

ADDENDUM
OFFICIAL EXHIBITS
DEC-Specific Volume 29

Williams Rebuttal Exhibit 2

Bednarcik Direct DEP Redirect Exhibits 1-4

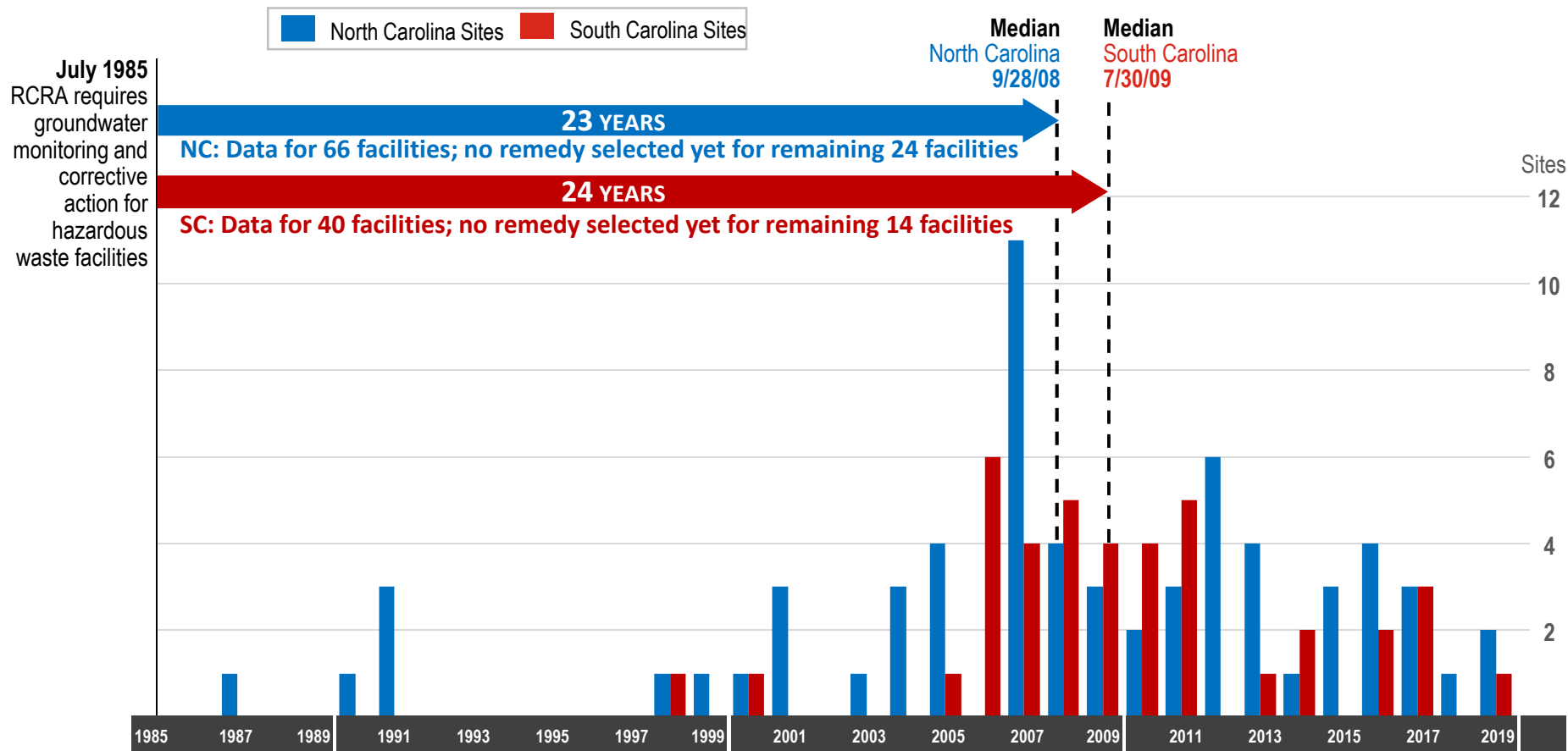
Bednarcik Rebuttal Confidential Public Staff Cross Examination Exhibit 8

Bednarcik Rebuttal Public Staff Cross Examination Exhibits 7 and 9

Lucas / Maness Public Staff Redirect Exhibit 2

DEC Correction Action Plans for Belews Creek, Marshall, Allen, and Cliffside

RCRA Hazardous Waste Corrective Action Facilities - Remedy Selection Date



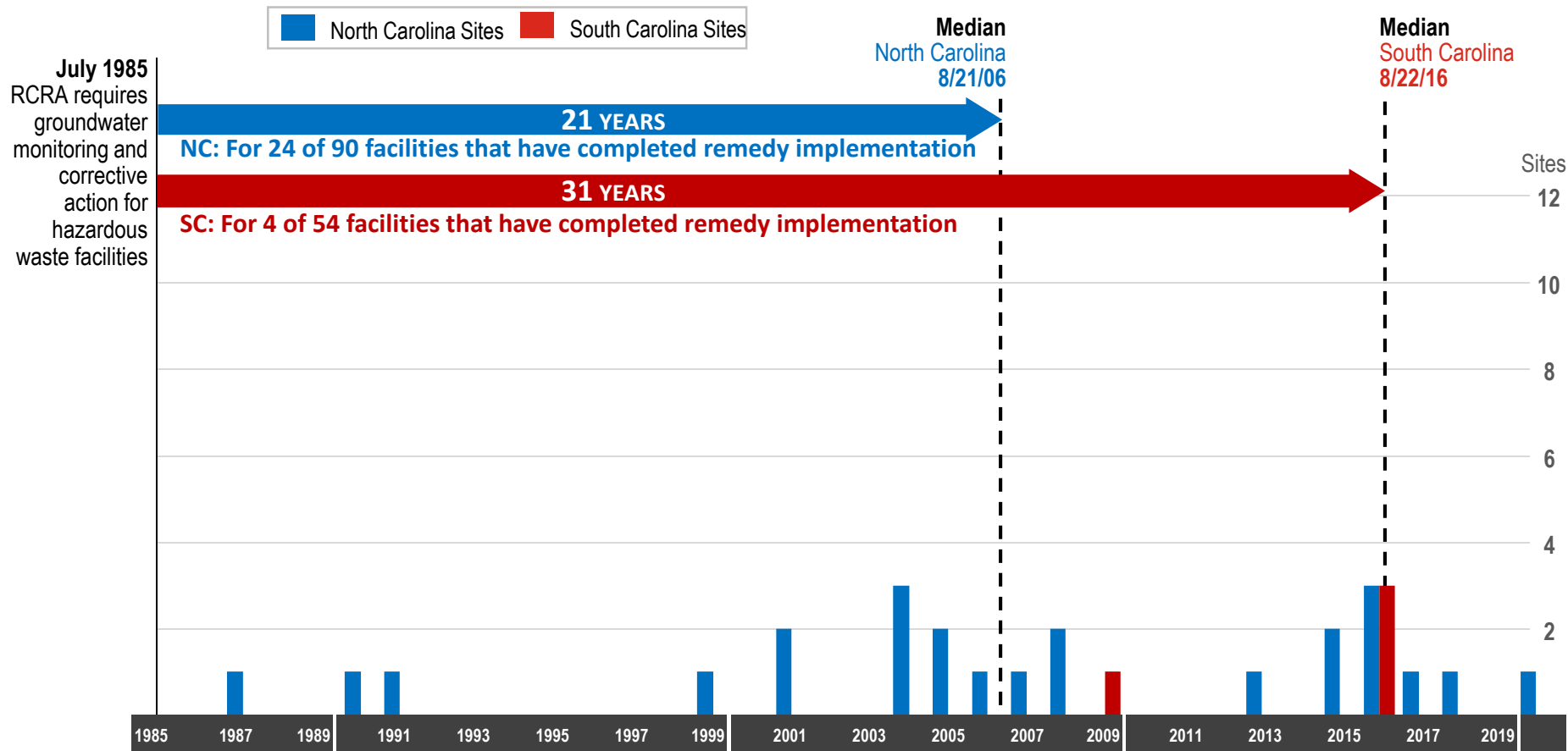
NC has 90 hazardous waste corrective action facilities

SC has 54 hazardous waste corrective action facilities

Remedy Selection Date (CA400) defined by EPA as date the State or EPA formally selects a remedy designed to meet long-term goals of protection of human health and the environment.

Data obtained on March 9, 2020 from <https://ofmpub.epa.gov/apex/cimc/f?p=100:15:::NO:RIR,CIR::>

RCRA Hazardous Waste Corrective Action Facilities - Remedy Completion Date



NC has 90 hazardous waste corrective action facilities
SC has 54 hazardous waste corrective action facilities

Remedy Completion Date (CA999 and CA900) defined by EPA as the date remedy has been fully implemented and associated performance standards are attained or date that corrective action process terminated because all required activities are completed.

Data obtained on March 9, 2020 from <https://ofmpub.epa.gov/apex/cimc/f?p=100:15:::NO:RIR,CIR::>



I/A

North Carolina Department of Environment and Natural Resources

Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

June 17, 2011

MEMORANDUM

To: Aquifer Protection Section Staff
Interested Parties

From: Ted L. Bush, Chief
Aquifer Protection Section

Subject: Policy for Compliance Evaluation of Long-Term Permitted Facilities with No Prior Groundwater Monitoring Requirements

Adherence to state regulations is fundamental to the protection of the waters of the state and is mandated in permits issued by the Division of Water Quality (DWQ). Evaluating permit conformity can be challenging, and oftentimes regulatory staff will add permit conditions to a permit to help determine if a facility is in compliance with state requirements. When groundwater monitoring requirements are added to a permitted facility that has operated for some period of time, it may be necessary to place wells at or near the compliance boundary (defined by 15A NCAC 2L .0107), rather than the review boundary (defined by 15A NCAC 2L .0108). This is determined by considering, at minimum, the following factors:

- 1) *Type of Permitted Activity.* Some permitted activities are more conducive to potential contamination than others. For instance, an unlined lagoon has a higher probability of contaminating the subsurface than a lined lagoon due to infiltration of the permitted waste into the underlying soil.
- 2) *Subsurface Geology.* Groundwater flow in the subsurface is controlled by the local geology. Some geological formations due to their structure and composition, such as unconsolidated sand or fractured bedrock, allow for greater groundwater flow rates. These formations have open pathways that can allow contaminants to easily migrate throughout the subsurface.
- 3) *Duration of Permitted Activity.* The longer a permitted activity takes place, the more opportunity there is for potential contamination to migrate away from the source. If the subsurface geology allows for greater groundwater flow, the amount of time it takes for potential contaminants to move away from the source is decreased. For the purpose of this document, a "Long-Term Permitted Facility" is a facility that has operated long enough that resulting contamination from the permitted source has a high probability of having reached or passed the compliance boundary.
- 4) *Location of the Review and Compliance Boundaries.* The distance of the review and compliance boundaries from the source is determined by rule. However, in some instances these boundaries can be closer to the source based on the location of the property boundaries.

