ERRATA

To: Kimberley A. Campbell, Chief Clerk

From: Kim Mitchell, Court Reporter

CC:

Date: November 24, 2020

Re: Duke Energy Progress, LLC

Docket Number E-2, Sub 1219, Volume 15 - Redacted

The purpose of this errata is to include Jay B. Lucas' Corrected Direct Testimony – redacted and confidential versions – which was inadvertently omitted from Transcript Volume 15. Please see attached redacted testimony.

Confidential will be filed separately.

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1219

In the Matter of		TESTIMONY OF
Application of Duke Energy Progress,	)	JAY B. LUCAS
LLC, for Adjustment of Rates and	)	PUBLIC STAFF – NORTH
Charges Applicable to Electric Utility	)	CAROLINA UTILITIES
Service in North Carolina	)	COMMISSION

Table of Contents

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1219

Testimony of Jay B. Lucas

On Behalf of the Public Staff

North Carolina Utilities Commission

March 25, 2020

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND PRESENT POSITION.

A. My name is Jay B. Lucas. My business address is 430 North Salisbury Street, Dobbs Building, Raleigh, North Carolina. I am an engineer with the Electric Division of the Public Staff – North Carolina Utilities Commission.

Q. BRIEFLY STATE YOUR QUALIFICATIONS AND DUTIES.

A. My qualifications and duties are included in Appendix A.

INTRODUCTION

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to present to the Commission the Public Staff's position on the following topics in the general rate case filed by Duke Energy Progress, LLC (DEP or the Company), in Docket No. E-2, Sub 1219, on October 30, 2019:

1. The environmental compliance record of the Company under applicable State and Federal laws and regulations governing the management and disposal of coal combustion residuals (CCR);
2. Whether the electric power industry, especially prominent utilities with substantial coal-fired power plant portfolios, such as DEP, was or should have been aware of the potential environmental impacts of CCR storage in unlined impoundments, was investigating the likelihood (or occurrence) of exposure of CCR constituents to surface waters, groundwater, or soils, and was planning and implementing improvements to CCR handling and storage practices;
3. Whether the Company reasonably and prudently managed its CCR, and cost impacts to the extent it did not;
4. Whether there should be an equitable sharing between ratepayers and shareholders of CCR costs for which a specific imprudence disallowance has not been recommended; and
5. The portion of the Commission's Order Directing the Public Staff to File Testimony, dated January 22, 2020 (Order), requiring estimated costs for CCR remediation as initially proposed and after the December 31, 2019, Settlement Agreement (2019 Settlement Agreement) between DEP and the North Carolina Department of Environmental Quality (DEQ).

Q. BRIEFLY EXPLAIN THE SCOPE OF YOUR INVESTIGATION REGARDING THIS RATE INCREASE APPLICATION.

A. My investigation in this proceeding included the review of Company records ranging over 40 years pertaining to coal ash management, groundwater standard compliance data, state and federal environmental compliance records, Company accounting records related to coal ash, and litigation records.

<u>SUMMARY OF RECOMMENDATIONS</u>

Q. PLEASE PROVIDE A SUMMARY OF YOUR RECOMMENDATIONS.

A. As described in more detail later in my testimony, I make the following recommendations:

1. It is appropriate to exclude from rate recovery: (1) costs to remedy environmental violations where the costs exceed what the North Carolina Coal Ash Management Act (CAMA)[1] would have required in the absence of environmental violations; (2) costs to provide bottled water and permanent water supplies, including municipal connections and treatment systems, to neighboring properties either voluntarily or as required by CAMA; and (3) fines and penalties, or the equivalent, for environmental violations, including all costs

---

[1] 2014 N.C. Sess. Law 122, as amended by 2016 N.C. Sess. Law 95.

required to be excluded under the probation conditions of the federal plea agreement.

2. It is appropriate to implement an equitable sharing methodology for coal ash remediation and closure costs not otherwise disallowed. The Public Staff recommends that the Company's shareholders pay 50 percent of the costs for CCR remediation and closure and the Company's customers pay the remaining 50 percent.

Q. PLEASE SUMMARIZE YOUR SPECIFIC RECOMMENDATIONS FOR DISALLOWANCE OF COSTS.

A. The Public Staff is recommending disallowance of the following costs:

1. Costs to remedy violations where the costs exceed what CAMA would have required in the absence of violations. This position is consistent with the Public Staff's position in the previous DEP rate case in 2017 (Docket No. E-2, Sub 1142) and the pending appeal of that case before the North Carolina Supreme Court. The costs at issue in this rate case are for the installation and operation of wells and appurtenances for the extraction and treatment of groundwater at the Asheville and Sutton plants, and for the purchase of land at the Mayo plant to mitigate the risk of spreading groundwater contamination. The total costs incurred amount to $1,240,328. These plants have substantial violations of the state groundwater standards that have been further confirmed, and the nature and extent characterized and monitored, since DEP's last rate case. CAMA and

2. Costs to provide bottled water and alternate permanent water supplies, including water treatment systems, to neighboring properties.
3. Fines and penalties or the equivalent for environmental violations, which the Company has appropriately excluded.

Q. PLEASE SUMMARIZE YOUR POSITION REGARDING THE EQUITABLE SHARING OF COSTS.

A. As described in more detail below, I recommend the Commission make findings and conclusions consistent with the following:

1. DEP has accumulated a record of significant environmental violations caused by leaking coal ash basins, which have resulted in unlawful releases of regulated contaminants to groundwater and surface water. These violations include unauthorized seeps that DEP has admitted to environmental regulators, in violation of its National Pollutant Discharge Elimination System (NPDES) permits, and 7,411 groundwater exceedances confirmed by DEP's own groundwater monitoring data, in violation of the state's 2L rules.[2]

[2] Groundwater Classification and Standards, 15A N.C. Admin. Code 2L.

2. DEP has culpability for its environmental violations, even without a showing of traditional imprudence. The Company had a duty to comply with long-standing North Carolina environmental regulations, and it failed that duty many times over many years at every coal-fired power plant it owns in North Carolina. The Company should not be able to claim that, in order to generate electricity, it had to create groundwater contamination. It would be manifestly unjust to require ratepayers to bear all the deferred coal ash costs where those costs include corrective actions to remedy the Company's environmental violations.

3. DEP has estimated that the ultimate cost to remediate and close its existing coal ash disposal sites will be **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]** Corrective actions to address environmental impacts under CAMA and the Environmental Protection Agency's (EPA) Coal Combustion Residuals Final Rule (CCR Rule)[3], including the ultimate closure of all coal ash basins, should remedy the Company's environmental violations and eliminate the risk of significant future violations. DEP argues that its coal ash closure costs are reasonable and recoverable in rates because they are the costs of complying with state and federal law; namely, CAMA and the CCR Rule. However, these compliance costs

[3] Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 80 Fed. Reg. 21301 (April 17, 2015).

include the costs of mitigating DEP's environmental violations. The corrective action requirements for the remediation of groundwater contamination pursuant to CAMA and the CCR Rule, which became effective in 2014 and 2015, respectively, largely overlap with the 2L rules. There is no doubt that substantial assessment and remediation costs would have been incurred without CAMA and the CCR Rule, but, in my opinion, those costs cannot be quantified without undue speculation. Furthermore, CAMA – as administered by DEQ – goes beyond the CCR Rule in that it requires closure of all ash basins and requires excavation of most of the ash from DEP's unlined basins. Given the difficulty in identifying the costs of corrective action for environmental violations that DEP would have incurred in the absence of CAMA and the CCR Rule, and also the difficulty of knowing if North Carolina would have required such rapid and expensive closure of ash basins in the absence of the Dan River spill, which gave impetus to CAMA, I do not believe the traditional imprudence approach is feasible for most of DEP's coal ash costs.

4. Equitable sharing is appropriate because the costs of remediation and closure of DEP's coal ash disposal sites are intertwined with the Company's failure to prevent groundwater contamination as required by the 2L rules. Public Staff witness Maness identifies additional reasons in support of equitable sharing in his testimony. This case presents factual circumstances (extensive environmental violations)

where the determination of "reasonable and just rates" under N.C. Gen. Stat. § 62-133(d) requires a qualitative judgment of the Commission for a 50% - 50% sharing of coal ash disposal site remediation and closure costs.

