were reasonable, prudent, and recoverable. (*Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction*, Docket No. E-7, Sub 1146, pp. 266-269).

IV. Site Closure Activities – January 1, 2018 through January 31, 2020

As of January 1, 2018, DE Carolinas had already entered into extensive contracts with engineering and construction contractors to perform the necessary site assessments, develop excavation and compliance plans, and to excavate and transport the CCR for permanent disposal. Costs related to those contracts and activities performed pursuant to those contracts through December 31, 2017 have already been approved by the Commission. DE Carolinas has continued its efforts to execute the excavation and closure plans for the Dan River Station and comply with state and federal regulatory requirements.

From January 1, 2018 through January 31, 2020, DE Carolinas has completed or is scheduled to complete the following tasks:

- Dewater the basins, including interstitial water;
- Excavate all remaining CCR from the Primary and Secondary Ash Basins – approximately 1,507,200 tons through May 20, 2019;
- Dispose of remaining CCR from the Primary and Secondary Ash Basins in the on-site landfill;
- Transport a portion of CCR and other materials offsite;
- Construct, operate, and close cells in the on-site landfills;
- Install an ultrafiltration system to pretreat wastewater that is sent to the City of Eden's publicly owned treatment works consistent with DE Carolina's industrial use permit;
- Install additional wastewater treatment equipment to pretreat water discharged through the site's NPDES outfall;
- Install and monitor groundwater wells and analyze samples; and
- Decommission and grade the ash basin dams to meet post-closure dam safety requirements.

The tasks that DE Carolinas has performed and will perform from January 1, 2018 through January 31, 2020 are a continuation of the activities for which costs were approved in the prior DE Carolinas rate case. These activities and associated costs continue to be necessary, appropriate, and consistent with applicable regulatory requirements.

SITE ANALYSIS AND REMOVAL PLAN

DAN RIVER STEAM STATION

REVISION 1

Prepared for

DUKE ENERGY

Duke Energy
550 South Tryon Street
Charlotte, North Carolina 28202

April 2017

Prepared by

amec foster wheeler

Amec Foster Wheeler Environment & Infrastructure, Inc.
Project No. 7810140065.09

NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER KENNETH R. DALY

4/6/17

Dan River Steam Station

Coal Ash Excavation Plan

2018 Update

Table of Contents

Exhibits

I. Statement of Purpose

Duke Energy Carolinas, LLC (Duke Energy or the Company) is required by Part II, Section 3(b) of the Coal Ash Management Act of 2014 (Session Law 2014-122) (Coal Ash Act or Act) to close, in accordance with Part II, Section 3(c), the coal combustion residuals (CCR) surface impoundments located at the Dan River Combined Cycle Plant (Dan River or Plant), National Pollutant Discharge Elimination System (NPDES) Permit No. NC0003468, in Rockingham County as soon as practicable, but not later than August 1, 2019.

This Coal Ash Excavation Plan (Plan) represents activities to satisfy the requirements outlined in Part II, Sections 3(b) and 3(c), Subparagraphs 1 and 2 of the Act and the requests set forth in the North Carolina Department of Environmental Quality's (NCDEQ) August 13, 2014 letter titled "Request for Coal Ash Excavation Plans for Asheville Steam Station Electric Generating Plant, Dan River Combined Cycle Station, Riverbend Steam Station, L.V. Sutton Electric Plant" (NCDEQ Letter). The NCDEQ Letter specifically requests that the Plan include 1) soil and sediment erosion control measures, 2) dewatering, and 3) the proposed location(s) of the removed ash. These requirements are found in this updated Plan.

This is a revision of the Coal Ash Excavation Plan updated December 1, 2017, which covered the subsequent phase of ash basin excavation activities, including basin dewatering, site preparation, ash basin preparation, and ash removal from the basins at Dan River. The Plan has been updated and submitted to NCDEQ annually; however, due to the anticipated completion of ash basin excavation activities by the applicable CAMA deadline, no further updates will be made to the Plan.

The Plan covers some of the work required by Part II, Sections 3(b) and 3(c) of the Coal Ash Act. The Act requires the closure of the ash basins as soon as practicable, but no later than August 1, 2019. However, the Act contains no requirement for the submittal of an excavation plan of the kind presented here. Thus, while the formulation, submittal, and review of this Plan will assist in Duke Energy's work to close the ash basins, its ultimate approval is an action not specifically required by statutory, regulatory, or other applicable authority.

The scope of work in excavating the ash basins has been determined by applicable laws, rules, permits, and approvals that control the activities to be performed under the Plan. There are several external and internal factors that could potentially affect the precise scope of the work to be performed under the Plan. As a consequence, neither the submittal of this Plan nor its acknowledgement by NCDEQ should be taken as requiring actions different from such applicable requirements. Duke Energy submits this Plan to NCDEQ based on the understanding that it may be necessary to take actions that deviate from the Plan in the future, and the Company reserves the right to make such changes.

II. General Facility Description

The Dan River Steam Station is located in Rockingham County near Eden, NC. The Plant operated from 1949 until retirement of the coal-fired units in 2012. Upon retirement of the coal-fired units, a new 620 MW gas-fired unit began operations.

The Primary Ash Basin was constructed in 1956, with an embankment crest elevation of 523.5 feet mean sea level (msl). In 1968, the basin embankment crests were raised to elevation 530 feet msl and extended in length approximately 1,200 feet east along the Dan River. An intermediate dike was constructed in 1976, resulting in two basins, with the Primary Ash Basin dam crest being raised to elevation 540 feet msl. The east side of the basin was designated the Secondary Ash Basin. The Primary Ash Basin was periodically dredged and the material dry-stacked on higher terrain north of the basins (referred to as dry ash stacks). The dam numbers for the ash basins are (ROCKI-237) and (ROCKI-238.) The dry ash stacks have been capped with soil.

Duke Energy's Coal Combustion Residuals Removal Verification Procedure (Removal Verification Procedure) will be used to verify that primary source ash has been removed from the basin. Subsequent to removal of the ash pursuant to the Removal Verification Procedure, Duke Energy will implement its Excavation Soil Sampling Plan (ESSP), which was developed for the purpose of meeting the applicable performance standard. Although not required under CAMA, in November 2016, NCDEQ sent Coal Combustion Residuals Surface Impoundment Closure Guidelines for Protection of Groundwater to Duke Energy instructing the Company to submit the ESSP to NCDEQ as part of the site's excavation plan. In accordance with this directive, a copy of the ESSP is attached as **Exhibit "A"** to this Plan.

Primary Ash Basin

The Primary Ash Basin at Dan River consists of a composite dam made up of local borrow materials, including silty sands and sandy silts with some clay. Portions of the dam may have been built on, or contain, ash materials. The eastern face of the embankment is armored with rock up to elevation 512 feet msl. A rock fill berm was constructed alongside the river, up to elevation 503 feet msl. An intermediate bench was constructed at approximate elevation of 530 feet msl. The primary basin has an approximate footprint of 39 acres with a surface water area of 18 acres. The Primary Ash Basin received sluiced ash from pipes in the southwest corner and outlets into the Secondary Ash Basin through a decant structure located near the northeast corner of the Primary Ash Basin. Initially, the Primary Ash Basin contained approximately 1,215,000 tons of CCR material. In September 2018, the CCR inventory of the Primary Basin was increased by 552,000 tons due to quantifying CCR material under vertical expansion embankment soil, incorporating revised bottom of ash floor grades, and including estimated soil waste.

Intermediate Dike
(Separates the Primary Ash Basin and the Secondary Ash Basin)

The intermediate dike was constructed in 1976, bisecting the basin into Primary and Secondary Ash Basins. The dike was constructed on existing ash deposits, with an upper crest elevation of 540 feet msl adjacent to the Primary Ash Basin and a lower crest elevation of 530 feet msl adjacent to the Secondary Ash Basin. The dike has a surface road at the 540 feet msl level. It has a vegetated slope adjacent to the road, which extends to a 530 feet msl elevation shelf adjacent to the Secondary Ash Basin. A rock buttress was constructed below the elevation 530 feet msl crest. The width of the intermediate dike is approximately 100 feet.