June 17, 2011

Page 2

Once the factors above have been considered and wells have been installed and sampled, the attached flowchart will be used to determine facility compliance. The flowchart outlines the steps to be taken to assess whether or not groundwater standards have been exceeded at the compliance boundary, and only apply to long-term permitted facilities as defined above. The flowchart is designed to apply to any DWQ permitted facility where groundwater monitoring requirements have recently been added to the permit.

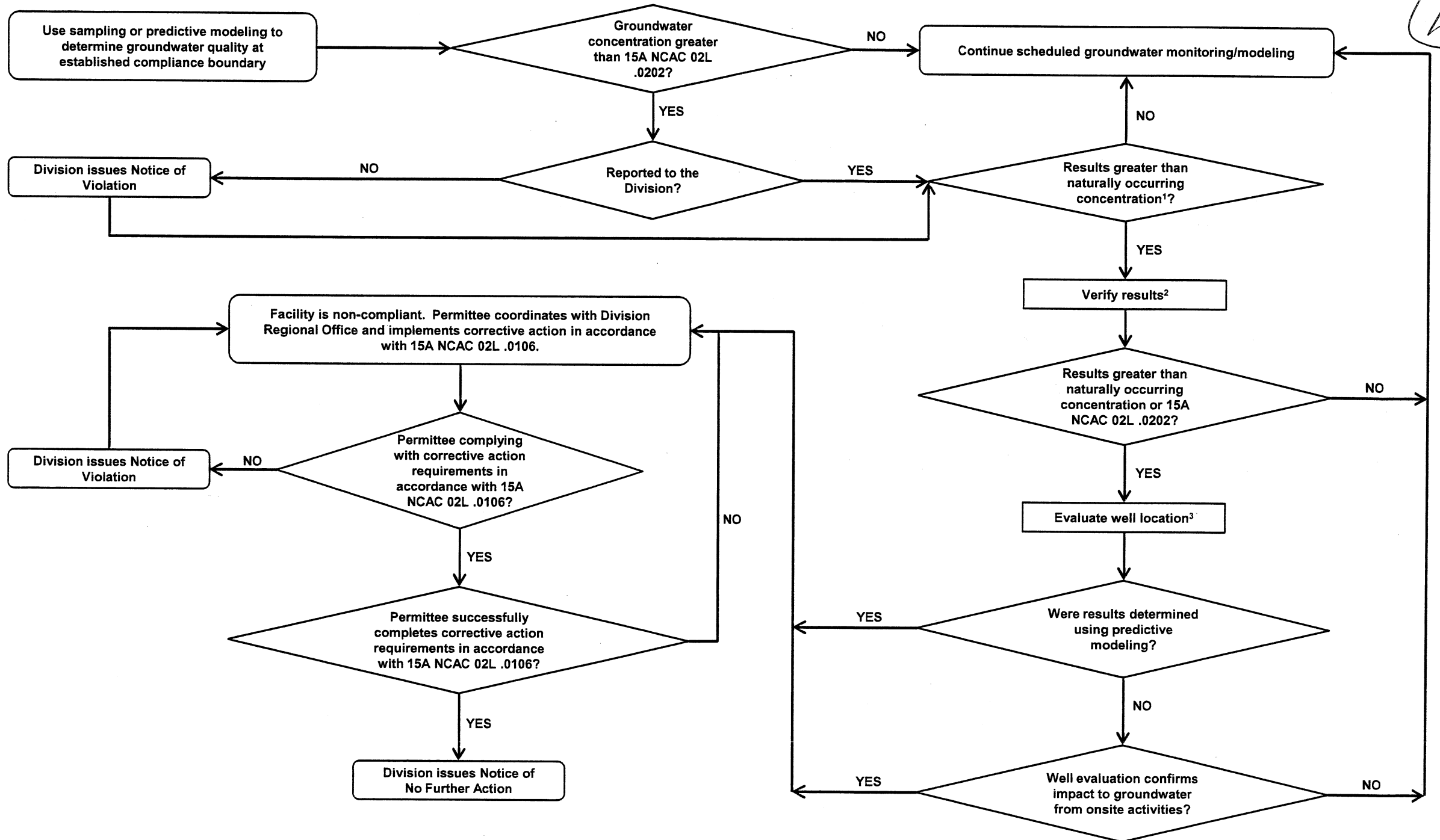
If the permitted facility is determined to be in non-compliance after following the steps outlined on the attached flowchart, adherence to the corrective action requirements specified in 15A NCAC 2L .0106 will be required. However, as long as the permittee is cooperative with the Division in taking all necessary steps to bring the facility into compliance, a notice of violation may not be necessary. The overall determination of whether or not a notice of violation is necessary will largely be based on the overall compliance history of the facility and the potential for impacts to human health and the environment.

cc: Surface Water Protection (Matt Matthews)

Compliance Evaluation of Long-Term Permitted Facilities with No Prior Groundwater Monitoring Requirements

(Refer to Policy Dated 6/17/11)

6/17/11



¹Per 15A NCAC 2L .0202 (b)(3). Naturally occurring, site-specific concentration to be evaluated by permit holder and approved by DWQ.

²Verification may include re-sampling, further well development, consideration of other analytical methods, comparison to split-sample results, review of model parameters (if determined using predictive modeling), etc.

³Evaluation will include a review of an array of hydrogeologic, site-specific features, related well location and construction specifications, groundwater flow direction, compliance boundaries, other contaminant sources, etc.

I/A

**Public Staff
Junis Exhibit 29**

O I C I A L C O P Y
Jan 24 2018

SETTLEMENT AGREEMENT

This is an AGREEMENT TO SETTLE AND FOR RELEASE OF CLAIMS ("Agreement") made and entered by and among North Carolina Department of Environmental Quality ("DEQ") (formerly known as the North Carolina Department of Environment and Natural Resources) on the one hand, and Duke Energy Carolinas, LLC and Duke Energy Progress, LLC (formerly known as Duke Energy Progress, Inc.) (together, "Duke Energy") on the other. DEQ and Duke Energy (collectively, the "Parties") agree to the following terms as a basis upon which to resolve the issues between them relating to alleged exceedances of state groundwater standards associated with coal ash facilities at sites operated by Duke Energy and its predecessors. By this Agreement, the undersigned settling Parties mutually agree to compromise, settle, and forgo all current, prior, and future claims related to exceedances of groundwater standards associated with coal ash facilities at Duke Energy's North Carolina facilities.

I. RECITALS

WHEREAS, Duke Energy owns and operates the following facilities that are the subject of this Agreement (collectively, the "Duke Energy Sites"):

- (1) the Allen Steam Station, located in Gaston County;
- (2) the Asheville Steam Electric Generating Plant, located in Buncombe County (the "Asheville Plant");
- (3) the Belews Creek Steam Station ("Belews Creek Plant"), located in Stokes County;
- (4) the Buck Steam Station, located in Rowan County, which has been retired and is no longer used for the production of electricity;

- (5) the Cape Fear Steam Electric Generating Plant, located in Chatham County, which has been retired and is no longer used for the production of electricity;
- (6) the Dan River Steam Station, located in Rockingham County, which has been retired and is no longer used for the production of electricity;;
- (7) the H.F. Lee Steam Electric Generating Plant ("H.F. Lee Plant"), located in Wayne County, which has been retired and is no longer used for the production of electricity;
- (8) the Marshall Steam Station, located in Catawba County;
- (9) the Mayo Steam Electric Generating Plant, located in Person County;
- (10) the Riverbend Steam Station, located in Gaston County, which has been retired and is no longer used for the production of electricity;
- (11) the Rogers Energy Complex (formerly Cliffside Steam Station), located in Cleveland and Rutherford Counties;
- (12) the Roxboro Steam Electric Generating Plant in Person County;
- (13) the L.V. Sutton Electric Plant, located in New Hanover County (the "Sutton Plant"), which has been retired and is no longer used for the production of electricity; and,
- (14) the Weatherspoon Steam Electric Plant, located in Robeson County, which has been retired and is no longer used for the production of electricity.

WHEREAS, the National Pollutant Discharge Elimination System ("NPDES") Permits associated with the Duke Energy Sites contain requirements for Duke Energy to monitor groundwater at the Duke Energy Sites and to report the results to DEQ.

WHEREAS, Duke Energy has at all times complied with its groundwater monitoring and reporting requirements of its NPDES Permits for each of the Duke Energy Sites.

WHEREAS, on June 17, 2011, DEQ issued its “Policy for Compliance Evaluations of Long-Term Permitted Facilities with No Prior Groundwater Monitoring Requirement” (hereinafter, the “2011 Policy for Compliance Evaluations”). The 2011 Policy for Compliance Evaluations attempts to address the situation where groundwater monitoring indicates that a “long-term permitted facility” is out of compliance with the 2L standards, including the conditions under which DENR might issue a NOV to the affected facility.

WHEREAS, the 2011 Policy for Compliance Evaluations includes a detailed flow chart dictating the steps to be taken by DEQ should Duke Energy report any exceedance of North Carolina’s groundwater standards as established pursuant to N.C.G.S. Chapter 143 and 15A N.C.A.C. Subchapter 2L at the Duke Energy Sites. Those steps include, but are not limited to: (1) verify the accuracy and significance of the results of the groundwater testing; (2) determine whether and to what extent the identified substance could be naturally occurring; and, (3) evaluate other possible sources of the identified substance.

WHEREAS, on August 26, 2014, DEQ sent Duke Energy a Notice of Violation based upon the exceedances of the State’s groundwater standards reported to DEQ for the Sutton Plant (the “Sutton NOV”).

WHEREAS, on September 20, 2014, the North Carolina Coal Ash Management Act (“CAMA”) became effective. CAMA requires, among other actions, closure and dewatering of all ash ponds at the Duke Energy Sites and dictates, in detail, a procedure for assessing, monitoring and where appropriate, remediating groundwater quality in areas around coal ash

impoundments in North Carolina that follows closely the procedures outlined in DEQ's 2011 Policy for Compliance Evaluations.

WHEREAS, Duke Energy submitted monitoring that showed exceedances of the State's groundwater standards at or beyond the compliance boundary at the Asheville Plant.

WHEREAS, on February 25, 2015, DEQ sent Duke Energy a Notice of Violation, this one based upon groundwater monitoring results reported to DEQ for the Asheville Plant (the "Asheville NOV").

WHEREAS, on March 10, 2015, DEQ assessed a \$25.1 million civil penalty (the "Penalty Assessment") against Duke Energy based upon groundwater monitoring results reported to DEQ for the Sutton Plant.

WHEREAS, on April 9, 2015, Duke Energy filed a Petition for Contested Case at the North Carolina Office of Administrative Hearings, challenging the Penalty Assessment on multiple legal and factual grounds (the "Sutton Petition").