Q. PLEASE PROVIDE A SUMMARY OF THE RESULTS OF YOUR INVESTIGATION PURSUANT TO THE PORTION OF THE COMMISSION'S JANUARY 22, 2020, ORDER REGARDING COSTS OF CCR REMEDIATION.

A. Confidential Lucas Table 1 below provides a summary of DEP's projected CCR remediation costs for 2015 through 2079 at various points in time:

[BEGIN CONFIDENTIAL]

[redacted]	
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

[END CONFIDENTIAL]

[1] Costs are DEP only, but system-wide.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF COAL ASH.

A. Coal ash, the main type of CCR, is one of the largest industrial waste streams in the United States.[4] In North Carolina, there are over 100 million tons of coal ash currently stored in landfills and surface impoundments owned by both DEP and Duke Energy Carolinas, LLC (DEC), collectively "Duke Energy." Coal-fired power plants produce CCRs in the combustion process, and CCRs include by-products such as fly ash, bottom ash, coal slag, and flue gas desulfurization (FGD) material.[5] "Coal ash" includes both bottom ash and fly ash, and is often transported by mixing with water in a process known as sluicing, and then diverted into surface impoundments.[6] Surface impoundments are also known as ash basins, ponds, or lagoons. FGD material is often pre-treated in separate FGD blowdown ponds before also being sent to a CCR surface impoundment. The impoundments provide treatment of the wastewater by a combination of settling, attenuation, mixing, and dilution.

---

[4] For example, 117 million tons of coal ash were generated in the United States in 2015. American Coal Ash Association's Coal Combustion Product Production & Use Survey Report, available at https://www.acaa-usa.org/Portals/9/Files/PDFs/2015-Survey_Results_Table.pdf (last visited February 10, 2020).

[5] Joint Factual Statement, United States of America v. Duke Energy Business Services, LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc., Case No. 5:15-CR- 68-H in the Unites States District Court for the Eastern District of North Carolina (May 14, 2015) at 7.

[6] N.C. Gen. Stat. § 130A-290(2b) further defines CCRs as "residuals, including fly ash, bottom ash, boiler slag, mill rejects, and flue gas desulfurization residue produced by a coal-fired generating unit destined for disposal." For simplicity, my testimony sometimes refers to "coal ash" but means all types of CCRs.

HISTORY OF CCR MANAGEMENT

Q. WHAT IS THE HISTORY OF CCR MANAGEMENT IN THE UNITED STATES?

A. Electric generating plants have used coal as a fuel since the late nineteenth century, and coal has been a dominant fuel for many decades. In the 1960s and 1970s, nuclear generation began to compete with coal-fired generation and beginning in 2010, natural gas-fired generation began to compete directly with coal-fired generation.

In the eastern United States, the availability of fresh water allowed electric generators to sluice the ash remaining in the boiler fireboxes after combustion (bottom ash) into ash storage ponds. Most coal ash constituents would settle to the bottom of the storage ponds, and cleaner wastewater from the top of the ponds would be discharged into a nearby natural water body.

The enactment of the Clean Air Act and subsequent air quality rules in the 1970s required treatment of the emissions released by coal-fired generating facilities. Air pollution control equipment such as electrostatic precipitators and later FGD created solid waste streams that were often placed in the ponds with bottom ash. Fly ash is a waste collected from air pollution control equipment.

Some CCRs can be recycled into raw materials for the concrete industry. CCR from FGD is known as synthetic gypsum and can be directly used by the drywall industry.

Groundwater contamination and accidental releases of CCR brought attention to the storage and disposal of CCR and ultimately led to the adoption of the EPA's CCR Rule, which is presented later in my testimony.

CCR STATE AND FEDERAL REGULATORY FRAMEWORK

Q. ARE YOU SPONSORING ANY ADDITIONAL TESTIMONY OR EXHIBITS WITH YOUR DIRECT TESTIMONY?

A. Yes. My testimony incorporates by reference the Public Staff's testimony and exhibits in the last DEC rate case describing the development of state and federal regulations applicable to CCR management, especially coal ash impoundments.[7] I provide a summary discussion and appropriate updates to the regulatory framework in my testimony below.

Q. WHAT IS THE SIGNIFICANCE OF ENVIRONMENTAL REGULATIONS THAT APPLY TO CCR?

A. One of the reasons for the Public Staff's equitable sharing recommendation is that DEP has culpability for non-compliance with environmental regulations that are meant to protect groundwater and surface water from

[7] Page 14, line 1, through page 32, line 18, and Exhibits 1 and 2, Direct Testimony of Public Staff Engineer Charles Junis filed in Docket No. E-7, Sub 1146, on January 24, 2018.

contamination by CCR constituents. Additionally, DEP's past management of coal ash has resulted in a risk of future contamination that EPA and the North Carolina legislature have determined requires costly new management and closure requirements. Equitable sharing is explained more fully in the testimony of Public Staff witness Maness. I note that the equitable sharing recommendation is not based on the imprudence standard, which would result in a 100% disallowance, but instead is based in part on DEP's culpability for failure to comply with environmental regulations for the protection of groundwater and surface water. Therefore, a summary of those environmental regulations is important for understanding how DEP has been culpable.

Q. PLEASE SUMMARIZE THE REGULATORY FRAMEWORK FOR CCR.

A. CCR surface impoundments contain certain contaminants, such as acidity, arsenic, boron, cobalt, iron, manganese, vanadium, and others that can, when present in sufficient concentrations, pollute surface water, groundwater, and drinking water. CCRs were originally considered for federal regulation under the Resource Conservation and Recovery Act (RCRA) of 1976, but were exempted by the 1980 Bevill Amendment as a category of special waste requiring further study and assessment.[8] In 1993,

---

[8] The Bevill Amendment, one of the 1980 Solid Waste Disposal Act Amendments, exempted fossil fuel combustion waste from regulation as a hazardous waste under Subtitle C of RCRA until further study and assessment of risk could be performed. 42 U.S.C. § 6921(b)(3)(A).

the EPA determined that regulation of coal combustion wastes as hazardous waste under Subtitle C of RCRA was not warranted.[9] In 2000, the EPA determined that coal combustion wastes should instead be regulated as non-hazardous solid waste under Subtitle D of RCRA.[10]

The EPA first proposed specific regulations for the disposal of CCRs in 2010, and conducted a nationwide assessment of CCR surface impoundments, ranking the safety of the impoundments on the basis of dam design, safety, and integrity.[11] The EPA finalized the CCR Rule in April 2015, regulating for the first time the disposal of CCRs as non-hazardous solid waste.[12] The CCR Rule became effective on October 19, 2015.

The regulatory framework in place prior to the CCR Rule, including the Clean Water Act (CWA) and state groundwater regulations, as well as more recent requirements, are all relevant to the review of the Company's coal ash management and disposal in this case.

---

[9] Final Regulatory Determination on Four Large-Volume Wastes from the Combustion of Coal by Electric Utility Power Plants, 58 Fed. Reg. 42,466 (Aug. 9, 1993).

[10] Notice of Regulatory Determination on Wastes From the Combustion of Fossil Fuels, 65 Fed. Reg. 32,214 (May 22, 2000).

[11] CCR Impoundment Assessment Reports, *available at* https://www.epa.gov/sites/production/files/2016-06/documents/ccr_impoundmnt_asesmnt_rprts.pdf (last visited February 7, 2020).

[12] Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities, 80 Fed. Reg. 21,301 (Apr. 17, 2015).

Q. WHAT DOES THE CCR RULE REQUIRE?

A. The CCR Rule establishes minimum criteria that must be met by owners and operators of CCR surface impoundments and CCR landfills. The minimum criteria consist of location restrictions, design and operating requirements, groundwater monitoring and corrective action, closure of certain units, post-closure care, recordkeeping, and posting of information to the internet for public access.