Secondary Ash Basin

The Secondary Ash Basin embankments, including the intermediate dike forming the southwest boundary, have a crest elevation of 530 feet msl and are constructed of the same local materials as the Primary Ash Basin. The eastern face of the embankment is armored with rock up to elevation 512 feet msl. A rock fill berm was constructed alongside the river, up to elevation 503 feet msl. The basin receives decanted flow from the Primary Ash Basin in the northwestern corner, and flows exit the basin through a decant structure near the southeastern corner. Flow from the Secondary Ash Basin is regulated by NPDES Permit No. NC 0003468. The pool level is controlled by the decant riser using concrete stop-logs and conveys to the outlet through a 36-inch diameter reinforced concrete pipe constructed through the embankment dike. Initially, the Secondary Ash Basin contained approximately 390,000 tons of CCR material.

Ash Stacks

The dry ash stacks are located to the north of the Primary and Secondary Ash Basins. These ash stacks consist of CCR material dredged from the Primary Ash Basin. Initially, Ash Stack 1 and Ash Stack 2 contained approximately 950,000 tons and 415,000 tons of CCR material, respectively. For the purposes of stormwater management, the ash stacks are located within the ash basin system. Stormwater run-off from the ash stacks is contained within the ash basin system and flows to the Secondary Ash Basin. The excavation of all CCR from Ash Stack 1 was completed on July 27, 2017.

III. Project Charter

Dewatering of the ash basins and the removal of ash from the site will be performed in project phases. As of November 1, 2018, approximately 2.67 million tons of ash have been excavated. Approximately 1.2 million tons were transported to an off-site landfill. Approximately 106,560 tons were sent to the Roanoke Cement Company for beneficial use and the remainder to an on-site landfill. This project has completed Phase I and is now implementing Phase II.

The following items in Phase I have been completed or initiated:

1. Developed and installed approved erosion and sediment control measures.
2. Obtained applicable permits for work in Phase I.
3. Completed the work scope and bid event to support ash basin closure.
4. Developed and constructed the infrastructure to remove and transport the ash.
5. Completed rail load out spur for rail transportation.
6. Began bulk dewatering of the Secondary Ash Basin.
7. Initiated and completed the removal of the first 1 million tons of ash from the Dan River site.
8. Obtained a Permit to Construct the new on-site landfill on October 27, 2016, following resolution of the environmental justice review.
9. Commenced construction of an on-site landfill.
10. Completed a plan to reroute and eliminate inflows to the ash basins.
11. Validated production rates to meet project requirements.
12. Planned activities for subsequent phase(s), including development of option(s) for beneficial use or proposed ash disposal location(s).

The Dan River NPDES wastewater permit was issued and became effective on December 1, 2016. The removal of bulk free water of the Secondary Basin was completed when the basin water level was lowered to elevation 515 feet msl in 2016. Interstitial dewatering commenced in 2018 to support excavation in the Secondary and Primary Basins and is on-going. All leachate and contact stormwater wastewater treatment will be performed by the City of Eden's Publicly Owned Treatment Works (POTW) in accordance with the Industrial User Pre-treatment Permit issued to Duke Energy by the City of Eden. To provide additional wastewater treatment capability, an on-site treatment system is being installed, which will send treated water to the discharge point of Outfall 002. The Secondary Basin riser structure and the pipe leading to Outfall 002 was plugged with grout on September 6, 2018.

The excavation of Ash Stack 1 began on October 13, 2015, following acknowledgement of this Plan by NCDEQ and the receipt of final permits. Phase I was completed on March 23, 2017. Phase II will include completion of the on-site landfill and excavation of the basins to the on-site landfill. Construction of an on-site landfill began on October 31, 2016, following receipt of the Landfill Permit-to-Construct by NCDEQ.

In accordance with the project plan, during Phase I, the Company removed ash to an off-site location while simultaneously developing an on-site landfill, which was needed in order to meet the closure requirements mandated in the Coal Ash Act. The Company received a Permit-to-Operate (PTO) for the first landfill cell on May 30, 2017, and promptly began transporting ash to the on-site landfill. The PTO for the second landfill cell was

received on October 2, 2017, and the final PTO for the third landfill cell was received on April 18, 2018.

Project Charter Objectives

Phase II Objectives

1. Submit and obtain any necessary permits for Phase II activities.
2. Continue to dewater the ash basins.
3. Construct, operate, and close cells for the on-site landfill.
4. Excavate and remove the remaining ash from ash basins and ash stacks.
5. Continue evaluating beneficial use opportunities.
6. Gain knowledge and opportunities for program improvement that can be applied to other Duke Energy projects.

Project Charter Scope

Phase II Scope

1. Submit and obtain applicable permits
2. Complete construction of the on-site landfill (Cells 1 & 2 complete).
3. Receive PTOs for the on-site landfill cells (PTOs received for Cells 1 & 2).
4. Excavate and transport the remaining ash from the Dan River Station to the on-site landfill or for off-site reuse options.
5. Continue dewatering of the Primary and Secondary Ash Basins.
6. Complete closure activities.
7. Operate and close cells for the on-site landfill.

IV. Critical Milestone Dates

Critical Milestones within the Plan are summarized in the table below.

MILESTONES	NO LATER THAN DATE	STATUS
Submit Excavation Plan to NCDEQ	November 15, 2014	Completed November 13, 2014
Complete Comprehensive Engineering Review	November 30, 2014	Completed November 30, 2014
Excavation Plan acknowledgement	February 17, 2015	Completed February 2, 2015
Receive Industrial Stormwater Permit	March 18, 2015	Completed October 1, 2015
Commence Work – Ash Removal (including ash stack soil overburden)	Final permit approval + 60 Days	Completed October 13, 2015
Submit Updated Excavation Plan to NCDEQ	November 15, 2015	Completed November 13, 2015
Receive Permit-to-Construct On-Site Landfill	March 31, 2016	Delayed due to NCDEQ environmental justice review; completed October 27, 2016

Submit Updated Excavation Plan to NCDEQ	December 31, 2016	Completed December 21, 2016
Receive Permit-to-Operate (PTO) On-Site Landfill	June 30, 2017	Delayed due to NCDEQ environmental justice review. Cell 1 PTO received May 30, 2017. Cell 2 PTO received October 2, 2017. Cell 3 PTO received April 18, 2018.
Submit Updated Excavation Plan to NCDEQ	December 31, 2017	Completed December 1, 2017
Eliminate stormwater discharge into impoundments	December 31, 2018	Completed June 28, 2018
Impoundments closed pursuant to Part II, Sections 3(b) and 3(c) of the Coal Ash Act	August 1, 2019	On Track
Submit Updated Excavation Plan to NCDEQ	December 31, Annually	On Track

V. Erosion and Sediment Control Plan

The Erosion and Sediment Control (E&SC) Plan for the excavation of the Ash Stack and related site activities have been approved. The approval of this plan by NCDEQ meets the requirement outlined in the referenced NCDEQ Letter. Modifications from E&SC plans for subsequent phase(s) will be approved by NCDEQ prior to installation and initiation of subsequent phase work. The approved contractor will install the E&SC measures indicated in the plan. All control measures will be maintained throughout the project in accordance with the E&SC plans. When possible, portions of the E&SC plan will be closed out at the approval of NCDEQ as areas become stabilized.

VI. Dewatering Plan

The Dan River ash basins are being dewatered to facilitate the removal of ash and to mitigate risk. Interstitial dewatering of the Primary Ash Basin commenced in March 2018. Interstitial dewatering of the Secondary Ash Basin commenced in June 2018. Leachate from the onsite landfill, interstitial waste water, and contact stormwater are being treated by the City of Eden's Publicly Owned Treatment Works (POTW) in accordance with the Industrial User Pre-treatment Permit issued to Duke Energy by the City of Eden. In addition, and to provide additional treatment capacity beyond what the City of Eden could accommodate, that facility installed an on-site wastewater treatment system in Q3 2018 to treat interstitial wastewater for discharge to Outfall 002 in compliance with the facility's NPDES Wastewater Permit.

VII. Location(s) for Removed Ash

Ash removed from the site will be transported by the contractor to permitted facilities. The ash disposal location(s) will be managed and maintained to ensure environmental compliance with all applicable rules and regulations.

Disposal Sites

The Maplewood Landfill and the on-site landfill at Dan River have been identified as the primary disposal locations.

Maplewood Landfill
The Maple Landfill is located near Jetersville, VA and is where 1.2 million tons of ash where shipped by rail during Phase I. The final rail shipment of ash to the Maplewood Landfill from Dan River occurred on March 23, 2017.