WHEREAS, the Parties have engaged in extensive discovery regarding the arguments raised in the Sutton Petition, during which the Parties have concluded that:

- (1) The 2011 Policy for Compliance Evaluations is a current DEQ policy that was in effect at the time DEQ issued the Sutton NOV, the Asheville NOV and Penalty Assessment against Duke Energy;
- (2) The 2011 Policy for Compliance Evaluations applies to each of the Duke Energy Sites listed above;
- (3) The 2011 Policy for Compliance Evaluations states that as "long as the permittee is cooperative with the Division in taking the necessary steps to bring the facility into compliance, a notice of violation may not be necessary."
- (4) During the discovery process internal e-mails and testimony by former DENR management demonstrate that, although not expressly stated in the 2011 Policy for Compliance Evaluations, the intent at the time the 2011 Policy for Compliance Evaluations

was that corrective action would precede any enforcement and would be in lieu of monetary penalties.

WHEREAS, DEQ further acknowledges that the procedures outlined in CAMA are specifically designed to address, and will address, the assessment and corrective action of alleged groundwater contamination associated with coal ash facilities at the Duke Energy Sites. In combination with the specific requirements of CAMA, DEQ further acknowledges that this Agreement fully addresses and resolves all issues related to groundwater contamination associated with coal ash facilities at the Duke Energy Sites, including all groundwater violations alleged in the state enforcement actions currently pending in Superior Court in Wake and Mecklenburg Counties.

WHEREAS, DEQ and Duke Energy have determined that it is in the best interest of the Parties, the environment, as well as the citizens of North Carolina, that they enter into a compromise settlement to avoid the time and expense of prolonged litigation so that the Parties may focus the same on the assessment and, if necessary, corrective action of alleged groundwater standard exceedances at the Duke Energy Sites.

WHEREAS, DEQ and Duke Energy have determined that the actions provided for in this Agreement and the provisions of CAMA represent the best course for prompt assessment and remediation of any alleged groundwater standard exceedances at the Duke Energy Sites.

NOW, THEREFORE, in consideration of the promises and covenants contained herein and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, DEQ and Duke Energy agree to compromise, settle, and dismiss with prejudice all claims and causes of action related to alleged groundwater standard exceedances associated with coal ash facilities at the Duke Energy Sites upon fulfillment of the terms and conditions set forth below:

II. DUKE ENERGY'S OBLIGATIONS

A. Consistent with 15A NCAC 2L .0106 Duke Energy shall implement accelerated remediation at the Sutton Plant on the following terms and conditions:

- (1) Duke Energy will commence installation of extraction wells on the eastern portion of the Sutton Plant property where data show constituents associated with the ash basins at concentrations over the 2L standards ("Constituents of Interest") have migrated off site.
- (2) Extraction wells will be used to pump the groundwater to arrest the off-site extent of the migration. The pumped groundwater will be treated as needed to meet standards and returned either to the ash basin or the discharge canal.
- (3) This extraction and treatment system will be installed as soon as practicable following receipt of all permits and approvals from DEQ, the issuance of which will occur as soon as practicable. This accelerated groundwater remediation is in addition to and shall be performed concurrent with the coal ash impoundment closure obligations set forth in CAMA.
- (4) The extraction wells shall remain operational until such time as Duke Energy demonstrates through sampling, analysis, and appropriate modeling, and subject to DEQ's written concurrence, that off-property constituents of interest have been remediated to 2L Standards and there is no reasonable potential for future off-site migration.
- (5) As part of accelerated remediation, DEQ agrees that dry ash can be removed from the head of the ash basins under a construction storm water permit and shall expedite such construction storm water permit in order for Duke Energy to commence the removal of ash which is the source of the constituents of interest from the Sutton Plant. DEQ will issue construction storm water permits for Sutton plant within 10 days of receiving Duke Energy's complete application. Only dry ash from the head of the ash basins will be removed with no impact to wastewater treatment or water levels in the basins. DEQ shall use its best efforts to complete the process of the issuance of the NPDES permit modification at the Sutton Plant to allow for the removal of water and ash beyond the areas covered under the construction storm water permit from the Sutton Plant.

B. Consistent with 15A NCAC 2L .0106 Duke Energy shall implement accelerated remediation at the Asheville Plant, Belews Creek Plant, and H.F. Lee Plant, which are the only three other Duke Energy facilities that demonstrated offsite groundwater impacts in isolated areas that are not impacting private wells in the Comprehensive Site Assessments conducted

pursuant to CAMA. Such accelerated remediation shall be tailored to each facility's unique characteristics.

C. Petitioner agrees to pay to Respondent the sum of seven million dollars (\$7,000,000.00) (the "Payment") in full settlement of all current, prior, and future claims related to exceedances of groundwater standards associated with coal ash facilities at Duke Energy's North Carolina facilities. The Payment shall be made by check and made payable to the North Carolina Department of Environmental Quality and delivered to the following address:

North Carolina Department of Environmental Quality

Sam M. Hayes

217 West Jones Street

Raleigh, North Carolina 27603

The Payment shall be made within thirty (30) days of the receipt by Duke Energy of the acknowledgment described in part III.A. below. The Payment shall be accepted and acknowledged in writing by DEQ as "Payment In Full" in this matter within thirty-five (35) days of the execution of this Agreement.

D. Within fifteen (15) days of the receipt by Duke Energy of the acknowledgment described in part III.A. below, Duke Energy shall file and serve a Voluntary Withdrawal with Prejudice of the Sutton Petition, Case No. 15-EHR-02581, the Petition for Contested Case Hearing filed by Duke Energy related to the Notice of Regulatory Requirements dated July 9, 2014, Case No. 14-EHR-09631, and the Petition for Contested Case Hearing filed by Duke Energy related to the determination that Sutton Lake is waters of state, Case No. 15-EHR-04922.

III. DEQ'S OBLIGATIONS

A. Within five (5) days of the execution of this Agreement, DEQ shall communicate to Duke Energy, in writing, its withdrawal and rescission, with prejudice, of the Sutton NOV, the Sutton NORR, the Asheville NOV, and the Penalty Assessment.

B. DEQ shall not issue any further Notices of Violation, Notices of Regulatory Requirements, other similar notices, unilateral orders or civil penalty assessments to, file any judicial action against, or take any administrative, regulatory, or other enforcement actions against Duke Energy based on or in any way related to any previous or future groundwater monitoring results or alleged groundwater conditions at any of the coal ash facilities at any of the Duke Energy Sites, as long as Duke Energy continues to be in substantial compliance with CAMA requirements as they relate to groundwater assessment and remediation and closure of ash basins, including corrective action plans. DEQ also shall not issue Notices of Violation, Notices of Regulatory Requirements, other similar notices, unilateral orders or civil penalty assessments to, file any judicial action against, or take any administrative, regulatory, or other enforcement actions against Duke Energy based on or in any way related to the classification of Sutton Lake as waters of the State as set forth in paragraph II.D. above.

C. Except as necessary under CAMA or unless ordered or required to change, alter, modify, or amend by a court of competent jurisdiction or by the enactment or amendment of any applicable federal or state statute, rule, or regulation, or in response to an immediate threat to public health, DEQ agrees to not materially modify the groundwater monitoring terms in the existing NPDES Permits and in issuing future NPDES Permits for the Duke Energy Sites. For purposes of this provision "immediate threat to public health" shall mean circumstances beyond exceedances of the applicable provisions of 15A N.C.A.C. Subchapter 2L (the "2L Standards"). Except as provided in part III.B above, DEQ further agrees to limit the

use of the results of any groundwater monitoring required by NPDES permits or CAMA for the determination of prioritizing the coal ash impoundments and approving closure plans. This provision shall not modify the rights, duties and obligations of DEQ or Duke Energy pursuant to CAMA.

D. DEQ agrees that applicable, enforceable groundwater quality standards and naturally occurring (also known as “background”) concentrations shall only be those established pursuant to applicable provisions of the “2L Standards.”

E. Duke Energy and DEQ acknowledge that Duke Energy has been receiving and may in the future continue to receive concerns from individuals or local governments regarding alleged adverse impacts to groundwater from beneficial re-use activities conducted under Distribution of Residual Solids Permits, Ash Reuse Permits or similar permits issued by DEQ or its predecessors authorizing ash reuse programs. Except as otherwise provided by CAMA and the Distribution of Residual Solids permits, Ash Reuse Permits, or similar permits issued by DEQ, DEQ shall be responsible for investigating (including, when necessary, collecting and analyzing groundwater samples) and respond to all such concerns and shall notify Duke Energy of all such responses.

F. DEQ will issue construction storm water permits for Sutton plant within 10 days of receiving Duke Energy’s complete application. Only dry ash from the head of the ash basins will be removed with no impact to wastewater treatment or water levels in the basins. DEQ shall use its best efforts to complete the process of the issuance of the NPDES permit modification at the Sutton Plant to allow for the removal of water and ash beyond the areas covered under the construction storm water permit from the Sutton Plant.

IV. LEGAL PROVISIONS

A. Binding Nature of Agreement. The Parties represent and agree that the persons executing this Agreement have full and sufficient authority to sign and agree to be bound by the Agreement, and that this Agreement shall be binding upon DEQ and Duke Energy, and their successors and assigns, upon its execution by all Parties.

B. No Admissions. By entering into this Agreement, the Parties to this Agreement make no admission of liability, violation, or wrongdoing whatsoever, by itself, any of its affiliated companies, or any or its or their present or former officers, directors, employees, or agents.

C. Attorney's Fees, Costs, and Expenses. The Parties agree to bear their own respective attorney's fees, costs, and other expenses that have been incurred in connection with any stage of the state enforcement actions or Duke Energy's Petition for Contested Case related to the Penalty Assessment.

D. Governing Law and Interpretation. This Agreement shall be governed and interpreted in accordance with the laws of the State of North Carolina without regard to the conflict of laws provisions of North Carolina or any other state, and any provision herein that violates a statute or rule shall be void and unenforceable.

E. Enforceability and Remedies for Breach. The Parties stipulate and agree that this Agreement may be enforced in any court of competent jurisdiction in North Carolina, and that venue is appropriate in either Wake or Mecklenburg County. The Parties' sole and exclusive remedy for breach of this Agreement shall be an action for specific performance or injunction. In no event shall any Party be entitled to monetary damages for breach of this Agreement. In addition, no legal action for specific performance or injunction shall be brought or maintained

until: (a) the non-breaching Party provides written notice to the allegedly breaching Party which explains with particularity the nature of the claimed breach, and (b) within thirty (30) days after receipt of said notice, the allegedly breaching Party fails to cure the claimed breach or, in the case of a claimed breach which cannot be reasonably remedied within a thirty (30) day period, the allegedly breaching Party fails to commence to cure the claimed breach within such thirty (30) day period, and thereafter diligently completes the activities reasonably necessary to remedy the claimed breach. This Agreement may be introduced as evidence in any action involving either or both Parties for the purpose of implementing its terms.

