DEQ Coal Combustion Residuals
Surface Impoundment
Closure Determination

Allen Steam Station

April 1, 2019
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).

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

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 $1 \times 10^{-5}$ 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, 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 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
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’

<table>
<thead>
<tr>
<th>Model Simulation</th>
<th>Maximum Concentration of Boron Above 2L (μg/L) Beyond Compliance Boundary</th>
<th>Depth of GW Contamination Above 2L (feet bgs) Beyond Compliance Boundary</th>
<th>Width of Contamination Plume (feet) Beyond Compliance Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Conditions</td>
<td>700-4,000</td>
<td>120</td>
<td>4300</td>
</tr>
<tr>
<td>Completion of Final Cover (t=0 yrs)</td>
<td>700-4,000</td>
<td>20</td>
<td>4300</td>
</tr>
<tr>
<td>Final Cover (t=120 yrs)</td>
<td>700-4,000</td>
<td>70</td>
<td>2000</td>
</tr>
<tr>
<td>Completion of Hybrid (t=0 yrs)</td>
<td>700-4,000</td>
<td>140</td>
<td>4300</td>
</tr>
<tr>
<td>Hybrid (t=120 yrs)</td>
<td>700-4,000</td>
<td>95</td>
<td>2400</td>
</tr>
</tbody>
</table>

bgs – below ground surface
### Allen Modeling Results for Cross-Section B-B’

<table>
<thead>
<tr>
<th>Model Simulation</th>
<th>Concentration of Boron Above 2L (ug/L) Beyond Compliance Boundary</th>
<th>Depth of GW Contamination Above 2L (feet bgs) Beyond Compliance Boundary</th>
<th>Width of Contamination Plume (feet) Beyond Compliance Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Conditions</td>
<td>700-4,000</td>
<td>95</td>
<td>4300</td>
</tr>
<tr>
<td>Completion of Final Cover (t=0 yrs)</td>
<td>700-4,000</td>
<td>100</td>
<td>4300</td>
</tr>
<tr>
<td>Final Cover (t=120 yrs)</td>
<td>700-4,000</td>
<td>85</td>
<td>250</td>
</tr>
<tr>
<td>Completion of Hybrid (t=0 yrs)</td>
<td>700-4,000</td>
<td>155</td>
<td>4300</td>
</tr>
<tr>
<td>Hybrid (t=120 yrs)</td>
<td>700-4,000</td>
<td>85</td>
<td>2400</td>
</tr>
</tbody>
</table>

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.
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:


2. STREAMS OBTAINED FROM AMEC FOSTER WHEELEWER 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.
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
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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
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
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
FINAL COVER IN 2150, $t = 120$ years

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

MAX BORON ANY LAYER \[\text{green} = 75-700, \text{tan} = 700-4000, \text{red} = 4000-10,000, \text{blue} = 10,000-40,000\]

Allen model layers:
- Ash 1-11
- Saprolite 12-14
- TZ 15-16
- Bedrock 17-26

Vertical exaggeration X 3

A-A' \(~820\text{ ft})
B-B' \(~730\text{ ft})
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

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

A-A'  ~820 ft
B-B'  ~730 ft
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
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

~ 100 ft bls
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

A
A’ ~820 ft
B
B’ ~730 ft

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

compliance boundary
Lake Wylie
~ 85 ft bls
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

~155 ft bls
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
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 groundwater 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/6iK1sbV0O58
John Wagner - ACT Member  https://youtu.be/lIV9crtEyTJY
Frank Holleman - lead attorney of SELC  https://youtu.be/elwPWPYb3Uc
Danielle Bailey-Lash on CNN  https://youtu.be/OCTU-CUoQzQ
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 choose 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.