Dan River On-site Landfill
Transportation of ash to the on-site landfill began on May 31, 2017. The project team utilized lessons learned from Phase I in developing and constructing the on-site landfill, which provides the improvements below:

- Provide a reliable, long-term, cost-effective solution for ash designated for removal
- Support development of a diverse supplier program to drive innovation and competition
- Establish performance baselines and a system to optimize excavation, transportation, and disposal of ash

VIII. Transportation Plan

Ash is currently being transported from the basins via off-road articulated dump truck to the on-site landfill. Truck loading operations will be conducted with a crew working typically 12 hours per day, five to six days per week. Ash transportation to Roanoke Cement Company for beneficiation is by on-road truck. Transportation off-site will be conducted by approved transporters and will meet Department of Transportation (DOT) and other applicable federal, state, and local regulations.

IX. Environmental and Dam Safety Permitting Plan

Excavation of ash creates potential for stormwater impacts. The facility holds an approved E&SC plan and associated Construction Stormwater Permit approval for ash stack removal. Also, NCDEQ indicated that an NPDES Industrial Stormwater Permit is required to excavate ash. The Company has received the NPDES Industrial Stormwater Permit to support ash removal at the site. Pursuant to the requirements of the NPDES Industrial Stormwater Permit, a stormwater pollution prevention plan (SPPP)

incorporating best management practices has been created and is currently being implemented. Future modifications to the permit/plan will be managed as necessary. On October 27, 2016, Duke Energy received a modified NPDES Wastewater Permit, which included provisions for dewatering activities.

The area between Ash Stack 1 and Ash Stack 2 was determined to be a jurisdictional wetland and an Individual Permit (IP) will be required to remediate this area and complete stormwater diversion prior to basin closure. Wetlands/stream impacts related to the rail improvements were managed through the United States Army Corps of Engineers (ACOE) with particular attention paid to the difference between jurisdictional wetlands/streams under Section 404 and those arising from Section 401 waters. The Company received approvals from ACOE and NCDEQ for wetlands/stream impacts related to the rail. The company received approvals from ACOE and NCDEQ for wetlands/stream impacts related to stormwater diversion in the fourth quarter of 2017. Dan River ash is a non-hazardous material.

Subsequent phase(s) will include dewatering and continued excavation and removal of ash from the Primary and Secondary Ash Basins. Subsequent phase(s) also include the continued construction of the on-site landfill.

In order to facilitate on-site landfill construction and operation, NCDEQ's Solid Waste Section issued a Landfill Permit-to-Construct on October 27, 2016. Following construction of each cell of the on-site landfill, Construction Quality Assurance Reports were submitted to obtain the corresponding PTO. NCDEQ's Solid Waste Section issued a Landfill PTO for Cell 1 on May 30, 2017, a Landfill PTO for Cell 2 on October 2, 2017, and a Landfill PTO for Cell 3 on April 18, 2018.

Dam Decommissioning Plan Sequence 'A' was approved by NCDEQ Dam Safety on February 20, 2018. Dam Decommissions Plan Sequence 'B' was approved by NCDEQ Dam Safety on July 16, 2018. Decommissioning Plan Sequence 'C' will be submitted to NCDEQ Dam Safety no later than Q1 2019. Any impacted wells or piezometers will be properly abandoned in accordance with NCDEQ requirements. Fugitive dust will be managed to mitigate impacts to neighboring areas.

Other than the agreement with City of Eden regarding development of the on-site landfill, there are no additional site-specific or local requirements identified.

Permit Matrix

MEDIA	PERMIT	RECEIVED DATE (R) TARGET DATE (T)	COMMENTS
Water	NPDES Industrial Stormwater Permit	October 1, 2015 (R)	SPPP implementation was completed March 31, 2016.

I/A

MEDIA	PERMIT	RECEIVED DATE (R) TARGET DATE (T)	COMMENTS
	NPDES Wastewater Permit – Major Modification	October 27, 2016 (R)	Effective December 1, 2016.
	City of Eden – Industrial User Permit	June 3, 2016 (R)	None
	Jurisdictional Wetland and Stream Impacts / 404 Permitting and 401 WQC	September 14, 2015 (R)	Two stream crossings for rail upgrade
	Jurisdictional Wetland and Stream Impacts / 404 Permitting and 401 WQC	401 Permit October 9, 2017 (R) 404 Permit October 24, 2017 (R)	Area between Ash Stack 1 and Ash Stack 2.
Dam Safety	Dam Decommissioning Request Approval	Sequence 'A' February 20, 2018 (R) Sequence 'B' July 20, 2018 (R) Sequence 'C' March 31, 2019 (T)	Sequence 'A' approved February 20, 2018. Sequence 'B' approved July 16, 2018. Sequence 'C' to be submitted no later than Q1 2019.
Waste	Site Suitability Report	August 28, 2015 (R)	None
	Permit-to-Construct Landfill	October 27, 2016 (R)	Target Date was March 31, 2016. Delay was due to NCDEQ's environmental justice review.
	Permit-to-Operate Landfill	Cell 1 May 30, 2017 (R) Cell 2 October 2, 2017 (R) Cell 3 April 18, 2018 (R)	Cell 1: Target Date was March 31, 2017. Delay was due to NCDEQ's environmental justice review.
Other Requirements	Site-Specific Nuisance/Noise/Odor/ Other Requirements, including DOT	July 21, 2015 (R)	Eden City Council adopted zoning amendment on July 21, 2015, which allows construction of Dan River on-site landfill.

X. Contracting Strategy

The Ash Management Program strategy is to engage multiple contractors, drive competition, create system-wide innovation, and develop a collection of best practices. Duke Energy has engaged contractor(s), who are experienced in coal ash excavation, transportation, and disposal, and continues to evaluate other potential contractors. The Company provides in-depth oversight, coordination, and monitoring of the contractors to ensure the work is performed appropriately. Duke Energy's core values include safety, quality, and protection of the environment, which are incorporated into our contracts. The Company continues to evaluate alternate approaches, methods, and contracting solutions and will adjust its strategy, as necessary.

In October 2018, the CCP Project Team decided to change the ash excavation contractor at Dan River due to concerns with excavation performance. With the contractor change and the additional discovered ash, the projected completion of ash excavation at Dan River is now targeted for June 1, 2019.

XI. Environmental, Health, and Safety Plan

The Company is committed to the health, safety, and welfare of employees, contractors, and the public, and to protecting the environment and natural resources. During all phases of the project work, the Company and its contractors will follow the Duke Energy Safe Work Practices Manual, the Environmental, Health, and Safety supplement document, and any additional requirements. Occupational health and safety expectations include oversight and continuous improvement throughout the project.

The project includes comprehensive environmental, health, and safety plans encompassing all aspects of the project work. In addition to adhering to all applicable environmental, health, and safety rules and regulations, Duke Energy and its contractors will focus on ensuring the safety of the public and protection of the environment during each phase of the project.

XII. Communications Plan

The project team has coordinated with Duke Energy's Corporate Communications Department to develop a comprehensive external communications plan tailored to the specific needs of each phase of the project. Many different external stakeholders, including neighbors, government officials, and media have an interest in this project. The Company is committed to providing information by proactively communicating about the project activities to potentially affected parties and responding to inquiries in a timely manner.

XIII. Glossary

TERM	DEFINITION
Ash Basin	Synonymous with Coal Combustion Residual Impoundment. A topographic depression, excavation, or dammed area that is primarily formed from earthen materials; without a base liner approved for use by Article 9 of Chapter 130A of the North Carolina General Statutes or rules adopted thereunder for a combustion products landfill or coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill; and an Area that is designed to hold accumulated coal combustion residuals in the form of liquid wastes, wastes containing free liquids, or sludge, and that is not backfilled or otherwise covered during periods of deposition.
Ash Stack	Ash storage areas located north of the Primary and Secondary Ash Basins.
Beneficial Use	Projects promoting public health and environmental protection, offering equivalent success relative to other alternatives, and preserving natural resources.
Bottom Ash	The agglomerated, angular ash particles formed in pulverized coal furnaces that are too large to be carried in the flue gases and collect on the furnace walls. Bottom ash falls through open grates to an ash hopper at the bottom of the furnace.
Bulk Water	Water above the ash contained in the ash basin. Synonymous with free water.
Coal Ash Excavation Plan	Plan required by NCDEQ letter dated August 13, 2014, including a schedule for soil and sediment erosion control measures, dewatering, and the proposed location of the removed ash.
Coal Ash Management Act of 2014	North Carolina Session Law 2014-122.
Coal Combustion Residuals (CCR)	Residuals, including fly ash, bottom ash, boiler slag, mill rejects, and flue gas desulfurization residue produced by a coal-fired generating unit.
Dewatering	The act of removing bulk and entrapped water from the ash basin.
Dewatering Plan	Engineered plan and the associated process steps necessary to dewater an ash basin.
Duke Energy Safe Work Practices Manual	Document detailing the Duke Energy safety guidelines.