F. Severability. The invalidity or unenforceability of any provision of this Agreement shall in no way affect the validity or enforceability of any other provision; the invalid or unenforceable provision shall be stricken, without assessing damages or imposing penalties to either Party arising out of said provisions by any court of competent jurisdiction.

G. Headings. The headings used in this Agreement are for convenience of reference only and shall in no way define, limit, expand or otherwise affect the meaning of any provision of this Agreement.

H. Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed to be an original, but all of which together shall constitute one and the same instrument.

I. Amendment. This Agreement may not be modified, altered or changed except in a written document that is signed by all Parties and that makes specific reference to this Agreement.

J. Entire Agreement. This Agreement sets forth the entire agreement between the Parties, and fully supersedes any prior agreements or understandings between the Parties related

to the subject matter of this Agreement, including but not limited to alleged groundwater standard exceedances associated with coal ash ponds at the Duke Energy Sites.

K. Review and Signing. Each Party and counsel for each Party has reviewed this Agreement. Accordingly, this Agreement shall be construed without regard to any presumption or other rule of construction requiring resolution of ambiguities against the drafting Party.

L. The Parties agree that this Agreement does not affect in any way the Joint Enforcement Agreement between DEQ and U.S. EPA, the subject of which does not involve any alleged groundwater standard exceedances associated with coal ash facilities at the Duke Energy Sites.

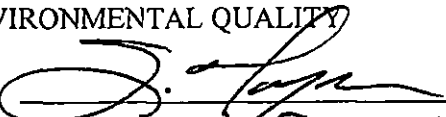
[Signature page follows]

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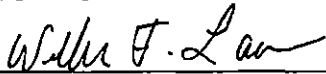
Jan 24 2018

IN WITNESS WHEREOF, DEQ and Duke Energy, and their respective counsel have
executed this Agreement as of September 29, 2015.

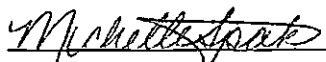
NORTH CAROLINA DEPARTMENT OF
ENVIRONMENTAL QUALITY

By: 
Its: General Counsel
Date: 9/29/15

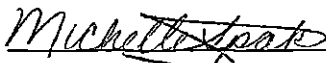
KILPATRICK TOWNSEND & STOCKTON LLP

By: 
Its: _____
Date: 9/29/2015

DUKE ENERGY CAROLINAS, LLC

By: 
Its: Associate General Counsel
Date: 9/29/2015

DUKE ENERGY PROGRESS, LLC

By: 
Its: Associate General Counsel
Date: 9/29/2015

McGUIREWOODS LLP

By: 
Date: 9/29/15

OFFICIAL COPY

Jan 24 2018



memo

Date: August 20, 2009

To: Laurie Moorhead
Dulcie Phillips
Kent Tyndall
Billy Milam

Leigh Barr
Ricky Miller
Larry Baxley
Robert Howard

Cc: Cam Wheeler
Dan Kemp
Shannon Langley
Steve Cahoon

Alan Madewell
Fred Holt
Robin Bryson

From: John Toepfer 

Subject: Progress Energy/Duke Energy and DENR Meeting on July 23, 2009

Attendance:

Ted Bush – Section Chief, Aquifer Protection Section - DENR
Debra Watts – Supervisor, Groundwater Protection Unit – DENR
Betty Wilcox – Groundwater Protection Unit - DENR
Eric Smith – Groundwater Protection Unit - DENR
Matt Matthews - NPDES Unit – DENR
Sergei Chernikov – NPDES Unit - DENR
Ed Sullivan, Allen Stowe and George Everett – Duke Energy
Cam Wheeler, Alan Madewell and John Toepfer - PEC

Debra Watts stated that they (APS) had received and responded to many questions from the media and the public about ash ponds so far this year. Some had requested copies of groundwater monitoring data and APS had provided it when available. When asked by the public, the APS staff had commended the utility companies for volunteering this groundwater monitoring program and maintaining a productive working relationship with the agency.

DENR along with PEC posed questions to discuss at this meeting. DENR then developed the "Topics to Discuss" which lead the meeting. I include the questions along with items discussed below:

1. Is it feasible to evaluate the entire power plant site for compliance as one source rather than on an individual site-by-site basis (e.g. landfills, active ash ponds, inactive ash ponds, etc.)?

Memorandum

Ted Bush stated that this is not an unreasonable question. Both Aquifer Protection Section and NPDES were open to such an evaluation but stated it would require bringing solid waste to the table to discuss. Then if all DENR Divisions were open to such an evaluation, the statutes would need to be changed along with the corresponding regulations. George Everett and Cam Wheeler have the action item to bring Solid Waste and Water Quality DENR personnel to the table to discuss further.

2. Is it feasible to evaluate these same sites on a risk-based approach rather than on a 2L basis (does DWQ support or not support)? Additionally, if groundwater discharging to surface water, but the surface water still meets NPDES limits or water quality standards, is this acceptable?

As above, DENR is open to risk based approaches but must follow the statutes and regulations which force them to follow 2L. Would require statute and corresponding regulation changes to allow risk based approaches for our industry. Right now, only dry cleaners and leaking USTs have risk based cleanup standards. This is a long standing issue from industry and has consistently been opposed by environmental organizations. There is a proposed bill in the state legislature which discusses risk based cleanup standards for industry but it does not look promising. Cam Wheeler and George Everett will discuss this in their future meeting with DENR Solid Waste and Water Quality.

Debra Watts stated that if you have a site where a water body is located within your compliance boundary around an ash pond and groundwater flows into this water body, you can have exceedances of 2L standards in the groundwater with no further work required by APS. However, the water body must be in compliance with all surface water standards (review surface water sampling results to same constituents monitored in groundwater) for APS to state no further work required. Then, NPDES is satisfied since the water body is in compliance with all surface water standards. NPDES and APS would want to see surface water sampling both upstream and downstream of the potential ash pond discharge into the surface water body.

3. How does DWQ plan to address inactive sites that are not permitted and not operating e.g. give over to DWM, leave alone, monitor? If the sites are permitted and receiving waste, what are the closure requirements?

DWQ stated they would not address inactive sites but did not state if they would hand over to DWM or not. Unless there is reason to believe these inactive sites could cause groundwater or surface water impacts, they will leave them alone.

DWQ have on-site lagoon closure requirements but admit they are light on specifics and open to a wide interpretation. These interpretations would be made by the appropriate regions on site by site basis. Both APS and NPDES said they would get together internally to discuss closure requirements for ash ponds. They did not state by when they would issue closure requirements for ash ponds.

4. Does DWQ plan to incorporate groundwater monitoring for active sites into NPDES permits? If so, at what point – mid-stream of the permitting cycle, volunteer only, etc.?

Debra Watts stated she wanted to see groundwater monitoring incorporated into NPDES permits once exceedances are recorded at the review boundary. She stated the NPDES permit would not incorporate all groundwater monitoring wells nor all constituents but would be captured into the permit in some form. Both PEC and Duke were not in favor. We stated that the voluntary approach now had lost all flexibility

once within a permit. Examples were groundwater results must be sent to DENR within 30 days or an NOV is issued. NPDES submittals require signatory authority. These arbitrary barriers could lead to NOV's and both companies are adverse to NOV's. Also, any changes to the monitoring program would now require a permit modification with public comment. Many PEC and Duke sites just completed their 5 year NPDES permit cycle and would not want to open the permit to incorporate groundwater monitoring. Plus when the permit is opened, much could change besides the addition of groundwater monitoring. Debra Watts stated she was not aware of these concerns and states she may re-think the requirement to have groundwater monitoring within the NPDES permit. She indicated that her concerns over access to the data might be adequately addressed with a software change.

At this time, Ted Bush and George Everett had to leave to attend meetings at the legislature building. As the remaining questions only pertained to APS, Matt Matthews and Sergei Chernikov exited the meeting.

5. "Location of waste disposal areas and other potential sources of contamination at the site." Does this include all contamination not associated with CCP sites, e.g. oil spills?

DENR was satisfied with the information that PEC and Duke Energy supplied APS back in April 2009. Both companies stated that since the request for information from DENR was CCP related, we only submitted information on active, semi-active and inactive CCP sites and this was sufficient for DENR.

6. Well data (site-by-site basis). DWQ observations and recommendations.

Eric Smith had comments on a site-by-site basis for both companies. Most of the comments related to the fact that the wells were not at the review boundary (between waste boundary and review boundary) and that the well screens were below the groundwater elevation (this might result in a stagnant layer of water above the screen that could affect low flow sampling results). Eric did not have the comments for both companies in writing but stated he would provide both companies the comments in writing shortly.

7. Water quality data (site-by-site basis). DWQ observations and recommendations.

Due to time issues, the question was not discussed in great detail. Any comments from DENR would be incorporated into Eric Smith's comments.

8. Recommended definition of waste boundary – acceptable or not acceptable?

Debra Watts stated that she discussed with the various DENR regions our definition of the waste boundary, the starting point for determining the location of review and compliance boundaries. We stated in our April 2009 submittal to DENR that the waste boundary should not be at the edge of water adjacent to a dam, but at the downstream toe of the dams and dikes. DENR has decided to accept this position and therefore, significant additional distance is provided to allow for compliance with groundwater quality standards downgradient from dams. Also, PEC does not have to change the location of the waste boundary, nor review and compliance boundaries as shown in the April 2009 submittal to DENR. One note: DENR does want to see the waste boundary along with the review and compliance boundaries circle the entire ash pond. This will require that PEC Asheville Plant, Mayo Plant and Sutton Plant figures to be updated at some point. Cape Fear, Lee and Weatherspoon figures will not require changes for this issue.

9. Compliance boundaries that overlap with other permitted sites or fall into surface water.

Memorandum

Duke Energy has a few sites where compliance boundaries overlap. APS stated they were not too concerned, as long as the well was within a compliance boundary, they would not require additional work. Duke Energy stated DSW viewed this differently. This topic would be discussed when George Everett and Cam Wheeler meet with DENR Solid Waste and Water Quality.

It was discussed already that APS would be open to monitoring the surface water body when the compliance boundary falls into an adjacent water body. However, Debra Watts did state you would still have to follow 2L for sites where a surface water body is just beyond the compliance boundary and wells at the compliance boundary show 2L exceedances. Our Asheville Plant is a potential example of this situation. The French Broad River is just beyond the compliance boundary but we don't yet have wells at the compliance boundary. The group did discuss that 2L has options that can be explored such as variances from 2L, monitoring the surface water body and modeling rather than pump and treat to remedy exceedances at the compliance boundary.