The CCR Rule applies to new and existing CCR surface impoundments and landfills,[13] as well as lateral expansions of such units. The rule also applies to inactive CCR surface impoundments, defined as impoundments that no longer received CCR on or after October 19, 2015, and that still contained both CCR and liquids on or after that date.[14] The Rule does not apply to CCR landfills that ceased receiving CCR prior to October 19, 2015.

Q. HOW DOES THE CCR RULE APPLY TO CCR LANDFILLS AND IMPOUNDMENTS IN NORTH CAROLINA AND SOUTH CAROLINA?

A. As originally drafted, the CCR Rule was self-implementing, in that it had no associated federal permitting program or delegation of permitting authority

[13] Existing surface impoundments and landfills are those that received CCR both before and after October 19, 2015, or for which construction commenced prior to October 19, 2015, and received CCR on or after October 19, 2015. 40 C.F.R. 257.53.

[14] The CCR Rule as it was originally adopted did not apply to inactive surface impoundments at inactive facilities. That exemption was vacated and remanded by the U.S. Court of Appeals for the D.C. Circuit on August 21, 2018. Utility Solid Waste Activities Group v. EPA (USWAG), 901 F.3d 414 (D.C. Cir. 2018).

to the states.[15] Facilities must comply with the CCR Rule regardless of whether they are directed to do so by a state regulatory agency, and enforcement can take place pursuant to the citizen suit provision of RCRA.

CCR units (ash pond impoundments and landfills) at six of the Company's coal-fired power plants in North Carolina are subject to the CCR Rule: Asheville, H.F. Lee, Mayo, Roxboro, Sutton, and Weatherspoon. According to DEP, EPA's CCR Rule is not applicable to the Cape Fear plant. The Company's one coal-fired power plant in South Carolina, Robinson, is also subject to the CCR Rule.

Q. WHAT IS THE CURRENT STATUS OF THE CCR RULE?

A. On June 14, 2016, the United States Court of Appeals for the D.C. Circuit ordered the vacatur of the "early closure" provisions of the CCR Rule.[16] The early closure provisions allowed inactive impoundments to avoid the substantive requirements of the rule (e.g., location criteria, design and operating requirements, groundwater monitoring and corrective action, and closure and post-closure care) if they closed by April 17, 2018. In response to the Court's vacatur of the early closure provision, the EPA on August 5,

[15] The Water Infrastructure for Improvements to the Nation Act was signed into law on December 16, 2016, and authorizes the states to create permitting programs to implement or act in lieu of the CCR Rule. For non-participating states, the Act directed the EPA to implement a permitting program "subject to the availability of appropriations . . . ." Pub. L. No. 114-322, 130 Stat. 1628, Section 2301 (2016). Neither North Carolina nor South Carolina have submitted permitting programs to the EPA for approval.

[16] Util. Solid Waste Activities Grp. v. EPA, 2016 U.S. App. LEXIS 24320 (D.C. Cir. June 14, 2016).

2016, issued a direct final rule extending the deadline by which inactive surface impoundments must come into compliance with the substantive requirements of the CCR Rule.[17]

The EPA proposed additional revisions to the CCR Rule in March 2018,[18] and in July 2018 issued a rulemaking finalizing three of the proposed revisions.[19] This "Phase One, Part One" rulemaking adopted alternative performance standards where an authorized state or the EPA is acting as a permitting authority, set groundwater protection standards for four constituents that do not have maximum contaminant levels (MCLs), and provided certain units that are triggered into closure by the CCR Rule additional time to stop receiving waste and begin closure. In March 2019, however, the United States Court of Appeals for the D.C. Circuit remanded without vacatur at the EPA's request this "Phase One, Part One" rulemaking.[20] The compliance deadlines established by the remanded rule will remain in place until the EPA takes further action.

---

[17] Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Extension of Compliance Deadlines for Certain Inactive Surface Impoundments; Response to Partial Vacatur, 81 Fed. Reg. 51,802 (Aug. 5, 2016). The direct final rule took effect on October 4, 2016.

[18] Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Amendments to the National Minimum Criteria (Phase One); Proposed Rule, 83 Fed. Reg. 11,584 (Mar. 15, 2018).

[19] Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One), 83 Fed. Reg. 36,435 (July 30, 2018).

[20] Waterkeeper Alliance, Inc. v. EPA, 2019 U.S. App. LEXIS 7443.

On August 21, 2018, the United States Court of Appeals for the D.C. Circuit vacated the portions of the CCR Rule that: allowed for the continued operation of unlined impoundments; classified clay-lined impoundments as lined; and, exempted inactive impoundments at inactive facilities from regulation.[21] It also granted the EPA's request for voluntary remand without vacatur of provisions concerning coal residuals piles, beneficial reuse, and alternative groundwater protection standards.

While the federal CCR Rule remains a work in progress, it should be noted that DEP's cost for coal ash corrective action and closure at its North Carolina disposal sites is driven largely by the requirements of CAMA.

Q. PLEASE SUMMARIZE THE FEDERAL REGULATORY FRAMEWORK FOR SURFACE WATER.

A. The CWA was enacted in 1972 to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[22] The CWA prohibits the discharge of pollutants from point sources[23] into a water of the United States, unless the discharge is authorized in accordance with a NPDES permit.[24] In 1974, the EPA promulgated the Steam Electric Power

---

[21] Utility Solid Waste Activities Group v. EPA (USWAG), 901 F.3d 414 (D.C. Cir. 2018).

[22] 33 U.S.C. § 1251(a).

[23] A point source is defined as "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." 33 USCS § 1362(14).

[24] 13 U.S.C. § 402.

Generating Effluent Guidelines and Standards (ELG Rule), which are incorporated into NPDES permits and set effluent limitations on wastewater discharges from power plants.[25] Under a facility's NPDES permit, wastewater from coal ash impoundments that is discharged must meet the conditions prescribed in the permit.

Q. WHAT IS THE CURRENT STATUS OF THE ELG RULE?

A. On November 3, 2015, the EPA substantively amended the ELG Rule to include limitations and standards on various waste streams at electric power plants. Compliance deadlines, however, have been delayed due to legal and administrative challenges to the rule. On April 12, 2019, the U.S. Court of Appeals for the Fifth Circuit vacated portions of the 2015 ELG Rule applicable to legacy wastewater[26] and leachate.[27] The Court found that the best available technology economically achievable (BAT) set for legacy wastewater and leachate were outdated and inferior to other available technologies, and remanded those provisions back to the EPA. Most recently, in November 2019, the EPA proposed revisions to the ELG Rule that would reduce the stringency of effluent limitations, while also creating

[25] 40 C.F.R. Part 423.

[26] Legacy wastewater refers to wastewater from five waste streams—FGD, fly ash, bottom ash, flue gas mercury control, and gasification wastewater—that is generated prior to the first compliance deadline (November 1, 2020).

[27] Southwestern Elec. Power Co. v. United States EPA, 920 F.3d 999 (Apr. 12, 2019).

a voluntary program that extends compliance deadlines for operators who implement measures that achieve more stringent effluent limitations.[28]

Q. PLEASE SUMMARIZE THE REGULATORY FRAMEWORK FOR GROUNDWATER UNDER THE CCR RULE.

A. The CCR Rule is designed to address releases to groundwater from CCR waste disposal units. Pursuant to the CCR Rule, Groundwater Protection Monitoring must be performed at the waste boundary.[29] The standards in the CCR Rule are based on national MCLs[30] and secondary maximum contaminant levels (SMCLs) established by the EPA for drinking water quality pursuant to the Safe Drinking Water Act. Appendix III of the CCR Rule lists seven parameters — boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids — that must be monitored semi-annually. These constituents are primary indicators of potential contamination from

---

[28] Proposed Rule, Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category, 84 Fed. Reg. 64620 (Nov. 22, 2019).

[29] "*Waste boundary* means a vertical surface located at the hydraulically downgradient limit of the CCR unit. The vertical surface extends down into the uppermost aquifer." 80 Fed. Reg. 21471.