TERM	DEFINITION
Entrapped Water	Flowable water below the ash surface that creates hydrostatic pressure on the dam.
Excavation Activities	Tasks and work performed related to the planning, engineering, and excavation of ash from an ash basin.
Excavation Plan	Refer to Coal Ash Excavation Plan.
Free Water	Water above the ash contained in the ash basin. Synonymous with bulk water.
Fly Ash	Very fine, powdery material, composed mostly of silica with nearly all particles spherical in shape, which is a product of burning finely ground coal in a boiler to produce electricity and is removed from the plant exhaust gases by air emission control devices.
NPDES	National Pollutant Discharge Elimination System.
NPDES Permit	A permit that regulates the direct discharge of wastewater and/or stormwater to surface waters.
Permit	Federal, state, county, or local government authorizing document.
POTW	Publicly Owned Treatment Works is typically a municipal water treatment facility that can be utilized to treat wastewater and/or leachate.

XIV. Reference Documents

REF	DOCUMENT	DATE
1	NCDEQ Letter to Duke Energy, Request for Excavation Plans	August 13, 2014
2	Coal Ash Management Act of 2014	September 20, 2014
3	NCDEQ Letter from Jeff Poupart, Water Quality Permitting Section Chief, to Duke Energy regarding decant	July 20, 2016

Riverbend Site Details
Gaston County, North Carolina

I. Site History

Riverbend was a Duke Energy Carolinas, LLC ("DE Carolinas" or the "Company") coal-fired steam plant that was constructed in 1929. In 2013, Riverbend was decommissioned, and it no longer generates electricity. Historically, coal combustion residuals ("CCR") was stored at the site in several locations, including the Primary Ash Basin, Secondary Ash Basin, Cinder Pit, and Ash Stack (collectively "CCR Units"). Initially when the plant was constructed, the Company managed CCR from its coal-fired units in an area known as the Cinder Pit. In 1957, the Company began wet sluicing CCR and constructed a surface impoundment to receive the sluiced CCR. That original basin was divided and vertically expanded in 1979 to form the Primary and Secondary Ash Basins. Periodically, the Company would remove CCR from the ash basins to extend their useful life and meet permitting requirements. The CCR removed from the ash basins was stored in the Ash Stack area. An aerial view depicting the locations of the CCR Units at Riverbend is provided in **Figure 1** below.

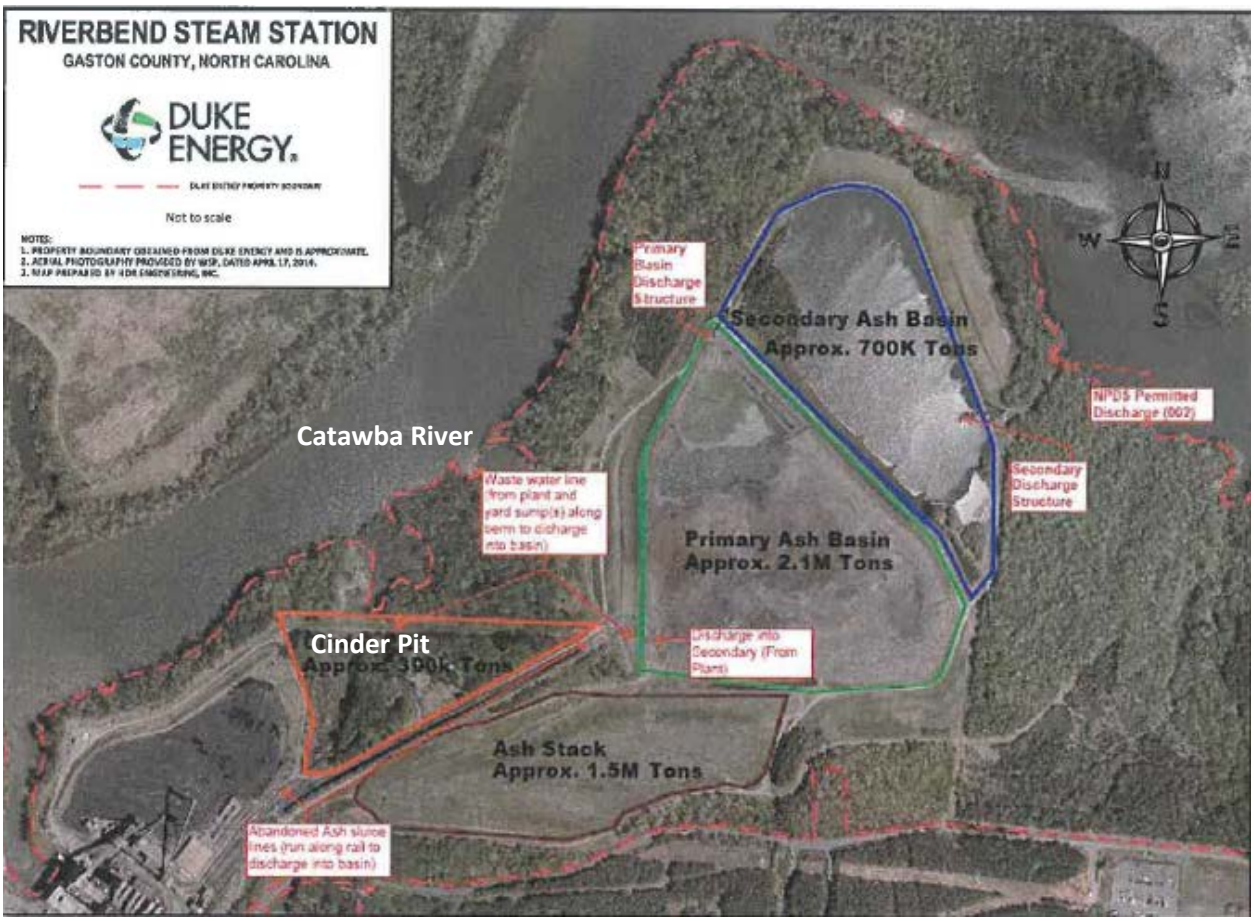


Figure 1 – Aerial showing the CCR Units at Riverbend

II. Regulatory History

The CCR Units at Riverbend have been regulated by a combination of state agencies over the operational history of the plant. The North Carolina Department of Environmental Quality ("DEQ") regulated the wet storage of ash in ash basins through the National Pollutant Discharge Elimination System ("NPDES") permit program and the dry storage and beneficial reuse of ash through the state's solid waste permitting program. Power plant dams were regulated by the North Carolina Utilities Commission until January 1, 2010, when that authority was transferred to DEQ.

Following the Tennessee Valley Authority coal ash spill in 2008, EPA was prompted to assess coal ash impoundments across the country. In 2010, EPA proposed, for the first time, comprehensive regulations and federal minimum standards to address the disposal and permanent storage of CCR. The final CCR Rule was signed in December 2014 and published in April 2015. As of August 2018, the CCR Rule applies to the ash basins at Riverbend Station.[1]

In 2014, the North Carolina General Assembly passed the Coal Ash Management Act ("CAMA") to establish new state standards for the disposal of CCR from coal-fired electric generation facilities. CAMA, and its later amendments, complement and overlap with the federal CCR Rule. CAMA designated Riverbend as a "high priority site" and required that its ash impoundments be closed by August 1, 2019.

III. Site Closure Activities – January 1, 2015 through December 31, 2017

Excavation and disposal of CCR began at Riverbend in 2015. DE Carolinas initially contracted with Waste Management Inc. to begin removing CCR from the Ash Stack at the Riverbend Plant and transporting the CCR to the R&B Landfill in Homer, Georgia via truck. DE Carolinas also for a short period transported CCR from Riverbend to the Company's permitted landfill at Marshall Steam Station ("Marshall") in 2015. Transportation of CCR to R&B Landfill ceased in September 2015, at which time the Company began transporting the ash to the Brickhaven Mine Structural Fill ("Brickhaven") in Chatham County, North Carolina.