**DWQ AND PROGRESS ENERGY/DUKE ENERGY MEETING
AGENDA**

July 23, 2009

<u>Timeframe</u>	<u>Topics to Discuss</u>
10:00 to 11:00	<p>Division discussion</p> <ol style="list-style-type: none">1. Is it feasible to evaluate the entire power plant site for compliance as one source rather than on an individual site-by-site basis (e.g. land fills, active ash ponds, inactive ash ponds, etc.)2. Is it feasible to evaluate these same sites on a risk-based approach rather than on a 2L basis (does DWQ support or not support). Additionally, if groundwater is discharging to surface water, but the surface water still meets NPDES limits, is this acceptable?3. How does the DWQ plan to address inactive sites that are not permitted and not operating e.g. give over to DWM, leave alone, monitor? If the sites are permitted and receiving waste, what are the closure requirements?4. Does DWQ plan to incorporate groundwater monitoring for active sites into NPDES permits? If so, at what point – mid-stream of the permitting cycle, volunteer only, etc.
11:00 to 12:00	<p>Follow-up items to June 4th Meeting:</p> <ol style="list-style-type: none">✓ 5. "Location of waste disposal areas and other potential sources of contamination at the site." Does this include all contamination not associated with CCP sites, e.g. oil spills?✓ 6. Well data (site-per-site basis). Discussion on well locations, well construction, etc.✓ 7. Water quality data (site-per-site basis). DWQ observations and recommendations✓ 8. Recommended definition of waste boundary – acceptable or not acceptable? <i>regions comfortable w/ this approach</i>✓ 9. Compliance boundaries that overlap with other permitted sites or fall into surface water

From: Stowe, Allen
Sent: Friday, April 19, 2013 1:43 PM
To: Watts, Debra
Cc: Toepfer, John; Smith, Eric; Wilcox, Betty
Subject: RE: Ash Pond Closure Draft

Debra,

Attached are our consolidated comments on ash pond closure guidelines and closure letter. We very much appreciate the opportunity to review and provide input. If possible, we would like to review the revised documents before they are finalized as well.

Please let me know if you have any questions or comments regarding these documents.

Thanks

Allen Stowe
Water & Natural Resources
Duke Energy
704-382-4309 (Office)
704-516-5548 (Cell)
Allen.Stowe@duke-energy.com

From: Watts, Debra [<mailto:debra.watts@ncdenr.gov>]
Sent: Tuesday, March 26, 2013 5:55 PM
To: Stowe, Allen
Cc: Toepfer, John; Smith, Eric; Wilcox, Betty; Hickok, Linda; Brown, Kevin; Zarzar, Issa; Sullivan, Ed M; Ed Henriques
Subject: Ash Pond Closure Draft

Allen

As discussed, the APS staff has developed ash pond closure guidelines over the past year. Much of this was based on what you presented during our Weatherspoon closure meetings, so you shouldn't be too surprised as to what we are sending you. The policy letter is titled "Ash Pond Closure Letter 3-26-13 Final Draft..." and the list of requirements (attachment to the policy) is titled "Draft Closure Requirements 3-25-13."

Ted has seen this although he has not signed it. We are looking at receiving feedback from our stakeholders, Duke and the former Progress Energy, before going forward with this. The Environmental Groups will also be asked for feedback, and will receive a copy of this after we incorporate any changes you may have.

We would appreciate you distributing this to whomever it needs to be seen by. Also, we'd like to have your consolidated comments by April 19th (3 weeks), but if you need more time, please let us know.

Thanks for your assistance with this. Let us know if you have any questions.

Debra J. Watts, Supervisor
Groundwater Protection Unit
Aquifer Protection Section

Ash Pond Closure Plan Requirements

The purpose of the following outline is to aid in the development of an ash pond closure plan. These plans must be submitted to the Aquifer Protection Section (APS) Chief for approval.

- 1) Facility and Ash Pond Description. Briefly describe or provide the following:
 - a) Site and history of site operations.
 - b) Ash handling and storage operations.
 - c) Types of flows discharging into the pond (e.g. ash transport water, stormwater runoff, chemical and non-chemical metal cleaning wastewaters, coal pile runoff, miscellaneous equipment cooling and lubricating water, etc.)
 - d) Estimated volume of material contained in the ash pond(s).
 - e) Analysis of the structural integrity of dikes and/or dams associated with ash pond.
 - f) Composition of liner (lined or unlined pond).
 - g) Summarized results of any previous environmental investigations performed at the site.
- 2) Site Map. Provide a site map that illustrates the following:
 - a) All structures associated with operations of the ash ponds within the power plant property boundary.
 - b) All identified current and former ash disposal and storage areas including structural fills.
 - c) All property boundaries and established compliance boundaries.
 - d) All known potential receptors (i.e. water supply wells, surface water bodies (streams, springs, lakes, ponds and other surface drainage features), and wetlands) within 1500 feet of the ash pond boundary.
 - e) Topographic contours of the site (no less than 5 ft. intervals).
 - f) Locations of all on-site active and inactive Division of Waste Management (DWM) permitted solid waste facilities along with their associated compliance boundaries and monitoring wells.
 - g) All existing and proposed groundwater monitoring wells associated with monitoring of the active and inactive ash ponds.
 - h) All existing and proposed sample collection locations associated with the operation or closure of the ash pond(s).
- 3) Hydrogeologic, Geologic, and Geotechnical Investigation. Refer to the Policy for Hydrogeologic Investigation and Reporting dated May 31, 2007. Provide the following:
 - a) A brief description of the hydrogeology and geology of the site.
 - b) A description of the stratigraphy of the geologic units underlying the ash ponds.
 - c) The saturated hydraulic conductivity for the ash, liner (if present), and all identified stratigraphic units underlying the ash pond(s).
 - d) The geotechnical properties for the ash, liner (if present), and the uppermost identified stratigraphic unit underlying the ash pond(s). Analyses should include the following:
 - i) Soil Classification by Unified Soil Classification System
 - ii) In-place moisture content

- iii) Particle size distribution
 - iv) Atterberg limits
 - v) Specific gravity
 - vi) Effective friction angle
 - vii) Maximum dry density
 - viii) Optimum moisture content
 - ix) Permeability
 - e) Provide laboratory results for chemical analysis of the ash basin pond water, ash, and ash-affected soil. Identify constituents with concentrations found to be in excess of 15A NCAC 02L.0202 Groundwater Quality Standards.
 - f) A map that illustrates the following:
 - i) potentiometric contours and flow directions for all identified aquifers underlying the ash pond(s) (shallow, intermediate, and deep).
 - ii) the known horizontal extent of areas where 15A NCAC 02L.0202 Groundwater Quality Standards are exceeded.
 - g) Cross-sections that illustrate the following:
 - i) Vertical and horizontal extent of the ash within the ash pond
 - ii) Stratigraphy of the geologic units underlying the ash pond.
 - iii) the vertical extent of areas where 15A NCAC 02L.0202 Groundwater Quality Standards are exceeded.
- 4) Hydrogeologic Modeling. Please refer to the Groundwater Modeling Policy and Reporting Policy dated May 31, 2007.
- a) Perform groundwater modeling based on the design of the proposed pond closure method.
 - b) The groundwater modeling should:
 - i) be based on the site hydrogeologic conceptual model developed using the Hydrogeologic Investigation and Reporting Policy.
 - ii) provide predictions on post-closure groundwater elevations, groundwater flow directions and velocities
 - iii) provide predictions at the compliance boundary for constituents identified in part 3 (e) as exceeding 15A NCAC 02L.0202 Groundwater Quality Standards.
 - c) If required, describe the actions necessary to demonstrate compliance with 15A NCAC 02L.0202 Groundwater Quality Standards and 15A NCAC 02L .0106, as applicable.
- 5) Closure Method
- a) Provide a description of the closure method. Closure methods include:
 - i) Closure-in-Place. This alternative entails placing an engineered cover system such as a composite geomembrane, impermeable clay, and/or a soil cover over the ash pond. No ash or ash-affected soil would leave the ash pond area.
 - ii) Clean Closure. This alternative assumes that all coal ash can be excavated and the ash pond area will be returned to a non-erosive and stable condition.
 - iii) Hybrid Closure. This alternative entails consolidating ash and ash-affected soil into as small area as feasible within the ash pond footprint. An engineered cover system (e.g. composite geomembrane, impermeable

- clay, and/or a soil cover) would be installed over the consolidated ash and ash-affected soil. The remaining ash pond area will be returned to a non-erosive and stable condition.
- iv) Other closure methods as approved by the Aquifer Protection Section Chief. These methods must be demonstrated to be effective at protecting water quality.
 - b) Provide any plans for beneficial reuse of the coal ash under 15A NCAC 02T .1200 (if applicable).
 - c) Identify the closure method for the ash pond(s).
 - d) Provide all engineering drawings, schematics, and specifications for the proposed closure method.
 - i) If required by G.S. 89C, engineering design documents should be prepared, signed, and sealed by a professional engineer.
 - ii) Describe the construction quality assurance and quality control program including:
 - A) responsibilities and authorities;
 - B) monitoring and testing activities; and
 - C) sampling strategies
 - D) reporting requirements
 - e) Describe the provisions for disposal of wastewater through the NPDES permit or any other relevant permit. The facility needs to meet all the requirements of the NPDES wastewater permit during the dewatering of the ash pond.
 - f) Describe the provisions for disposal or removal of ash. Identify the site and the permit number for ash sent to a permitted disposal site. If ash is left in place:
 - i) Describe how the ash will be stabilized during closure and post closure.
 - ii) Estimate the volume of ash left in place.
 - g) Identify all permits that are necessary (i.e. permits that will need to be acquired or modified) to complete closure activities.
- 6) Post-Closure Plan. Post-Closure Plans should be designed for a minimum of 30 years. If required by G.S. 89C, these plans should be signed and sealed by a professional engineer.
- a) Describe the post-closure care and maintenance activities.
 - b) Demonstrate the long-term control of all leachate, affected groundwater, and stormwater
 - c) Describe the Groundwater Monitoring Program, to include:
 - i) Post closure groundwater monitoring including parameters to be sampled and sampling schedules
 - ii) Any additional monitoring well/s installations, including a map with the proposed location/s and well construction details.
 - e) The length of the post-closure care period may be decreased and/or the frequency and parameter list may be modified by the Section if the owner demonstrates that the reduced period and/or modifications are sufficient to protect human health and the environment and this demonstration is approved by the Section.
 - f) Following completion of the post-closure care period, the owner shall notify the Section that a certification, signed by a registered professional engineer, verifying that post-closure care has been completed in accordance with the post-closure plan, has been placed in the file.

- 7) Schedules
 - a) Provide an estimate of the milestone dates for all activities related to closure and post-closure..
- 8) Future Site Use
 - a) Describe the anticipated future site use.
 - b) Determine the necessity for deed restrictions following closure.