[30] A Maximum Contaminant Level (MCL) is "[t]he highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards." *National Primary Drinking Water Regulations*, U.S. EPA (last visited February 12, 2020), *available at* https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations #one.

A Maximum Contaminant Level Goal (MCLG) is "[t]he level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals." *Id.*

ash basins, and if discovered at certain levels, they trigger additional testing requirements for more constituents.

In particular, if it is determined that there has been a statistically significant increase over the established background level for any of the Appendix III parameters, then Groundwater Assessment Monitoring must begin within 90 days. The Assessment Monitoring shall include Appendix III and Appendix IV substances and establish a groundwater protection standard for each Appendix IV constituent. Appendix IV of the CCR Rule lists constituents including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, selenium, thallium, and Radium 266-228 combined.[31] The groundwater protection standard is to be the maximum contaminant level or background level, whichever is higher. If any Appendix IV constituents are determined to have a statistically significant increase in exceedance of the groundwater protection standard, then the nature and extent of the release must be characterized, additional monitoring wells must be installed, and assessment of corrective action must be started.

[31] "With the exception of cobalt, lead, lithium and molybdenum (included on appendix IV because of their relevance in the risk assessment and damage cases), all appendix IV constituents have an MCL." 80 FR 21405

Q. PLEASE SUMMARIZE THE REGULATORY FRAMEWORK FOR GROUNDWATER UNDER STATE STANDARDS.

A. N.C. Gen. Stat. § 143-214.1 directs the North Carolina Environmental Management Commission (EMC) to develop water quality standards applicable to the groundwaters of the State. In 1979, those groundwater quality standards were established by the 2L rules.[32] In accordance with Section .0103 of the 2L rules, the EMC establishes the best usage of groundwater as a source of drinking water. This means contamination should be avoided if it would make groundwater unfit for human consumption.

The groundwater quality standards are listed in Section .0202 of the 2L rules. The 2L rules generally prohibit an exceedance of an established water quality standard at or beyond the compliance boundary of a permitted disposal system.[33] The compliance boundary is a certain distance from the waste boundary, depending on whether the permit was issued prior to or after December 30, 1983. If the permit was issued prior to December 30, 1983, the compliance boundary is 500 feet from the waste boundary, or at the facility property line if less than 500 feet.[34] If the permit was issued on

[32] 15A NCAC 02L .0101 et seq. (1979).

[33] "Compliance boundary" means a boundary around a disposal system at and beyond which groundwater quality standards may not be exceeded and only applies to facilities which have received a permit issued under the authority of G.S. 143-215.1 or G.S. 130A. 15A NCAC 02L .0102.

[34] 15A NCAC 02L .0107 (a).

or after December 30, 1983, the compliance boundary is 250 feet from the waste boundary, or 50 feet within the facility property line if less than 250 feet.[35]

In addition to the listed groundwater quality standards, the 2L rules also provide for the establishment of interim standards for emerging constituents (e.g., acetic acid and butanol) for which a standard has not been established, known as interim maximum allowable concentrations (IMACs). The IMACs are adopted by DEQ and approved by the EMC. IMACs are enforceable groundwater standards pursuant to the 2L rules.[36]

Many of the constituents in CCRs are also naturally occurring in the soil. Per 15A NCAC 02L .0202(b)(3), where naturally occurring substances exceed the established standard, the standard is the naturally occurring concentration as determined by DEQ.[37] Background levels are typically determined by the use of upgradient monitoring wells as a baseline in comparison to downgradient monitoring wells. Fundamentally, as groundwater flows from an upgradient well location, then under the ash impoundment, then to the downgradient well location, a higher level of constituent in the downgradient well than in the upgradient well indicates the coal ash is the source of the higher reading. Any background levels that

[35] 15A NCAC 02L .0107 (b).

[36] 15A NCAC 02L .0202(c).

[37] 15A NCAC 02L .0202(b)(3).

are calculated to be above the 2L groundwater standards or the IMACs become the enforceable groundwater standard. The 2L groundwater standards and IMACs together are referred to as “constituents of interest.”

Pursuant to 15A NCAC 02L .0106(d) and (e), when activities result in an increase of the concentration of a substance in excess of the standards at or beyond a compliance boundary then the permittee shall respond according to subsection (f), conduct a site assessment per subsection (g), and submit corrective action plans per subsection (h). Pursuant to the 2L rules, the site assessment reporting and corrective action plan shall be conducted in accordance with a schedule established by DEQ. The site assessment shall include the “horizontal and vertical extent of soil and groundwater contamination and all significant factors affecting contamination transport” and “geological and hydrogeological features influencing the movement, chemical, and physical character of the contaminants.”

CCR-RELATED ACTIONS TAKEN BY DEQ

Q. WHAT IS DEQ’S ROLE IN THE REGULATION OF COAL ASH?

A. DEQ is the agency responsible for enforcing environmental regulations including, but not limited to, CAMA and the 2L rules. It also issues and enforces NPDES permits subject to its delegated authority under the CWA.

Q. PLEASE DESCRIBE THE CCR SURFACE IMPOUNDMENT CLASSIFICATIONS ISSUED BY DEQ.

A. CAMA states in part:

> As soon as practicable, but no later than December 31, 2015, the Department shall develop proposed classifications for all coal combustion residuals surface impoundments, including active and retired sites, for the purpose of closure and remediation based on these sites' risks to public health, safety, and welfare; the environment; and natural resources and shall determine a schedule for closure and required remediation that is based on the degree of risk . . . .[38]

The risk categories and closure dates prescribed in CAMA are as follows: high-risk impoundments must close no later than December 31, 2019, intermediate-risk impoundments must close no later than December 31, 2024, and low-risk impoundments must close no later than December 31, 2029.[39]

On November 13, 2018, DEQ reclassified the impoundments at the Roxboro and Mayo plants from intermediate-risk to low-risk due to DEP's establishment of permanent water supplies and correction of dam safety deficiencies.

---

[38] N.C. Gen. Stat. § 130A-309.213(a).

[39] N.C. Gen. Stat. § 130A-309.214.

Q. PLEASE DESCRIBE THE EXCAVATION ORDERS ISSUED BY DEQ IN APRIL 2019.

A. On April 1, 2019, DEQ ordered Duke Energy to excavate impounded coal ash at six plants – Allen, Belews Creek, Cliffside, Marshall, Mayo, and Roxboro. Below is an excerpt from DEQ's Closure Determination for the Roxboro plant, which is very similar to that for the other five plants:

> 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 Roxboro 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 impoundments at Roxboro 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.[40]

The excavation orders did not affect the Asheville, Cape Fear, H.F. Lee, Robinson, Sutton, and Weatherspoon plants. DEP is excavating coal ash at the Asheville plant under North Carolina's Mountain Energy Act (Session Law 2015-110), which amended CAMA and set August 1, 2022, as the closure date for the Asheville impoundments. DEP had selected the Cape Fear and H.F. Lee plants as cementitious beneficiation sites, which also

[40] *Available at* https://deq.nc.gov/news/key-issues/coal-ash-excavation/marshall-steam-station-coal-ash-closure-plan#closure-determination-april-1,-2019 (last visited February 5, 2020)

necessitates excavation. The Robinson plant is in South Carolina and not under the jurisdiction of DEQ or CAMA. DEQ had classified the impoundments at Sutton as high-risk in 2016, and DEP was already excavating the impoundments at that plant. In addition, DEQ had classified the impoundment at the Weatherspoon plant as intermediate-risk in 2016, and DEP was already excavating the impoundment at that plant. Lucas Table 1 below summarizes the status of DEP's coal-fired power plants with DEQ:

Lucas Table 1

Plant	Initial CAMA Classification	Current CAMA Classification	Did Excavation Orders Apply?
Asheville	High	High	No
Cape Fear	Intermediate	Intermediate	No
H.F. Lee	Intermediate	Intermediate	No
Mayo	Intermediate	Low	Yes
Robinson	N/A	N/A	N/A
Roxboro	Intermediate	Low	Yes
Sutton	High	High	No
Weatherspoon	Intermediate	Intermediate	No

Q. WHAT HAPPENED AFTER THE ISSUANCE OF DEQ'S EXCAVATION ORDERS?

A. After DEQ issued the excavation orders on April 1, 2019, Duke Energy filed a contested case challenging the orders. On December 31, 2019, Duke Energy, DEQ, and community and environmental groups entered into the 2019 Settlement Agreement that resolved the litigation over the excavation orders, as well as other ongoing litigation between Duke Energy and the community and environmental organizations. The 2019 Settlement Agreement is shown in **Lucas Exhibit 1**.