The activities described above and costs associated with those activities were the subject of DE Carolinas' 2017 rate case before the Commission (Docket No. E-7, 1146). In that docket, the Commission determined that DE Carolinas' coal ash basin closure costs for Riverbend were reasonable, prudent, and recoverable. (*Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction*, Docket No. E-7, Sub 1146, pp. 266-269).

IV. Site Closure Activities – January 1, 2018 through January 31, 2020

As of January 1, 2018, DE Carolinas had already entered into extensive contracts with engineering contractors to perform the necessary site assessments, develop excavation and compliance plans, and to excavate and transport the CCR for permanent disposal. The Commission has already determined that

---

[1] *See Util. Solid Waste Activities Grp., et al. v. Envtl. Prot. Agency*, 901 F.3d 414 (D.C. Cir. 2018), *judgment entered,* No. 15-1219, 2018 WL 4158384 (D.C. Cir. Aug. 21, 2018).

costs related to those contracts and activities performed pursuant to those contracts are recoverable. DE Carolinas has continued its efforts to execute the excavation and closure plans for Riverbend and comply with state and federal regulatory requirements. The Company completed excavation of the ash basins at Riverbend in March 2019.

From January 1, 2018 through January 31, 2020, DE Carolinas has completed or is scheduled to complete the following tasks:

- Perform engineering support for basin closure;
- Dewater the ash basins;
- Complete excavation of the Primary and Secondary Ash Basins;
- Complete excavation of the Cinder Pit and Ash Stack;
- Close all CCR Units;
- Transport CCR offsite for disposal;
- Install and monitor groundwater wells;
- Decommission the ash basin dams;
- Complete final grading of the former ash basins; and
- Develop a Corrective Action Plan for groundwater.

The tasks that DE Carolinas has performed and will perform from January 1, 2018 through January 31, 2020 are a continuation of the activities for which costs were approved in the prior DE Carolinas rate case. These activities and associated costs continue to be necessary, appropriate, and consistent with applicable regulatory requirements.

APPENDIX A: ASH INVENTORY

Riverbend Steam Station

Coal Ash Excavation Plan

2018 Update

Table of Contents

Exhibits

I. Statement of Purpose

Duke Energy Carolinas, LLC (Duke Energy or the Company) is required by Part II, Section 3(b) of the Coal Ash Management Act of 2014 (Session Law 2014-122) (Coal Ash Act or Act) to close, in accordance with Part II, Section 3(c) the coal combustion residuals (CCR) surface impoundments located at the Riverbend Steam Station (Riverbend or Plant), National Pollutant Discharge Eliminations System Permit No. NC0004961 in Gaston County as soon as practicable, but not later than August 1, 2019.

This Coal Ash Excavation Plan (Plan) represents activities to satisfy the requirements outlined in Part II, Sections 3(b) and 3(c), Subparagraphs 1 and 2 of the Act and the requests set forth in the North Carolina Department of Environment Quality's (NCDEQ) August 13, 2014 letter titled "Request for Coal Ash Excavation Plans for Asheville Steam Electric Generating Plant, Dan River Combined Cycle Station, Riverbend Steam Station, L.V. Sutton Electric Plant" (NCDEQ Letter). The NCDEQ Letter specifically requests that the Plan include 1) soil and sediment erosion control measures, 2) dewatering, and 3) the proposed location(s) of the removed ash. These requirements are found in this updated Plan.

This is a revision of the Coal Ash Excavation Plan dated December 1, 2017, which covers the final phase of ash basin excavation activities, including the continuation of basin dewatering, site maintenance, ash basin preparation, and ash removal from the basins at Riverbend. The Plan has been updated and submitted to NCDEQ annually; however, due to the completion of ash basin excavation activities by the applicable CAMA deadline, no further updates will be made to the Plan.

The Plan covers some of the work required by Part II, Sections 3(b) and 3(c) of the Coal Ash Act. The Act requires the closure of the ash basins as soon as practicable, but no later than August 1, 2019. However, the Act contains no requirement for the submittal of an excavation plan of the kind presented here. Thus, while the formulation, submittal, and review of this Plan will assist in Duke Energy's work to close the ash basin, its ultimate approval is an action not specifically required by statutory, regulatory, or other applicable authority.

The scope of work in excavating the ash basins has been determined by applicable laws, rules, permits, and approvals that control the activities to be performed under the Plan. There are several external and internal factors that could potentially affect the precise scope of the work to be performed under the Plan. As a consequence, neither the submittal of this Plan nor its acknowledgement by NCDEQ should be taken as requiring actions different from such applicable requirements. Duke Energy submits this Plan to NCDEQ based on the understanding that it may be necessary to take actions that deviate from the Plan in the future, and the Company reserves the right to make such changes.

II. General Facility Description

Riverbend is located off Horseshoe Bend Beach Road near the town of Mt. Holly in Gaston County, NC on the south bank of the Catawba River. The seven-unit Station began commercial operation in 1929 with two units and then expanded to seven by 1954. At its peak, the generating facility had a capacity of 454 megawatts. As of April 1, 2013, all of the coal-fired units were retired. Demolition was completed in June 2018.

The CCR from Riverbend's coal combustion operations was historically processed in the ash basin system located on the northeast side of the property adjacent to the Catawba River. The discharge from the ash basin system is permitted through Outfall #002 to the Catawba River in the Catawba River Basin by NCDEQ's Division of Water Resources under National Pollutant Discharge Elimination System (NPDES) Permit No. NC0004961. Riverbend has been decommissioned, and no active ash placement or sluicing is occurring within the ash basin system.

Duke Energy's Coal Combustion Residuals Removal Verification Procedure (Removal Verification Procedure) will be used to verify that primary source ash has been removed from the basin. Subsequent to removal of the ash pursuant to the Removal Verification Procedure, Duke Energy will implement its Excavation Soil Sampling Plan (ESSP), which was developed for the purpose of meeting the applicable performance standard. Although not required under CAMA, in November 2016, NCDEQ sent Coal Combustion Residuals Surface Impoundment Closure Guidelines for Protection of Groundwater to Duke Energy instructing the Company to submit the ESSP to NCDEQ as part of the site's excavation plan. In accordance with this directive, a copy of the ESSP is attached as **Exhibit "A"** to this Plan.

Ash Basin System

The ash basin system was an integral part of the station's NPDES permitted wastewater treatment system, which predominantly received inflows from the ash removal system, station yard drain sump, and stormwater flows. During station operations, inflows to the ash basin were highly variable due to the cyclical nature of station operations. The ash basin system consisted of a Primary Ash Basin and a Secondary Ash Basin, which were separated by an Intermediate Dam. The Primary Ash Basin and the Secondary Ash Basin are no longer separated since the decommissioning of the Intermediate Dam. For the purpose of stormwater management, the Ash Stack was also within the ash basin system.

The ash basin system was located approximately 2,400 feet to the northeast of the power plant, adjacent to the Catawba River. The Primary Ash Basin is impounded by an earthen embankment dam, referred to as Primary Dam (GASTO-97), located on the

west side of the Primary Ash Basin. The Secondary Ash Basin is impounded by an earthen embankment dam, referred to as Secondary Dam (GASTO-98), located along the northeast side of the Secondary Ash Basin.

Originally, the ash basin at Riverbend consisted of a single basin commissioned in 1957. In 1979, the original single basin was divided by constructing a divider dam (Intermediate Dam (GASTO-99)) to form two separate basins (Primary Ash Basin and Secondary Ash Basin). This modification improved the original basin's overall ability for suspended solids removal. The Primary Dam was raised, and the Intermediate Dam was built over sluiced ash to a crest of 730 feet mean sea level (msl). At the same time, the Secondary Dam crest elevation remained at 720 feet msl. As part of the Excavation Project, the Intermediate Dam was removed in February 2017. Prior to excavation, the Primary Ash Basin and the Secondary Ash Basin were estimated to contain a total of approximately 3.6 million tons of CCR. Based on the latest survey and estimate, this total has been revised to 3.3 million tons. As of November 1, 2018, approximately 3.2 million tons of CCR material have been removed from the basin.