DRAFT



North Carolina Department of Environment and Natural Resources

Division of Water Quality
Charles Wakild, P. E.
Director

Pat McCrory
Governor

John E. Skvarla, III
Secretary

March XX, 2013

MEMORANDUM

TO: Aquifer Protection Section Staff
Surface Water Protection Section Staff
Interested Parties

THROUGH: Jay Zimmerman, P.G.
Aquifer Protection Section Chief

THROUGH: Matt Matthews
Surface Water Protection Section Chief

FROM: Ted L. Bush, Jr.
Deputy Director

SUBJECT: Guidelines for the Closure of Ash Ponds

Purpose

The purpose of these guidelines is to provide a course of action for the closure of ash ponds at coal-fired power plant facilities permitted by the Division of Water Quality (DWQ). There are fourteen (14) major existing or recently retired coal-fired power plants in North Carolina that are regulated under North Carolina General Statute 143.215.1. These same facilities are further regulated by 15A NCAC 2L, *Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina*, but are not regulated as a solid or hazardous waste.

In order to develop guidelines for ash pond closures, the Aquifer Protection Section (APS) researched and incorporated elements from the North Carolina Division of Waste Management (DWM) Solid Waste Rules, the Environmental Protection Agency (EPA), and other State guidelines and rules. Although corrective action is not the focus of these guidelines, closure of these structures can be considered an important tool if corrective action is required. However, the basis of these guidelines is to assist permittees in obtaining a closure approval from DWQ.

Closure Plan Approval

Each coal ash facility presents a unique set of challenges for closure due to their size, complexity, and location. Therefore, to allow the most flexibility in solutions to these challenges, the attached guidelines only outline the requirements versus spelling out specific

details, thus facilitating the decisions the permittee may need to make to determine the best way to meet these requirements. A closure plan must still be submitted that details all aspects of the closure and post-closure activities at the facility, and should include the following elements:

- Facility and Ash Pond Description
- Site Maps
- Hydrogeologic, Geologic, and Geotechnical Investigation
- Closure Method
- Hydrogeologic Modeling
- Post-closure plan
- Schedules
- Future Site Use

Once the closure plan is developed, the permittee of the facility must submit this plan along with a letter to the APS Section Chief requesting closure.

Optional Pre-Submittal Meeting

Although a complete plan is required before approval can be obtained, a pre-submittal meeting is highly encouraged where the applicant must provide a minimum portion of the application (e.g. facility and ash pond description; site maps; and hydrogeologic, geologic, and geotechnical investigation) in addition to the chosen method of closure. Past DWQ experience has shown that pre-submittal meetings have been very beneficial to improving review timeliness since applications tend to be more complete. In addition, the pre-submittal meeting provides an opportunity to discuss the project in general, the history of the site, design considerations, and any initial questions the reviewers may have. Once the applicant and reviewers have had a chance to meet, the applicant must submit their complete closure request for approval as discussed above.

Submittal Requirements

The requestor should submit five (5) copies of the closure plan to the APS Section Chief and an electronic copy (not via email). The APS Section Chief will then distribute the copies to the appropriate agencies.

Closure Plan Review

The closure plan will be reviewed by a technical review committee selected by the APS Section Chief. The committee will generally consist of engineers, geologists and APS regional and central office representatives, to include the APS Regional Supervisor of the closure site. After thorough review of the closure plan and coordination with the DWQ National Pollutant Discharge Elimination System (NPDES) staff, the committee will present their recommendations to the APS Section Chief. The APS Section Chief will then send a letter recommending approval or denial of the closure request through the Surface Water Protection Section (SWPS) Chief to the DWQ Deputy Director. The Deputy Director will send a letter to the applicant that conveys approval or denial of the closure request. If the letter conveys denial, sufficient justification for the decision will be included. If the letter conveys approval, the requestor may begin the closure activities.

Additional Requirements

While the intent of this policy is to assist permittees in obtaining a closure approval for their permitted ash pond, this does not give them approval for decommissioning the dam. Permittees must apply separately for dam decommissioning with the Division of Energy, Mineral, and Land Resources (DEMLR). Since a number of the technical requirements for ash pond closure and dam decommissioning are the same, it may be acceptable to submit the same closure plan to DEMLR. Due to extensive grading work and potential for sedimentation anticipated during closure, an Erosion and Sedimentation control plan may need to be submitted to DEMLR as well (reference Sedimentation Pollution Control Act of 1973).

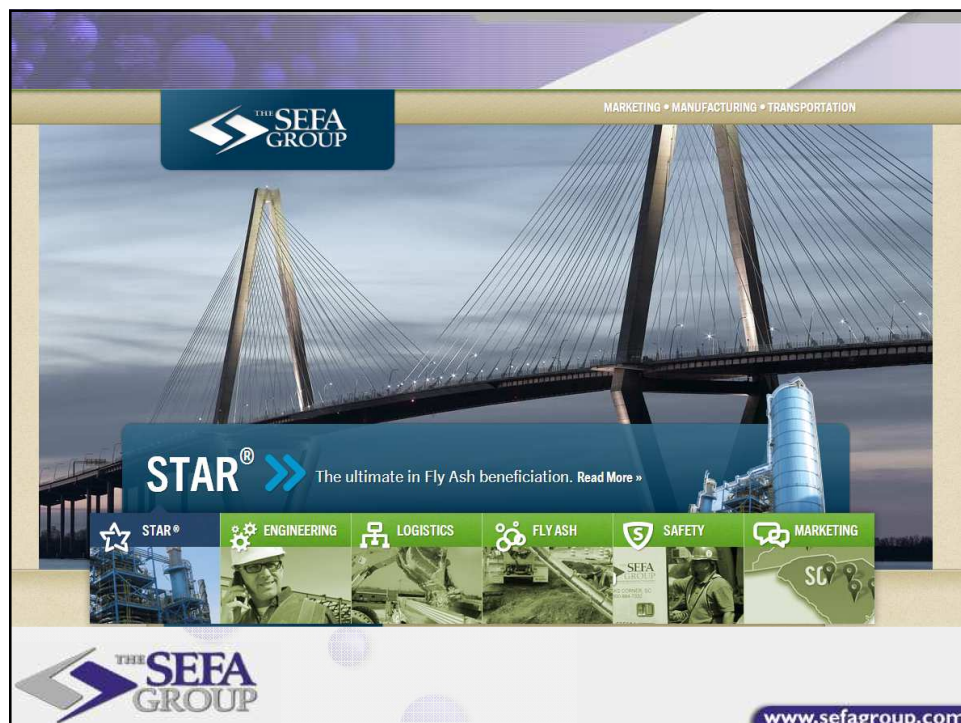
Closure Activities

Once the entire closure plan has been accepted by all State entities involved, the applicant may proceed with the proposed closure activities. The APS Regional Office will oversee the ash pond closure activities and perform inspections as needed.

Attachment:

Ash Pond Closure Requirements

cc: DWQ/Surface Water Protection Section (Matt Matthews)
DWQ/ Surface Water Protection Section /NPDES (Tom Belnick)
DEMLR/Land Quality Section (Steve McEvoy)
DWM/Solid Waste Section (Ed Mussler)





Company Info

Presentation Summary

1. By-Products & Waste Management
2. STAR® Technology
3. Operating Experience
4. Reclaimed Ash Testing and Commercialization

Processing material reclaimed from coal ash **PONDS** and **LANDFILLS**

THE SEFA GROUP

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Company Info

- Began operations in 1976
- Corporate Office in Lexington, SC
- Operate & Maintain Four (4) Thermal Beneficiation Facilities
- To date have processed more than 5 millions tons
- Developed the STAR® Process

THE SEFA GROUP

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By-Products & Waste Management



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- Disposal Operations began in 2007
- Operated & Managed Four (4) By-Products Management & Disposal Locations.
- Disposed of over 2,000 tons daily at certain facilities.
Average daily disposal rates = 600 – 2600 Tons



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Waste Management

Duke Energy – North Carolina Operations

Facility Operations

- Ash Management at 4 locations in NC
- 2007-2014
 - Marshall
 - Allen
 - Cliffside
 - Belews Creek

Disposal

- Structural Fill Construction
- Ash Pond(s) Management
- Flyash (Lined & Unlined) Landfill Operations
- FGD (Gypsum) Landfill Operations
- Engineering Support and Services

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Waste Management

Duke Energy – North Carolina Operations



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Waste Management

Duke Energy – North Carolina Operations



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Waste Management

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Waste Management

Duke Energy – North Carolina Operations



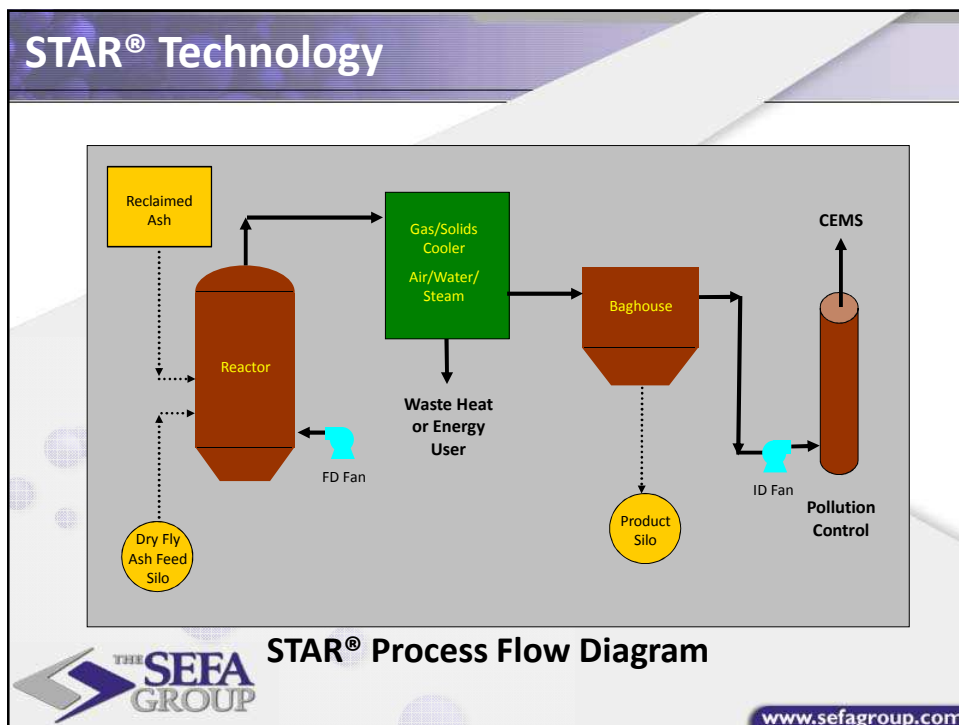
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Waste Management

Duke Energy – North Carolina Operations



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STAR® Technology

Controlled Manufacturing Process

- Staged** – Conditions in the Reaction Zone are Finitely Controlled
- Turbulent** – Shearing and Swirling Kinetic Forces Maximize Reaction Rates
- Air** – Both the Primary Chemical Reagent and the Motive Force for Kinetic Activity
- Reactor** – Processing Vessel in which Chemical Reactions Occur

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STAR® Technology

STAR® Product Quality

Simultaneously Produces Two Separate Products



High Quality Pozzolan-Grade Fly Ash

- Transparent Air-Entraining Characteristics
- Increased Fineness and Increased Strength
- Class F and Class C Fly Ashes
- Blended to Make High-Calcium, Class F Fly Ash

High Quality Mineral Filler

- Pure Mineral Matter – No Organics
- Particle Size Classification

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STAR® Technology

STAR® Processing Can Be Tailored To:

- Use multiple feed ingredients to produce a range of products that can be applied in markets not previously open to fly ash-derived products;
- Eliminate all unburned carbon in fly ash, allowing the contaminant-free mineral matter to be used as higher-value mineral admixtures;
- Increase the fineness of the mineral matter and improve its strength-producing character in concrete;
- Size-classify the mineral matter;
- Manage certain trace elements, such as mercury, selenium, etc.