Q. PLEASE SUMMARIZE THE 2019 SETTLEMENT AGREEMENT.

A. The 2019 Settlement Agreement addresses CCR impoundments at DEP's Mayo and Roxboro plants and DEC's Allen, Belews Creek, Cliffside, and Marshall plants. It requires Duke Energy to excavate a majority of the coal ash and place it in a lined landfill. Coal ash in certain unlined portions of ash storage areas can remain in place if Duke Energy covers it with a geomembrane layer or constructs walls to stabilize the ash.[41] The Settlement contemplates ash remaining in the Pine Hall Road Landfill (~100,000 tons) at the Belews Creek plant.[42] In addition, ash (~13,079,000 tons) would remain in four unlined areas at the Marshall plant: 1) the subgrade fill beneath the Industrial Landfill (Cells 1-4); 2) the Structural Fill beneath the solar panels; 3) the Retired Landfill; and 4) the Ash Basin. Lastly, ash (~10,845,000 tons) will remain in the subgrade fill and unlined portion of the Monofill and the East Ash Basin at the Roxboro plant.

According to the 2019 Settlement Agreement, all closure must be completed in compliance with the deadlines in CAMA. CAMA, however, allows Duke Energy to request deadline variances, resulting in "no later than" closure deadlines in the 2019 Settlement Agreement. **Lucas Exhibit 2** explains the key features of the 2019 Settlement Agreement.

---

[41] "Duke Energy on the one hand, and DEQ and the Community Groups on the other, have a dispute as to whether coal ash under a lawfully permitted landfill is regulated by CAMA." (Id. at p 4, Footnote 2).

[42] In addition, the closure plan at Allen provides that between 30,000 and 50,000 tons of unsaturated ash shall remain for structural stability around the footers for the transmission towers, and that all ash that remains will be covered with a geomembrane layer.

Q. ARE OTHER DUKE ENERGY POWER PLANTS AFFECTED BY THE 2019 SETTLEMENT AGREEMENT?

A. Yes. The 2019 Settlement Agreement also indicates some relief for the closure deadlines for the Buck, H.F. Lee, and Cape Fear plants as follows: "The Community Groups agree not to oppose in court or before an administrative body, extensions to the CAMA closure dates as requested by Duke Energy, for the purposes of completing [sic] and beneficiation at Buck, Cape Fear, and HF Lee, through December 31, 2035."[43]

The Buck, H.F. Lee, and Cape Fear plants are the three plants selected by Duke Energy for ash beneficiation projects as required in N.C. Gen. Stat. § 130A-309.216. If DEQ does not grant an extension for closure, these three plants will have to complete closure by December 31, 2029. An extension would likely be more economical by allowing for longer use of the beneficiation facilities and possibly avoiding construction of coal ash landfills at the plant sites.

Q. PLEASE DESCRIBE HOW DEQ REGULATES WASTEWATER DISCHARGES FROM DUKE ENERGY'S COAL-FIRED PLANTS.

A. The Asheville, Cape Fear, H.F. Lee, Mayo, Roxboro, and Weatherspoon plants discharge wastewater under NPDES permits issued by DEQ. A revised permit for the Roxboro plant is currently under review by DEQ. The Asheville, Cape Fear, H.F. Lee, Mayo, Roxboro, and Weatherspoon plants

[43] Page 22, paragraph 45.

also have Special Orders by Consent (SOCs) with DEQ that allow temporary variations from the NPDES requirements. The temporary variations give DEP time to eliminate unauthorized constructed seeps from ash basin dams by decanting the water and decommissioning the coal ash impoundments. Decanting removes most bulk water from the impoundments and can require some wastewater treatment before being discharged. Water that has been in close contact with coal ash is called interstitial water and cannot be decanted because of the higher risk of contamination. Interstitial water requires a higher degree of treatment before being discharged. Below is DEQ's explanation of SOCs:

> SOCs may be an appropriate course of action if a facility is unable to consistently comply with the terms, conditions, or limitations in an NPDES Permit. However, SOCs can only be issued if the reasons causing the non-compliance are not operational in nature (i.e., they must be tangible problems with plant design or infrastructure). Should you and the Environmental Management Commission enter into an SOC, limits set for particular parameters under the NPDES Permit may be relaxed, but only for a time determined to be reasonable for making necessary improvements to the facility.[44]

The permittee must apply for an SOC, include justification, and provide a complete discussion of the factors that led to non-compliance. After receiving the application, DEQ develops a draft SOC, releases it for public comment, and can issue it after 45 days.

[44] *Available at* https://deq.nc.gov/about/divisions/water-resources/water-quality-permitting/npdes-wastewater/npdes-compliance-and-2 (last visited March 12, 2020).

Q. WHAT IS THE STATUS OF COAL ASH AT THE ROBINSON PLANT IN SOUTH CAROLINA?

A. DEP has applied for a permit to build an on-site landfill for disposal of coal ash at the Robinson plant pursuant to the terms of its Consent Agreement with the South Carolina Department of Health and Environmental Control (SCDHEC).

<u>ENVIRONMENTAL LEGAL ACTIONS AGAINST THE COMPANY</u>

Q. ARE YOU SPONSORING ANY ADDITIONAL TESTIMONY OR EXHIBITS WITH YOUR DIRECT TESTIMONY?

A. Yes. My testimony incorporates by reference the Public Staff's testimony and exhibits in the last DEP rate case (Docket No. E-2, Sub 1142) describing the legal actions filed against DEP for unlawful management of coal ash and pollution from coal ash.[45]

Q. WHAT IS THE NATURE OF THE LEGAL ACTIONS FILED AGAINST DEP WITH REGARD TO ITS COAL ASH MANAGEMENT?

A. Governmental agencies and environmental groups have sued DEP in state court with regard to the handling and impacts of coal ash, and private citizens have filed tort claims. It appears that the state enforcement actions filed by DEQ were prompted by "notice of intent to sue" letters from environmental groups represented by the Southern Environmental Law

[45] Page 45, line 1, through page 57, line 2, and Exhibits 8 and 9, Direct Testimony of Public Staff Engineer Jay Lucas filed in Docket No. E-2, Sub 1142, on October 20, 2017.

Center. In addition to the legal actions against DEP in state courts, environmental groups have brought several federal citizen suits against DEP, and the federal government brought a criminal case against DEP for violations at the Asheville, Cape Fear, and H.F. Lee plants. A complete summary of these legal actions is presented in my testimony in the last rate case, as referenced above.

Q. HAS THE STATUS OF ENVIRONMENTAL LEGAL ACTION AGAINST THE COMPANY CHANGED SINCE DEP'S LAST RATE CASE?

A. Yes. In summary, the 2019 Settlement Agreement between Duke Energy, DEQ, and community and environmental groups resolved the following legal actions:

- <u>Wake County Superior Court, No. 11032</u> – Suits for violations at the Cape Fear, H.F. Lee, Mayo, Roxboro, Sutton, and Weatherspoon plants alleging unlawful discharges to surface waters, NPDES permit violations, and violations of the 2L rules.[46]
- <u>US District Court for the Middle District of North Carolina, No. 16-CV-607</u> – Federal citizen suit filed on behalf of Roanoke River Basin Association for violations at DEP's Mayo plant,

[46] Claims with respect to the Cape Fear, H.F. Lee, Sutton, and Weatherspoon plants were resolved prior to the Settlement Agreement.

alleging unpermitted discharges to surface waters and groundwater violations.

- US District Court for the Middle District of North Carolina, No. 17-CV-452 – Federal citizen suit filed on behalf of Roanoke River Basin Association for violations at DEP's Roxboro plant, alleging unlawful discharges to surface waters.