The inflows from the ash removal system and the station yard drain sump were directed through sluice lines into the Primary Ash Basin. The discharge from the Primary Ash Basin to the Secondary Ash Basin was through a concrete discharge tower located near the divider dam. The surface area of the combined Ash Basin is approximately 69 acres with an approximate maximum basin elevation of 714 feet msl. The full basin elevation of Mountain Island Lake is approximately 647 feet msl.

Prior to the station being retired, stormwater and wastewater effluent from other non-ash-related station flows to the ash basin were discharged in compliance with the station's NPDES permit to the Catawba River through a concrete discharge tower located in the Secondary Ash Basin. The concrete discharge tower drained through a 30-inch diameter corrugated metal pipe into a concrete-lined channel. The channel extended from the Secondary Ash Basin to NPDES Outfall #002, which discharged to the Catawba River. This discharge pipe has been grouted closed.

Ash Stack

An ash fill deposit, known as the "Ash Stack," was constructed from ash removed from the Primary and Secondary Ash Basins during basin clean-out projects. The Ash Stack was utilized for periodic ash basin clean-outs to prolong the life of the ash basins. The Ash Stack is a 29-acre area located south of the Primary Ash Basin and contained approximately 1.6 million tons of CCR. The Ash Stack was constructed during two ash basin clean-outs; the last recorded ash basin clean-out project was in 2007. Prior to Phase I excavation, the Ash Stack had 1.5 to 2 feet of soil cover and vegetation that was maintained following the last deposition in this area. For the purpose of water management, the stormwater run-off from the Ash Stack area is routed to the ash basin

system. As of November 1, 2018, approximately 1.56 million tons of CCR material have been removed from the Ash Stack.

Cinder Pit and Other Identified Ash Storage Areas

Prior to construction of the ash basin, bottom ash (cinders) was deposited in a primarily dry condition in the "Cinder Pit" and other areas near the cinder pit and coal pile. The Cinder Pit is approximately 13 acres and is located in a triangular area northeast of the coal pile and northwest of the rail spur. This area was utilized for storage of ash material at the station prior to the installation of precipitators and a wet sluicing system. The Cinder Pit contained predominantly dry cinders. As of November 1, 2018, approximately 180,000 tons of CCR material have been removed from the Cinder Pit area.

III. Project Charter

Dewatering of the ash basins and the removal of ash from the site is expected to complete before the end of 2018. As of November 1, 2018, approximately 4.94 million tons of ash have been excavated and removed from the site. Approximately 4.82 million tons were moved to an off-site structural fill and the remainder to off-site landfills. Coal ash excavation at Riverbend is ongoing, including completion of the Removal Verification Procedure.

The Riverbend NPDES wastewater permit was issued and became effective on March 1, 2016. Decanting of bulk water began soon thereafter and continued until halted in June 2016. In July 2016, NCDEQ imposed a new requirement to install a physical-chemical treatment facility. Following installation of a water treatment facility, bulk dewatering commenced in the fall of 2016 and was completed on January 31, 2017. Interstitial dewatering of the Primary and Secondary Ash Basins will continue through completion of the project.

Project Charter Scope

Phase II Scope

1. Complete closure activities for the Ash Basins.

IV. Critical Milestone Dates

Critical Milestones within the Plan are summarized in the table below.

MILESTONE	NO LATER THAN DATE	STATUS
Submit Excavation Plan to NCDEQ	November 15, 2014	Completed November 13, 2014
Complete Comprehensive Engineering Review	November 30, 2014	Completed November 30, 2014

MILESTONE	NO LATER THAN DATE	STATUS
Excavation Plan Acknowledgement by NCDEQ	February 17, 2015	Completed February 2, 2015
Receive Industrial Stormwater (ISW) Permit	March 5, 2015	Completed May 15, 2015
Commence Work – Ash Removal	Final permit approval + 60 Days	Completed May 21, 2015 After Receipt of ISW Permit
Submit Updated Excavation Plan to NCDEQ	November 15, 2015	Completed November 13, 2015
Submit Updated Excavation Plan to NCDEQ	December 31, 2016	Completed December 21, 2016
Submit Updated Excavation Plan to NCDEQ	December 31, 2017	Completed December 1, 2017
Eliminate Stormwater Discharge into Impoundments	December 31, 2018	On Track for December 20, 2018 Completion
Submit Final Updated Excavation Plan to NCDEQ	December 31, 2018	On Track
Impoundments Closed per Part II, Sections 3(b) and 3(c) of the Coal Ash Act	August 1, 2019	On Track

V. Erosion and Sediment Control Plan

The Erosion and Sediment Control (E&SC) plans for the excavation of the Ash Stack, construction of the rail infrastructure, and haul roads were developed, submitted to NCDEQ, and approved. All control measures will be maintained through the project in accordance with the E&SC plans. When possible, portions of the E&SC plan will be closed out at the approval of NCDEQ as areas become stabilized.

VI. Dewatering Plan

The Riverbend ash basins were dewatered to facilitate the removal of ash and to mitigate risk. An engineered dewatering plan for Riverbend was developed, and bulk dewatering was completed on January 31, 2017. Interstitial dewatering and stormwater removal continue through the required water treatment components noted in the previous phase of this Ash Plan.

Ash Basin System

During excavation, contact water has been controlled and diverted through ditches and pumps into sumps located within the area of the Basin. As water is collected in the sump(s), it is pumped into one of the two lined holding ponds, which were constructed to store water prior to treatment. Water from the holding pond(s) is pumped to the wastewater treatment facility on site, treated, and discharged to the Catawba River, in

accordance with the NPDES permit. Upon completion of ash excavation, the holding ponds and the wastewater treatment facility will be decommissioned.

VII. Location(s) for Removed Ash

A total of approximately 4.94 million tons of ash from the Ash Stack, ash basin system, and Cinder Pit have been excavated and removed from the Riverbend site. Ash removed from the site was transported by the contractor to permitted facilities.

Disposal Sites

A pilot program for ash removal began on May 21, 2015, to transport ash by truck to the R&B Landfill in Homer, GA. Ash transport to the landfills located at the Marshall Steam Station in Sherrills Ford, NC began on July 27, 2015. Initial ash shipments by truck from Riverbend to the Brickhaven Structural Fill began on October 23, 2015. Ash transportation to the R&B Landfill was terminated in September 2015, and ash transportation to the Marshall Landfill was terminated in the first quarter of 2016. Early in the first quarter of 2016, rail transport of the remaining ash commenced to the Brickhaven Structural Fill.

R&B Landfill

A total of approximately 16,000 tons of ash were removed from the site and transported to the R&B landfill in Homer, GA, which is a permitted facility.

Marshall FGD and Industrial Landfills

The FGD and industrial landfills are located at the Duke Energy Marshall Steam Station facility in Sherrills Ford, NC. Both are permitted facilities, and 88,745 tons of CCR material were relocated there.

Brickhaven Structural Fill

The Brickhaven Structural Fill is located at the Brickhaven Mine near the City of Moncure in Chatham County, NC. It resides on approximately 299 acres. Ash transported there is beneficially used as structural fill material at the reclaimed mine. A total of approximiately 4.82 million tons were relocated to the Brickhaven Structural Fill.

VIII. Transportation Plan

The majority of Ash was transported off-site via rail car. As previously noted in Section VII above, a pilot program for ash removal began with the transportation of ash by truck to the R&B Landfill in Homer, Georgia, Marshall Steam Station landfills, and the

Brickhaven Structural Fill. Truck transportation ceased and was replaced by rail transportation.

IX. Environmental and Dam Safety Permitting Plan

Excavation of ash creates potential for stormwater impacts. The facility holds approved E&SC plans and associated Construction Stormwater Permits for ash removal. Also, NCDEQ indicated that an NPDES Industrial Stormwater Permit is required to transport ash. The Company received the Industrial Stormwater Permit to support ash removal at the site. Pursuant to the requirements of the Industrial Stormwater Permit, a stormwater pollution prevention plan (SPPP) incorporating best management practices was created and is currently being implemented. Future modifications to the permit/plan will be managed as necessary.

On February 12, 2016, NCDEQ issued NPDES Permit NC0004961 for operation of the wastewater treatment works at Riverbend and for discharging treated wastewater to the Catawba River (Mountain Island Lake) and associated tributaries and wetlands. Certain effluent limits (pH and total hardness) in the permit were subsequently modified under that certain Special Order by Consent (EMC SOC WQ S16-005) dated November 10, 2016 (SOC).