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STAR® Operating Experience



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STAR® Operating Experience

McMeekin STAR® - Columbia, SC

Timeline

- Sited at SCE&G's McMeekin Station
- Broke Ground – June 2006
- Shake Down – December / January 2007
- Proof of Concept – July 2007
- Commercial Operations – February 2008

Feed Sources

- Sixteen (16) different ash sources
- Feed Ash - 5.0% to 25.0% LOI

Product Quality

- Shipments have averaged 1.0% LOI
- As low as 0.10% LOI



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STAR® Operating Experience



McMeekin STAR®



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STAR® Operating Experience

Morgantown STAR® - Newburg, MD

Timeline

- Sited at NRG's Morgantown Station
- Broke Ground – February 2011
- Substantial Completion – December 2011
- Commercial Operations – September 2012

Feed Sources

- Three (3) different ash sources
- Feed Ash - 5.0% to 15.0% LOI

Product Quality

- Shipments have averaged < 1.0% LOI



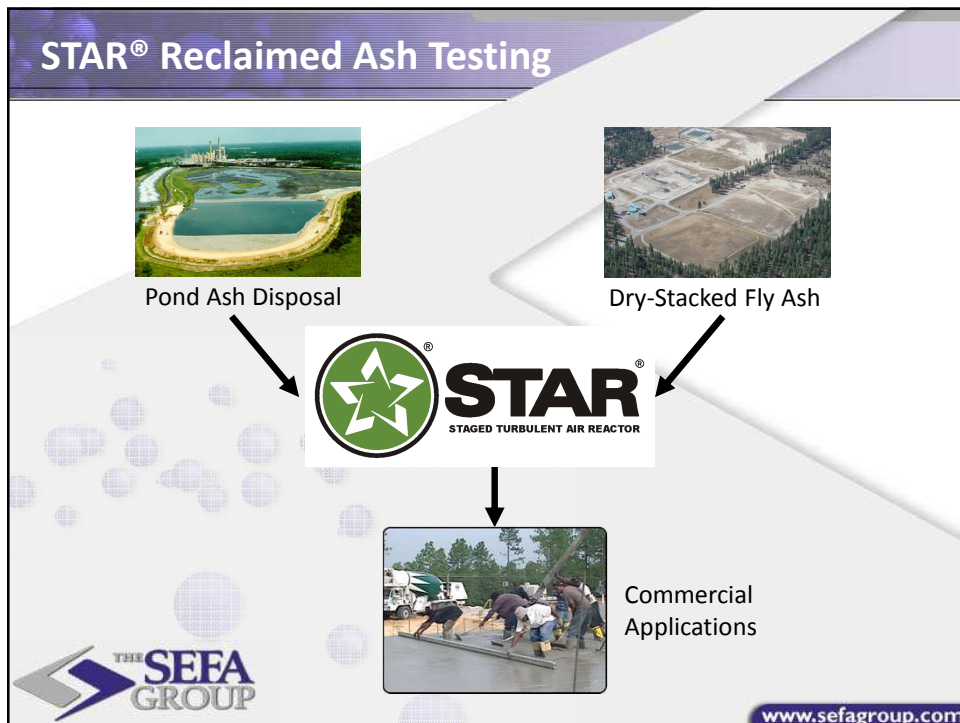
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STAR® Operating Experience



Morgantown STAR®


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STAR® Reclaimed Ash Testing

Reclaimed Ash

- During the 1st Quarter of 2013, the SEFA Group conducted testing at its McMeekin STAR® facility to process material reclaimed from existing ash ponds and landfills.
- The material tested contained up to 30% moisture and varied in LOI from approximately 8% to 19% (dry basis).
- The objectives of this testing were to confirm that the STAR® could transform this material into a suitable pozzolan for use in Ready-Mix Concrete and to determine if the process could remain self-sustaining.



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STAR® Reclaimed Ash Testing

Reclaimed Ash

- Due to the operational flexibility of the STAR® process, the reclaimed material can be successfully fed into the unit with no major modifications required to the standard plant design.
- Tests were conducted by blending certain percentages of reclaimed material with normal dry feed, as well as with 100% reclaimed material as feed.
- The majority of testing was conducted by first screening the material at the location where it was reclaimed (or “mined”).
- In all test cases the material was fed into the unit “As-Is”, and no drying was performed.



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STAR® Reclaimed Ash Testing



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STAR® Reclaimed Ash Testing

CONCRETE MIX RESULTS

As shown in the table on the next slide, laboratory concrete mixes were designed to incorporate six different fly ashes:

1. STAR®-Processed dry fly ash (for a control mix)
2. STAR®-Processed blend of dry fly ash (75%) and Reclaimed Ash (25%)
3. 100% STAR®-Processed Reclaimed Ash (Run 1)
4. 100% STAR®-Processed Reclaimed Ash (Run 2)
5. By-Product Fly Ash (Source A)
6. By-Product Fly Ash (Source B)

NOTE: All mixes were at 25% of total cementitious material



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STAR® Reclaimed Ash Testing

Table 2: Laboratory Concrete Mix Test Results

Cubic Yard Mix Proportions (lbs)	Mix 1 Control	Mix 2 Blend	Mix 3 100%	Mix 4 100%	Mix 5 Plant A	Mix 6 Plant B
Type I Cement	420	420	420	420	420	420
Fly Ash	140	140	140	140	140	140
Loss on Ignition, %	0.9	1.7	1.2	1.9	3.5	2.6
Total Cementitious Material	560	560	560	560	560	560
% SCM	25%	25%	25%	25%	25%	25%
#57 Stone	1850	1850	1850	1850	1850	1850
Natural Sand	1258	1258	1258	1258	1258	1258
City Water, gallons	32.2	32.3	31.5	32.2	32.1	33.0
w/cm Ratio	0.48	0.48	0.47	0.48	0.48	0.49
Water Reducer (oz/cwt)	3.00	3.00	3.00	3.00	3.00	3.00
Air Entrainment (oz/cwt)	0.36	0.36	0.36	0.52	1.60	2.20
Trial Batch Results						
Slump (inches)	4.75	4.75	4.50	4.75	4.75	5.00
Air %	4.4	4.4	4.5	4.4	4.5	5.2
Unit Weight (pcf)	147.5	148.0	147.4	147.6	147.6	146.4
Relative Yield %	98.83%	98.54%	98.77%	98.74%	98.77%	99.71%
Concrete Temp (°F)	56	56	59	60	62	64
Air Temp (°F)	58	59	50	60	60	60
Compressive Strength Results (psi)						
7-day Average	3540	3670	3660	3530	3930	2960
28-day Average	4650	4930	4730	4820	4800	3530
7-28 Gain	1110	1260	1070	1290	870	570



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STAR® Reclaimed Ash Testing

Summary of Test Results

Processed Material as a Suitable Pozzolan

Both the plastic and hardened characteristics of the concretes containing STAR®-Processed Reclaimed Ash were as good as or better than the STAR®-Processed Control (i.e., dry fly ash) concrete.

In addition, the compressive strengths for the concretes containing STAR®-Processed Ashes were higher than the concretes made with normal 'by-product' fly ashes (i.e., non beneficiated).



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STAR® Reclaimed Ash Testing

Summary of Test Results

STAR® Self-Sustaining Operations

Testing has confirmed that the STAR® Technology can process Reclaimed Ash as 100% Raw Feed.

In cases where the combination of Reclaimed Ash moisture is very high, and LOI is very low, the STAR® Waste Heat can be recaptured into the process to eliminate any need for drying or auxiliary fuel.



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STAR® Reclaimed Ash

Commercialization Plans



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Winyah Project

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The Challenge

Lack of Consistent Supply of Quality Product for Ready Mix Customers

- **Inconsistent Supply of Feed Ash**
 - Lack of Coal Fired Generation
 - Problems finding supply of high LOI (8% min) Feed Ash
 - Plant Closures
- **CBO Tied to Power Plant**
 - Flue Gas Treatment
 - Process Cooling



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Winyah Project

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The Solution

Remove CBO Unit and Install STAR

- **Flexibility to Process Either Wet or Dry Ash**
- **Stand Alone Facility**
- **STAR can process Ash with LOI 5-25%**



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Winyah Project

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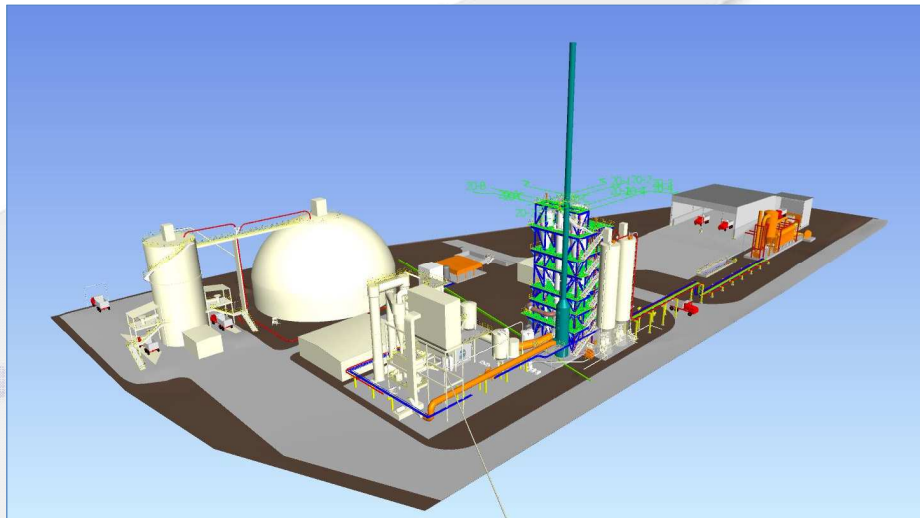
The Work

- Work with SC Environmental Agency to Test and Permit (Summer 2012)
- Operational Tests at McMeekin (March 2013)
- Process Design for Flue Gas, Cooling and Wet Feed
- Present Business Case to Santee Cooper (Summer 2013)
- Commercial Agreements (November 2013)
- Air Permit received February 2014
- Construction began March 2014
- Construction completion December 2014



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STAR® Plant - Winyah Project



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Reclaimed STAR® Ash Plant



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Reclaimed STAR® Ash Plant



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Reclaimed STAR® Ash Plant

News

- The SEFA Group, is building a \$40 million facility to recycle high carbon fly ash produced by the power company Santee Cooper at its Winyah generating station in Georgetown, S.C.
- SEFA also will take in coal fly ash from other Santee Cooper electric generating stations, where the material will be processed into a marketable product.
- The new facility is expected to recycle up to 400,000 tons of fly ash per year. SEFA will use the material as a primary ingredient for its STAR process to produce a pure mineral product, free of organic contaminants.



www.sefagroup.com

Reclaimed STAR® Ash Plant

News

- Santee Cooper has worked to recycle as much of its ash as possible (90%). ...with EPA regulations spurring the closure of coal-fired generating stations around the country, there has become greater demand for ash and the development of new technology that increases the viability of pond ash.