In addition, the following case was dismissed by the court without prejudice:

- US District Court for the Middle District of North Carolina, No. 17-CV-561 – Federal citizen suit filed on behalf of the Roanoke River Basin Association, alleging that the closure plans submitted by DEP for the Mayo plant violate the CCR Rule.

Q. SINCE YOUR TESTIMONY IN THE LAST RATE CASE, HAVE YOU BECOME AWARE OF ANY ADDITIONAL CCR-RELATED LEGAL ACTIONS FILED AGAINST DEP?

A. Yes. Four additional legal actions were filed against the Company, as summarized below.

- Wake County Superior Court, No. 17-CVS-10341 – Class action litigation filed in August 2017 on behalf of property owners living near DEP's Asheville, H.F. Lee, Mayo, and Roxboro plants, in addition to five DEC plants, alleging groundwater contamination. The parties entered into a settlement, and the class action litigation was dismissed, in January 2018.

- Person County Superior Court, No. 18-CVS-346 – Tort claim filed against DEP alleging private nuisance, negligence, and trespass relating to the unlined coal ash impoundment at the Mayo plant. The parties settled in June 2019 and filed a stipulation of dismissal in August 2019.
- US District Court for the Middle District of North Carolina, No. 17-CV-707 – Federal citizen suit filed on behalf of the Roanoke River Basin Association, alleging that the closure plans submitted by DEP for the Roxboro plant violate the CCR Rule. This case was dismissed by the court without prejudice in May 2018.
- New Hanover County Superior Court, No. 17-CVS-3305 – Tort claim filed against DEP in September 2017 alleging that DEP failed to notify officials or neighbors and failed to take remedial action when it discovered groundwater contamination at the Sutton plant. This case was voluntarily dismissed in June 2018.

POWER PLANT DESCRIPTIONS

Q. HAS THE PUBLIC STAFF HAD THE OPPORTUNITY TO VISIT AND TOUR THE DEP CCR BASIN SITES?

A. Yes. On December 13, 2019, the Public Staff visited the Cape Fear plant. On December 16, 2019, the Public Staff visited the Weatherspoon and H.F. Lee plants. On December 18, 2019, the Public Staff visited the Roxboro and Mayo plants. **Lucas Exhibit 3** shows photographs taken at each of these plants. In addition, **Lucas Exhibit 4** lists the nomenclature used to identify the CCR storage units at each plant, the amount of CCR stored in each unit, years of operation, and modifications.

At each of those plants, the Public Staff, accompanied by consultants Vance Moore and Bernard Garrett of Garrett & Moore, Inc., met with key plant personnel. Those employees gave site-specific overviews regarding the status of ash removal and activities to achieve CCR Rule and North Carolina regulatory compliance and timelines going forward. At the time of our plant visits, the excavation orders issued by DEQ and pending appeal by the Company had created uncertainty as to the continuation of DEP's present closure activities and the future cost of compliance.

Q. WHAT IS THE STATUS OF CCR SITE REMEDIATION AT ALL EIGHT COAL-FIRED POWER PLANT SITES?

A. **Asheville** – DEP retired the coal-fired units in January 2020 and has placed most of the combined-cycle natural gas fired units in operation. DEP completed excavation of the 1982 Ash Basin in September 2016 and is still excavating ash and removing interstitial water from the 1964 Ash Basin. DEP was sending coal ash to the Asheville Airport Structural Fill but stopped doing so in July 2015. DEP has removed approximately 6,954,649 tons of coal ash from the Asheville plant site and must complete the removal by August 1, 2022, per Session Law 2015-110 as discussed above. However, DEP currently plans to have excavation complete by February 28, 2022. DEP has constructed a lined retention basin and wastewater treatment plant to treat stormwater and wastewater from the site.

Cape Fear – DEP retired the coal-fired units in 2012. DEP has finished decanting the 1978 and 1985 Ash Basins. The 1956, 1963, and 1970 Ash Basins contain little or no water and have become largely forested. The Cape Fear site has one of the three ash beneficiation projects discussed more fully by Public Staff witness Vance Moore. Currently, DEP plans to excavate all coal ash at the plant site and use the beneficiation project to convert the ash into cementitious products to be sold.

H.F. Lee – DEP retired the coal-fired units in 2012 and placed the combined-cycle natural gas fired units in operation. DEP has finished decanting the 1982 (Active) Ash Basin and is in the process of dewatering the interstitial water. Inactive Ash Basins 1, 2, and 3 contain little or no water and have become largely forested. The H.F. Lee site has one of the three ash beneficiation projects discussed more fully by Pubic Staff witness

Vance Moore. Currently, DEP plans to excavate all coal ash at the plant site and use the beneficiation project to convert the ash into cementitious products to be sold.

Mayo – DEP operates the Mayo plant on an intermediate dispatch basis and has converted it to dry ash handling. The dry ash is placed into a lined landfill, and FGD solid waste is taken to the Roxboro plant. DEP is currently decanting the Ash Basin and remediating the FGD wastewater treatment ponds. DEP has constructed lined retention basins and a zero liquid discharge treatment plant to treat stormwater and wastewater from the site. As per DEP's 2019 Settlement Agreement with DEQ discussed earlier in my testimony, DEP must excavate all coal ash from the Ash Basin.

Robinson – DEP retired this South Carolina coal-fired unit in 2012. DEP is currently excavating all coal ash at the site to prepare for placement of the ash in a lined landfill that is currently under construction. The Ash Basin does not contain any bulk water and will not require decanting. Currently, DEP has not found any interstitial water in the Ash Basin.

Roxboro – DEP operates the Roxboro plant on an intermediate dispatch basis and has converted it to dry ash handling. The dry ash is placed into the Roxboro Monofill, and FGD solid waste from the Roxboro and Mayo plants is stockpiled onsite for purchase by a drywall manufacturer. DEP has constructed lined retention basins and a wastewater treatment plant to treat stormwater from the site. FGD wastewater will be treated by a separate wastewater treatment plant. As per DEP's 2019 Settlement Agreement with DEQ discussed earlier in my testimony, DEP must excavate all coal ash from the West Ash Basin and most coal ash from the East Ash Basin. Coal ash under and in the Roxboro Monofill, which was built partially on the East Ash Basin, may remain in place and must be stabilized with a permanent structure.

Sutton – DEP retired the coal-fired units in 2013 and placed the combined-cycle natural gas fired units in operation. Pursuant to CAMA, DEQ determined that the impoundments at the Sutton plant are high-risk, which requires impoundment closure by August 1, 2019. DEP has excavated all coal ash from the impoundments and placed it in either an on-site landfill or the Brickhaven landfill in Chatham County.

Weatherspoon – DEP retired the coal-fired units in 2011 and still operates four oil-fired combustion turbines at the site. Pursuant to CAMA, DEQ determined that the impoundment at the Weatherspoon plant is intermediate-risk, which requires impoundment closure by August 1, 2028. DEP is currently excavating coal ash and transporting it to South Carolina for beneficiation.

PAST KNOWLEDGE ABOUT THE ENVIRONMENTAL IMPACTS OF THE STORAGE OF COAL ASH

Q. ARE YOU SPONSORING ANY ADDITIONAL TESTIMONY OR EXHIBITS WITH YOUR DIRECT TESTIMONY?

A. Yes. My testimony incorporates by reference the Public Staff's voluminous record of exhibits and testimony in the previous DEC rate case describing historic academic, industry, regulatory, and utility documents.[47] The principal topic addressed by said exhibits and testimony is the history of known environmental impacts associated with the storage and management of coal ash in unlined surface impoundments.

Q. HAVE YOU CONDUCTED ANY FURTHER RESEARCH?

A. Yes. Per Commissioner Daniel G. Clodfelter's March 5, 2018, request in the hearing in Docket No. E-7, Sub 1146, Sierra Club submitted a copy of the Coal Ash Disposal Manual[48] published by the Electric Power Research Institute (EPRI) in October 1981. The following section briefly summarizes the manual, which my testimony incorporates by reference.