There are no jurisdictional wetlands/streams associated with the removal of the Ash Stack or Primary or Secondary Ash basins in Phase I. Future wetland/stream impacts and jurisdictional determinations will be managed through the United States Army Corps of Engineers with attention paid to the difference between jurisdictional wetlands/streams under Section 404 and those arising from Section 401 waters. Riverbend ash is a non-hazardous material.

All necessary Dam Safety approvals have been obtained to cover activities on or around jurisdictional dams. Dam decommissioning plans for the Primary and Secondary dams have been submitted and approved by NCDEQ Dam Safety. Any impacted wells or piezometers will be abandoned in accordance with NCDEQ requirements. Fugitive dust will be managed to mitigate impacts to neighboring areas. Additional site-specific or local requirements will be secured, as needed.

Permit Matrix

MEDIA	PERMIT	RECEIVED DATE (R) TARGET DATE (T)	COMMENTS
Water	NPDES Industrial Stormwater Permit	May 15, 2015 (R)	NCDEQ issued the ISW permit on May 15, 2015. SPPP implementation date was November 15, 2015.

MEDIA	PERMIT	RECEIVED DATE (R) TARGET DATE (T)	COMMENTS
	NPDES Wastewater Permit – Major Modification	Q1 2016 (R) (modified by SOC in Q4 2016)	Permit became effective December 1, 2016.
	Jurisdictional Wetland and Stream Impacts 404 Permitting and 401 WQC	N/A	There are no identified jurisdictional wetland/stream impacts.
Dam Safety	Intermediate Dam Decommissioning Request Approval	June 16, 2016 (R)	Submitted May 31, 2016 and received approval June 16, 2016. Decommissioning completed March 13, 2017.
	Primary Dam Modification Request Approval	August 3, 2017 (R)	Submitted on May 8, 2017. Received approval August 3, 2017. Modification completed March 3, 2018.
	Primary and Secondary Dam Decommissioning Request Approval	June 7, 2018 (R)	Resubmitted May 29, 2018. Received approval June 7, 2018.
Waste	Individual Structural Fill Permit	October 15, 2015 (R) (Permit to Operate)	Mine Reclamation Owner/Operator obtained an Individual Structural Fill Permit pursuant to G.S. § 130A-309.219.
Duke Energy Lake Services	Water Conveyance Permit	August 2, 2016 (R)	Original permit received April 7, 2016. Amended permit for revised quantities received August 2, 2016.
Other Requirements	Site-specific Nuisance/Noise/Odor Other Requirements, including DOT Requirements	N/A	None identified.

X. Contracting Strategy

The Ash Management Program strategy is to engage multiple contractors, drive competition, create system-wide innovation, and develop a collection of best practices. Duke Energy engaged contractor(s), who are experienced in coal ash excavation, transportation, and disposal, and continues to evaluate other potential contractors. The Company provides in-depth oversight, coordination, and monitoring of the contractors to

ensure the work is performed appropriately. Duke Energy's core values include safety, quality, and protection of the environment, which are incorporated into our contracts. The Company continues to evaluate alternate approaches, methods, and contracting solutions and will adjust its strategy, as necessary.

XI. Environmental, Health, and Safety Plan

The Company is committed to the health, safety, and welfare of employees, contractors, and the public, and to protecting the environment and natural resources. During all phases of the project work, the Company and its contractors will follow the Duke Energy Safe Work Practices Manual, the Environmental, Health, and Safety supplement document, and any additional requirements. Occupational health and safety expectations include oversight and continuous improvement throughout the project. The project includes comprehensive environmental, health, and safety plans encompassing all aspects of the project work. In addition to adhering to all applicable environmental, health, and safety rules and regulations, Duke Energy and its contractors will focus on ensuring the safety of the public and protection of the environment during each phase of the project.

XII. Communications Plan

The project team has coordinated with Duke Energy's Corporate Communications Department to develop a comprehensive external communications plan tailored to the specific needs of each phase of the project. Many different external stakeholders, including neighbors, government officials, and media have an interest in this project. The Company is committed to providing information by proactively communicating about the project activities to potentially affected parties and responding to inquiries in a timely manner.

XIII. Glossary

TERM	DEFINITION
Ash Basin	Synonymous with Coal Combustion Residual Impoundment. A topographic depression, excavation, or dammed area that is primarily formed from earthen materials; without a base liner approved for use by Article 9 of Chapter 130A of the North Carolina General Statutes or rules adopted thereunder for a combustion products landfill or coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill; and an area that is designed to hold accumulated coal combustion residuals in the form of liquid wastes, wastes containing free liquids, or sludge, and that is not backfilled or otherwise covered during periods of deposition.
Ash Stack	A dry ash storage feature external to the ash basin.
Beneficial Use	Projects promoting public health and environmental protection, offering equivalent success relative to other alternatives, and preserving natural resources.
Bottom Ash	The agglomerated, angular ash particles formed in pulverized coal furnaces that are too large to be carried in the flue gases and collect on the furnace walls. Bottom ash falls through open grates to an ash hopper at the bottom of the furnace.
Bulk Water	Water above the ash contained in the ash basin. Synonymous with free water.
Coal Ash Excavation Plan	Plan required by NCDEQ letter dated August 13, 2014, including a schedule for soil and sediment erosion control measures, dewatering, and the proposed location of the removed ash.
Coal Ash Management Act of 2014	North Carolina Session Law 2014-122.
Coal Combustion Residuals (CCR)	Residuals, including fly ash, bottom ash, boiler slag, mill rejects, and flue gas desulfurization residue produced by a coal-fired generating unit.
Dewatering	The act of removing bulk and entrapped water from the ash basin.
Duke Energy Safe Work Practices Manual	Document detailing the Duke Energy safety guidelines.

TERM	DEFINITION
Entrapped Water	Flowable water below the ash surface, which creates hydrostatic pressure on the dam.
Excavation Activities	Tasks and work performed related to the planning, engineering, and excavation of ash from an ash basin.
Excavation Plan	Refer to Coal Ash Excavation Plan.
Free Water	Water above the ash contained in the ash basin. Synonymous with bulk water.
Fly Ash	Very fine, powdery material, composed mostly of silica with nearly all particles spherical in shape, which is a product of burning finely ground coal in a boiler to produce electricity and is removed from the plant exhaust gases by air emission control devices.
NPDES	National Pollutant Discharge Elimination System.
NPDES Permit	A permit that regulates the direct discharge of wastewater to surface waters.
Permit	Federal, state, county, or local government authorizing document.

XIV. Reference Documents

REF	DOCUMENT	DATE
1	NCDEQ Letter to Duke Energy, Request for Excavation Plans	August 13, 2014
2	Coal Ash Management Act of 2014	September 20, 2014
3	NCDEQ Letter from Jeff Poupart, Water Quality Permitting Section Chief, to Duke Energy regarding decant	July 20, 2016

W.S. Lee Steam Station
Anderson County, South Carolina

I. Site Details

W.S. Lee Steam Station ("W.S. Lee") was a Duke Energy Carolinas, LLC ("DE Carolinas" or the "Company") coal-fired generation station that began operations in 1951. The Company operated three coal-fired generation units at W.S. Lee, all of which were retired by 2014. DE Carolinas now operates a natural gas combined-cycle plant at the site.

The Company constructed the first ash basin at W.S. Lee, referred to as the Inactive Ash Basin, in 1951. The Inactive Ash Basin received sluiced coal combustion residuals ("CCR") from 1951 through 1974. DE Carolinas constructed the Primary and Secondary Ash Basins in 1974 and 1978, respectively, when the Inactive Ash Basin reached its storage capacity. The Primary and Secondary Ash Basins received sluiced CCR and other wastewater streams until November 2014. Periodically, CCR were dredged from the ash basins and placed at other locations onsite, including the Old Ash Fill and the Structural Fill. After 2014, the Primary and Secondary Ash Basins only received wastewater from the combined-cycle facilities and other associated facility wastewaters. An aerial view depicting the CCR storage areas ("CCR Units") at W.S. Lee is provided in **Figure 1** below.