R.M. Singletary, executive vice president of corporate services, says "This is a triple win. It is cost effective, which means it is responsive to our customers' best interests. It utilizes innovative technology to help an important South Carolina industry be sustainable. And it is an EPA-approved use of ash."



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Reclaimed STAR® Ash Plant

Where does it make sense to locate a STAR Plant?

- Strong Concrete Market
- Utility's Need/Desire for Pond Clean Out or Landfill Reclamation
- Sufficient Volume of Ash to Sustain the Business Plan



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THANK YOU



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Bednarcik Rebuttal Public Staff Cross-Examination Exhibit 9

Public Staff 139



Google Earth

Image © 2020 Maxar Technologies



2000 ft



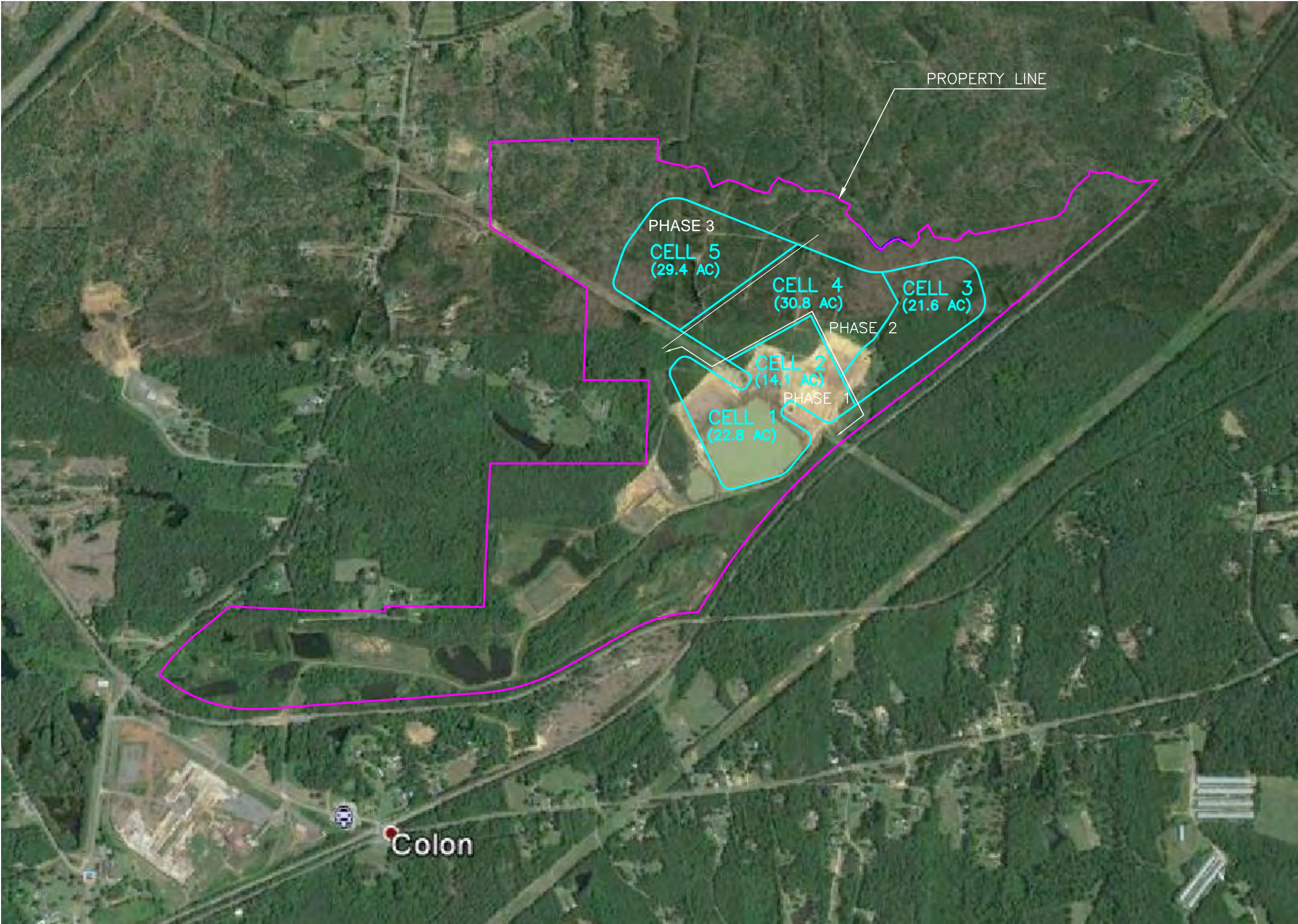
Brickhaven Mine 2020 Photo



Imagery ©2020 Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency, Map data ©2020

500 ft

I/A



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of the Carolinas

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Charlotte, NC 28202-2075
704.338.6700
N.C.B.E.L.S. F-0116

COLON MINE SITE OVERVIEW



COLON MINE SITE

DATE
11/2014

FIGURE
1



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(Reporter's Note: Per transcript volume 15, page 1821, lines 11 and 12, and transcript volume 16, page 19, line 2, this exhibit was identified and admitted as Lucas/Maness Public Staff Redirect Exhibit 2. ktm

I/A

Maness Lucas Public Staff Redirect Exhibit 2

Public Staff Redirect 78

**Duke Energy Progress
Response to
NC Public Staff Data Request
Data Request No. NCPS 163**

Docket No. E-2, Sub 1219

Date of Request: March 12, 2020

Date of Response: March 23, 2020

☐

CONFIDENTIAL

☒

NOT CONFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NC Public Staff Data Request No. 163-1, was provided to me by the following individual(s): Trudy Morris, Project Manager II, and was provided to NC Public Staff under my supervision.

Camal. O. Robinson
Associate General Counsel
Duke Energy Progress

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Data Request No. 163
DEP Docket No. E-2, Sub 1219
Item No. 163-1
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Request:

1. Please provide the Company's best estimate of the cost at the time and a calculation of the present value of such a cost to implement the following actions at each of its current and former coal-fired plants:

a. Implementation, including installation, monitoring, and associated costs, of groundwater monitoring starting with 2 downgradient wells at or near the waste boundary and 1 upgradient (background) well, and over a period of three years installing an additional 10 downgradient wells at the compliance boundary and 3 upgradient wells, assuming implementation was started in the following years:

- i. 1979
- ii. 1984
- iii. 1988
- iv. 2000

b. Installation and monitoring of approximately 50 groundwater monitoring wells at varying locations and depths assuming implementation took two years and was started in the following years:

- i. 1979
- ii. 1984
- iii. 1988
- iv. 2000
- v. 2004

c. Installation and monitoring of approximately 100 groundwater monitoring wells at varying locations and depths assuming implementation took two years and was started in the following years:

- i. 2010
- ii. 2014

d. Installation, operation, and maintenance of groundwater extraction and treatment systems near each unlined surface impoundment assuming implementation was started the following years:

- i. 1979
- ii. 1984
- iii. 1988
- iv. 2000
- v. 2004
- vi. 2010

e. Conversion to dry fly ash handling utilizing the best available technology of the time starting in the following years:

- i. 1979
- ii. 1984
- iii. 1988
- iv. 2000
- v. 2004
- vi. 2010

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f. Conversion to dry bottom ash handling utilizing the best available technology of the time starting in the following years:

- i. 1979
- ii. 1984
- iii. 1988
- iv. 2000
- v. 2004
- vi. 2010

g. Closure by cap in place of all unlined impoundments utilizing the best available technology of the time starting in the following years:

- i. 1979
- ii. 1984
- iii. 1988
- iv. 2000
- v. 2004
- vi. 2010

h. Closure by excavation of all unlined impoundments and disposal in an onsite lined landfill utilizing the best available technology of the time starting in the following years:

- i. 1979
- ii. 1984
- iii. 1988
- iv. 2000
- v. 2004
- vi. 2010

i. Closure by excavation of all unlined impoundments and disposal in an offsite lined landfill utilizing the best available technology of the time starting in the following years:

- i. 1979
- ii. 1984
- iii. 1988
- iv. 2000
- v. 2004
- vi. 2010

j. Construction and operation of an onsite lined landfill to receive production coal ash utilizing the best available technology of the time assuming a plant retirement in 2010 and starting in the following years:

- i. 1979
- ii. 1984
- iii. 1988
- iv. 2000
- v. 2004
- vi. 2010

k. Construction and operation of an onsite lined landfill to receive production coal ash utilizing the best available technology of the time assuming a plant retirement in 2020 and starting in the following years:

- i. 1979
- ii. 1984

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iii. 1988

iv. 2000

v. 2004

vi. 2010

l. Construction and operation of an onsite lined landfill to receive production coal ash utilizing the best available technology of the time assuming a plant retirement in 2030 and starting in the following years:

i. 1979

ii. 1984

iii. 1988

iv. 2000

v. 2004

vi. 2010

m. Construction, operation, and maintenance of a lined surface impoundment to replace all unlined basins utilizing the best available technology of the time starting in the following years:

i. 1979

ii. 1984

iii. 1988

iv. 2000

v. 2004

vi. 2010

n. Construction, operation, and maintenance of a wastewater treatment plant to replace all unlined coal ash basins utilizing the best available technology of the time starting in the following years:

i. 1979

ii. 1984

iii. 1988

iv. 2000

v. 2004

vi. 2010

Response:

DEP's Response to PSDR 163-1 and all of its subparts:

By this request, the Public Staff is asking the Company to generate hypothetical estimates in five days that no intervenor has been able to generate in three years, and which the Public Staff indicates would be speculative. See Junis Direct T., Docket E-7, Sub 1214, at 65:10-13 ("Even where some Company actions or omissions appear imprudent, such as failure to deploy a comprehensive groundwater monitoring system at a much earlier date, quantification of costs directly resulting from the acts or omissions would be speculative.") The Company agrees with the Public Staff's statement above; estimates of the nature requested by the Public Staff would be speculative and therefore unreliable. Using 20/20 hindsight to develop site-specific estimates for activities covering

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a four-decade span of time would, as Commissioner Clodfelter indicates, “require the impossible construction and evaluation of several different alternative histories and realities.” (2017 DEP Rate Case Order, Clodfelter Dissent, at 13).