The 1981 EPRI Coal Ash Disposal Manual's stated purpose was "to present detailed procedures for the evaluation of the technical, environmental, and

---

[47] Page 33, line 1, through page 53, line 3, and Exhibits 3-10, Direct Testimony of Public Staff Engineer Charles Junis filed in Docket No. E-7, Sub 1146, on January 24, 2018. *See also* Page 38, line 1, through page 60, line 27, and Exhibits 3-6, Direct Testimony of Public Staff Engineer Jay Lucas filed in Docket No. E-22, Sub 562, on August 23, 2019.

[48] Coal Ash Disposal Manual, Second Edition, GAI Consultants, Inc., Electric Power Research Institute, October 1981. Filed in Docket No. E-7, Sub 1146 on March 15, 2018.

economic factors involved with the disposal of coal ashes which include fly ash and bottom ash" and "to aid utility design personnel in the selection and location of optimal disposal systems . . . ."[49]

Section 3 states that "[w]hile most coal ash is currently handled in wet systems, the national trend is away from wet disposal systems toward dry handling methods."[50] It also notes that wet disposal systems could make the use of land after site closure "perhaps difficult and costly."[51]

Importantly, Section 7 states that "it is difficult to prove non-contamination without monitoring, and the burden of proof is placed on the industry."[52]

Q. PLEASE EXPLAIN THE SIGNIFICANCE OF HISTORICAL DOCUMENTS ON CCR RISKS.

A. In general, the exhibits are historic academic, industry, regulatory, and utility documents that show a growing awareness of environmental issues related to the storage and management of CCR. The documents are not a comprehensive review of the state of scientific and engineering knowledge about the risks of groundwater and surface water contamination from ash basins; it is a selection of documents that the Public Staff believes demonstrates an evolving body of scientific knowledge over more than 50

---

[49] *Id.* at S-1.

[50] *Id.* at 3-1.

[51] *Id.* at 3-3.

[52] *Id.* at 7-3.

years concerning the risks of environmental contamination resulting from storing coal ash in unlined impoundments, and alternative methods of coal ash management.

These documents demonstrate that, by the early 1980s, the electric generating industry knew or should have known that the wet storage of CCR in unlined surface impoundments posed a serious risk to the quality of surrounding groundwater and surface water. This knowledge was evident in the 1979 report entitled “Health and Environmental Impacts of Increased Generation of Coal Ash and FGD Sludges,” written by a research group from Arthur D. Little, Inc., and the Industrial Environmental Research Laboratory of the EPA. The report stated that FGD sludge and coal ash waste stored in “[w]et impoundments have the potential for contributing directly to groundwater contamination.”[53] It further concluded that “areas using lined impoundments would tend to minimize the potential effects on ground and surface waters” (Id. at p 155).

This important realization was reinforced by the 1982 “Manual for Upgrading Existing Disposal Facilities” published by EPRI, of which Duke Energy is a member. The manual states “[b]ecause ponds by design maintain a hydraulic head of standing water above the settled waste, there is little that

[53] Exhibit 7, NEP Study, p 153, Direct Testimony of Public Staff Engineer Charles Junis filed in Docket No. E-7, Sub 1146, on January 24, 2018.

can be done to eliminate leachate generation and migration" and "[f]or this reason, ponding has fallen into disfavor with EPA as a permanent method of waste disposal."[54] "While groundwater can be protected and leachate generation can be minimized with sound engineering design and site operation, monitoring of groundwater and leachate, is nevertheless necessary to provide convincing proof of a safe disposal practice." (Id. at p 4-19).

The 1988 Report to Congress by the EPA (1988 EPA Report)[55] was an extensive review of the quantities, physical and chemical characteristics, and collection and storage methods of waste products from coal-fired electric generation. The report describes coal combustion waste disposal and re-use methods and technological advancements and assesses the use of each across the industry. At the time of the report, regulations on impoundments were becoming more restrictive, which was increasing the cost and decreasing the use of impoundments. The use of liners, leachate collection systems, and groundwater monitoring had increased in the years leading up to the publication of the 1988 EPA Report. The report states the following in the Executive Summary:

> Only about 25 percent of all facilities have liners to reduce off-site migration of leachate, although 40 percent of the generating units built since 1975 have liners. Additionally, only about 15 percent have leachate collection systems; about

---

[54] Exhibit 8, pp 8-2 and 8-3, Direct Testimony of Public Staff Engineer Charles Junis filed in Docket No. E-7, Sub 1146, on January 24, 2018.

[55] *Available at* https://www.epa.gov/sites/production/files/2015-08/documents/coal-rtc.pdf (last visited February 4, 2020).

> one-third of all facilities have ground-water monitoring systems to detect potential leachate problems. Both leachate collection and ground-water monitoring systems are more common at newer facilities.

1988 EPA Report**,** p ES-3.

Exhibits 2-7 (<u>Id.</u> at 2-17) and 4-4 (<u>Id.</u> at 4-19) of the report are a 1985 map of EPA regions with a pie chart of electricity generation by fuel type and a 1985 table of CCR waste management facilities by EPA region. It is worth noting that EPA Region 4, at nearly a 4:1 ratio, was the only region to use more surface impoundments than landfills. Exhibit 4-6 is a table of the quantity of liners installed for leachate control at utility waste management facilities by EPA region. (<u>Id.</u> at p 4-31). Of the available dataset, Region 4 used predominantly unlined facilities, accounting for over half of the unlined surface impoundments in the United States, and had the lowest percentage of lined disposal units with the exception of Region 10 in the Pacific Northwest.

DEP, as a large and prominent electric utility with a substantial portfolio of coal-fired generation, knew or should have known of EPRI and EPA publications addressing the risk of unlined ash impoundments. DEP failed to improve and modernize its practices despite the available knowledge described in my testimony above. In particular, given the state of knowledge as publications from 1979 and later warned of the risks of CCR constituents leaching into groundwater from unlined storage ponds, DEP should have installed comprehensive groundwater monitoring well networks in the 1980s to determine if the risk was materializing at their ash ponds.

DEP continued to operate ash impoundments (i.e., basins or ponds) at every coal-powered plant until at least 2011. In addition, the characteristics of the CCR disposed of in the impoundments changed over time. The enactment of the Clean Air Act and subsequent air quality rules in the 1970s required treatment of the emissions released by coal-fired generating facilities. Often, constituents previously emitted into the air became part of the waste stream that was disposed of in impoundments and landfills. **Lucas Exhibit 5** is a table of when the Company implemented specific environmental controls.

Q. WHAT EVALUATIONS OR ANALYSES DID DEP CONDUCT WITH RESPECT TO THE HISTORICAL DOCUMENTS ON THE RISKS OF CCR STORAGE IN UNLINED IMPOUNDMENTS?

A. The Public Staff asked DEP for a copy of any CCR analysis that DEP had performed in response to the 1979 Arthur D. Little Report, 1981 EPRI Coal Ash Disposal Manual, the 1982 EPRI Manual, the 1988 EPA Report, or the 2004 EPRI Decommissioning Handbook. In response to each item, the Company stated that it “has not been able to locate a specific response to the document in question.”

The Company, however, also referenced its response to a data request from the Sierra Club in the Sub 1142 rate case that requested the following:

> Please produce all pre-2014 documents relating to risks posed by storing coal combustion residuals in unlined impoundments, including but not limited to any studies regarding the leaching of arsenic or other constituents of coal combustion residuals from unlined impoundments.

The Company provided a selection of documents, some of which were not specific to DEP and its predecessors. One document provided by the Company that is responsive to the discussion here was a 1979 evaluation conducted by DEP and a contractor. I will briefly address that evaluation below.

Edwin Floyd, Professional Engineer and Groundwater Hydrologist of Moore, Gardner & Associates, Inc. Consulting Engineers prepared the "Evaluation of the Potential for Contamination of the Ground-Water Aquifer by Leachate from the Coal-Ash Storage Pond at the Mayo Electric Generating Plant Site" dated January 31, 1979. The Introduction states:

> This report discusses the results of an on-site investigation of the geology and ground-water conditions and the potential for ground-water contamination by certain trace elements in ash sludge to be deposited in a proposed ash-disposal pond at the Carolina Power and Light Company generating plant site on Mayo Creek in Person County, North Carolina.