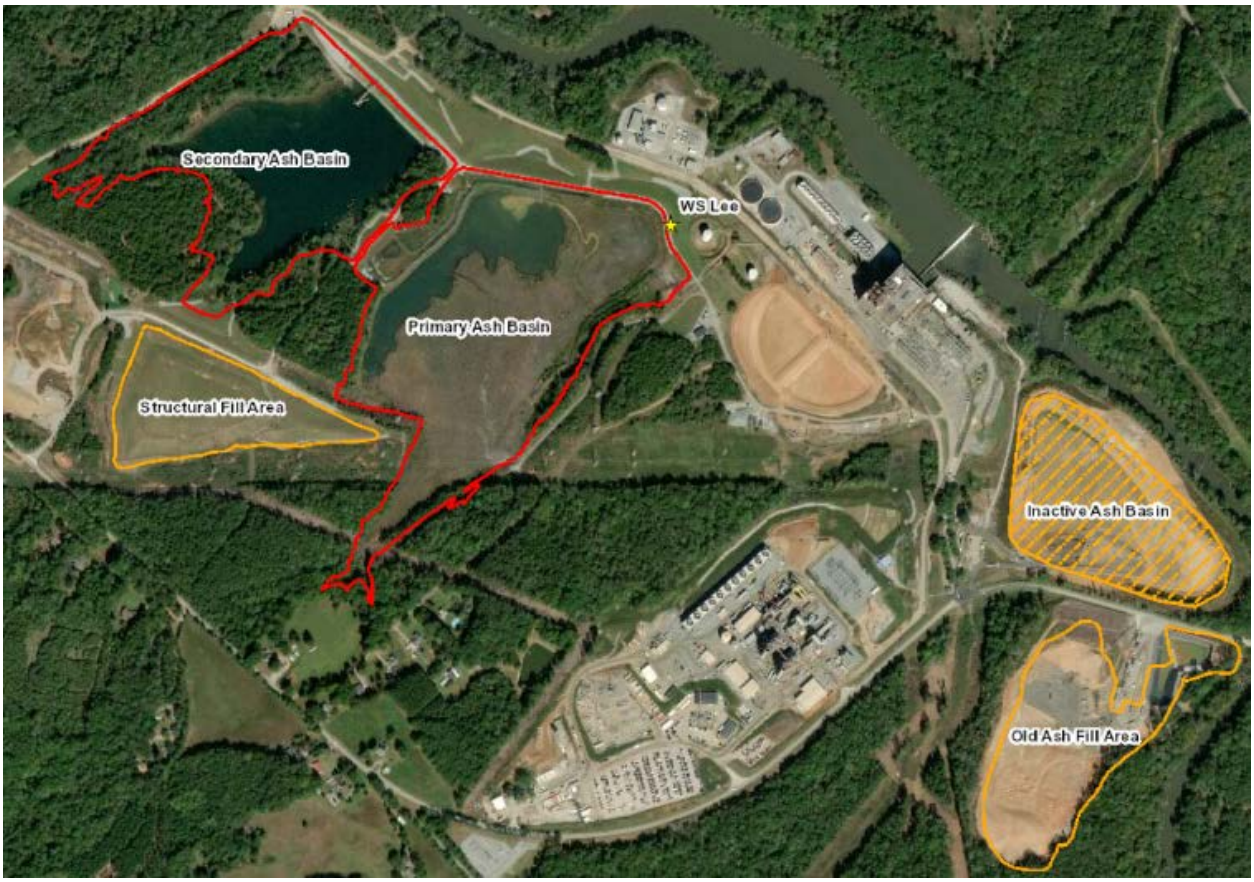


Figure 1 – Aerial showing the CCR Units at W.S. Lee

II. Regulatory History

The CCR Units at W.S. Lee have been regulated by a combination of state agencies over the operational history of the plant. The South Carolina Department of Health and Environmental Control ("DHEC") regulated the wet storage of ash in impoundments through the National Pollutant Discharge Elimination System ("NPDES") permit program and the landfilling and beneficial reuse of CCR through the state's solid waste management program. Dams were also regulated by DHEC under the S.C. Dams and Reservoirs Safety Act.

Following the Tennessee Valley Authority coal ash spill in 2008, EPA was prompted to assess coal ash impoundments across the country. In 2010, EPA proposed, for the first time, comprehensive regulations and federal minimum standards to address the disposal and permanent storage of CCR. The final CCR Rule was signed in December 2014 and published in April 2015. The CCR Rule applies to and requires the closure of the Primary, Secondary, and Inactive Ash Basins at W.S. Lee. [1]

In September 2014, DE Carolinas entered into the Consent Agreement (14-13-HW) with DHEC relating to the permanent storage of CCR at W.S. Lee. DHEC entered the Consent Agreement pursuant to its authority under the South Carolina Hazardous Waste Management Act, S.C. Code Ann. §44-56-10, et. seq. (Rev. 2002 and Supp. 2013), the Pollution Control Act, S.C. Code Ann. §48-1-10 et seq. (Rev. 2008 and Supp. 2013) and the South Carolina Solid Waste Policy and Management Act, S.C. Code Ann. §44-96-10, et. seq. (Rev. 2002 and Supp. 2013). Under the Consent Agreement, DE Carolinas is required to excavate the Inactive Ash Basin and Old Ash Fill at W.S. Lee. Pursuant to the Consent Agreement and the CCR Rule, DE Carolinas will be excavating CCR at W.S. Lee. A majority of the excavated CCR will be placed in an onsite landfill located within the footprint of the Secondary Ash Basin that meets federal and state landfill standards.

III. Site Closure Activities – January 1, 2015 through December 31, 2017

The Company immediately began complying with its new state and federal regulatory requirements affecting its storage of CCR as they became effective. In order to meet the deadlines set forth in the Consent Agreement and the CCR Rule, and in order to minimize risks to the environment, contractors and employees, the Company excavated CCR from the Inactive Ash Basin and Old Ash Fill and transported the CCR to a permitted landfill in Homer, Georgia. Additional closure activities that were performed during this time period include:

- Developing closure plans and other engineering reports;
- Obtaining environmental permits from State and Federal agencies;
- Installing erosion and sediment control measures;
- Installing groundwater monitoring wells;
- Constructing site infrastructure for loading trucks and hauling CCR; and
- Rerouting inflows to the ash basins.

---

[1] *See Util. Solid Waste Activities Grp., et al. v. Envtl. Prot. Agency*, 901 F.3d 414 (D.C. Cir. 2018), *judgment entered*, No. 15-1219, 2018 WL 4158384 (D.C. Cir. Aug. 21, 2018).

The activities described above and costs associated with those activities were the subject of DE Carolinas' 2017 rate case before the Commission (Docket No. E-7, 1146). In that docket, the Commission determined that DE Carolinas' coal ash basin closure costs for W.S. Lee were reasonable, prudent, and recoverable. (*Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction*, Docket No. E-7, Sub 1146, pp. 266-269).

IV. Site Closure Activities – January 1, 2018 through January 31, 2020

As of January 1, 2018, DE Carolinas had already entered into extensive contracts with engineering contractors to perform the necessary site assessments, develop excavation and compliance plans, and to excavate and transport the CCR for permanent disposal. Costs related to those contracts and activities performed pursuant to those contracts through December 31, 2017 have already been approved by the Commission. DE Carolinas has continued its efforts to execute the excavation and closure plans for W.S. Lee and comply with state and federal regulatory requirements.

From January 1, 2018 through January 31, 2020, DE Carolinas has completed or is scheduled to complete the following tasks:

- Develop and submit closure plans and engineering assessments to DHEC;
- Design and construct an emergency spillway and abandon the existing spillway;
- Decant and dewater the Primary and Secondary Ash Basins;
- Construct and obtain permits for a water treatment system to support decanting and dewatering of the Primary and Secondary Ash Basins;
- Install piezometers to support CCR Landfill permitting requirements;
- Excavate CCR from the Secondary Ash Basin and stockpile within the Primary Ash Basin;
- Construct a sediment basin;
- Install groundwater wells;
- Monitor and analyze groundwater samples; and
- Modify the Secondary Ash Basin dam to support ash basin closure activities.

The tasks that DE Carolinas has performed and will perform from January 1, 2018 through January 31, 2020 are a continuation of the activities for which costs were approved in the prior DE Carolinas rate case. These activities and associated costs continue to be necessary, appropriate, and consistent with applicable regulatory requirements.