In the Geology and Hydrologic Conditions Section, the site subsurface conditions are described in detail. The alluvial soil cover present near the Crutchfield Branch "consists of sandy clayey silts near the surface, grading downward into silty sands overlying a sandy gravel base which rests on clay or saprolite." (Id. at pp 5-6) Unless excavated, the soils that would be directly in contact with coal ash are described as sandy and would have porous characteristics. The underlying clay layer has low permeability, however, its ability to protect groundwater depends on the depth of the groundwater table, area and thickness of the clay layer, and the probability of cracking. Generally, the "water table configuration is determined mostly by topography, with depths to water usually being greatest in the upland areas and shallowest in the valleys." (Id. at p 6) In the Evaluation of Data Section starting on page 7, the subsurface conditions were further investigated by drilling 13 test holes to sample the soils and 12 test holes were completed as monitoring wells to observe the groundwater depth and for sampling. The groundwater depths during the seasonal low period are shown in Figure 1 of the report.[56] The last page of the Summary Section states that leachate from the pond would be filtered by the soils and diluted with natural groundwater and that "[p]eriodic sampling of the ground water from the observation wells around the pond will detect any evidence to the contrary." Despite the thin soil layer and shallow groundwater table, the report concludes that:

> In consideration of the natural action of the soils on heavy minerals in the leachate, the dilution effects of mixing with the natural ground water, and the fact that there are no water supply sources or major water courses for miles downstream from the ash pond dam, it is difficult to imagine that any significant adverse impact on the ground water aquifer could be caused by ponding of the ash wastes at the proposed site.

[56] "Figure 1 is a generalized map of the water-table at the ash pond site as it appeared on October 2, 1978. The water levels reflect the late summer dry season and are at, or very near, the yearly lowest levels. Seasonal fluctuations are probably within the range of 5 to 15 feet in upland areas and 2 to 5 feet in the valleys." (Id. at p 6)

In response to Public Staff data requests for the installation dates of all groundwater monitoring wells and monitoring data, DEP provided no data prior to 2008 for the Mayo plant. This is an indication that the Company did not continue to monitor the groundwater for impacts after this evaluation of the existing subsurface conditions and the construction of the ash basin at Mayo.

The conclusion that adverse impact is “difficult to imagine” is contrary to the earlier suggestion, in the same report, for periodic sampling. It was also imprudent, at least by the end of 1979, to the extent the Company relied on an assumption that there would be no contamination, rather than actually testing for contamination. A few months later in the same year, the Arthur D. Little report noted the risk of groundwater contamination from ash impoundments. In addition, the initial 2L rules prohibiting groundwater exceedances were promulgated in 1979. Without periodic sampling as recommended in the report, DEP was merely trusting that its unlined impoundments would comply with groundwater standards – DEP chose to trust without verifying. This analysis and report were completed as part of the planning for the Ash Basin at Mayo that was constructed in 1983, the same year that the plant’s wastewater characteristics changed and the volume increased when DEP added precipitators. Groundwater monitoring wells were not installed at Mayo until 25 years later in October of 2008.

ENVIRONMENTAL COMPLIANCE

Q. ARE YOU SPONSORING ANY ADDITIONAL TESTIMONY OR EXHIBITS WITH YOUR DIRECT TESTIMONY?

A. Yes. My testimony incorporates by reference the Public Staff's testimony and exhibits in the last DEP rate case describing what the Public Staff knew of the Company's environmental compliance up to the date of my testimony in that rate case.[57] I provide an update to the Company's environmental compliance record in my testimony below.

Q. WHAT IS THE STATUS OF THE COMPANY'S SEEPS?

A. DEP has identified its seeps in response to a Public Staff data request as provided in **Lucas Exhibit 6**. Seeps arise from the seepage or movement of water through porous, earthen coal ash basin dams. While almost all earthen dams have seeps, most of the earthen dams across the state impound fresh water whereas DEP's dams impound coal ash wastewater, which cannot be lawfully discharged – even by seeps – without a permit. "Engineered" or "constructed" seeps are discharge pipes or channels that were deliberately constructed.

On September 28, 2017, DEP submitted an application for an SOC related to coal ash basin seepage at Asheville, Cape Fear, H.F. Lee, Mayo, Roxboro, and Weatherspoon, and a number of DEC plants. On August 15,

[57] Page 34, line 11, through page 44, line 19, and Exhibits 3-7 (Revised Exhibits 5 and 6), Direct and Supplemental Testimonies of Public Staff Engineer Jay B. Lucas filed in Docket No. E-2, Sub 1142, on October 20, 2017, and November 15, 2017, respectively.

2018, the EMC approved the SOC for Mayo and Roxboro. See **Lucas Exhibit 7**. Under the SOC, the Company agreed to pay an upfront penalty of $150,000 as settlement of all alleged violations due to seepage from 10 deliberately constructed seeps and 5 non-constructed seeps, identified prior to January 1, 2015. In addition, the Company was required to accelerate compliance with CAMA, specifically N.C. Gen. Stat. §130A-309.210(d) and (f), by eliminating discharges of stormwater into the surface impoundments and converting to dry bottom ash handling prior to the decanting initiation and completion deadlines.

On January 10, 2019, the EMC approved an SOC for H.F. Lee. See **Lucas Exhibit 8**. Under the SOC, the Company agreed to pay an upfront penalty of $72,000 as settlement of all alleged violations due to seepage from 12 non-constructed seeps, identified prior to January 1, 2015. In addition, the Company was required to begin dewatering no later than July 31, 2019, and provide various reports to DEQ.

On January 27, 2019, the EMC approved SOCs for Cape Fear and Weatherspoon. See **Lucas Exhibit 9**. Under the SOC for Cape Fear, the Company agreed to pay an upfront penalty of $48,000 as settlement of all alleged violations due to seepage from 8 non-constructed seeps, identified prior to January 1, 2015. In addition, the Company was required to begin dewatering no later than January 31, 2020, and provide various reports to DEQ. Under the SOC for Weatherspoon, the Company agreed to pay an upfront penalty of $72,000 as settlement of all alleged violations due to seepage from 4 deliberately constructed seeps and 4 non-constructed seeps, identified prior to January 1, 2015. Similar to the other SOCs, the Company was required to provide various reports to DEQ and conduct water quality monitoring associated with the seeps.

Deliberately constructed seeps such as toe drains have been included in the renewed or modified NPDES permits for Asheville, Mayo, and Weatherspoon. Including these seeps in the Company's permits, however, does not retroactively condone them. Rather, their inclusion in a renewed or modified NPDES permit means that the seep must be monitored for contaminant levels, affording a level of environmental protection that did not previously exist.

Q. WHAT IS THE STATUS OF COMPLIANCE WITH STATE GROUNDWATER STANDARDS FOR DEP'S NORTH CAROLINA PLANTS?

A. DEQ requires DEP to monitor, assess, and characterize groundwater quality at or beyond the compliance boundary of the coal ash impoundments. Any exceedance of the applicable groundwater standards is evaluated against background levels (also known as provisional background threshold levels or PBTVs) to determine if the exceedance is attributable to the migration of constituents from the ash basins, natural causes, or offsite impacts. Legal counsel advises me that an exceedance of the state groundwater standards at or beyond the compliance boundary, not due to background levels, constitutes a violation of the groundwater standards. Furthermore, such an exceedance is a violation regardless of whether corrective action is undertaken.[58] See **Lucas Exhibit 10**, pp 4-15. Based on DEP's groundwater monitoring, the cumulative total of groundwater violations has reached 7,411.[59] See **Lucas Exhibit 11**.

Q. WHAT IS THE STATUS OF COMPLIANCE WITH STATE GROUNDWATER STANDARDS FOR DEP'S ROBINSON PLANT IN SOUTH CAROLINA?

A. The Company is required by SCDHEC to monitor groundwater quality around coal ash storage units. Based on DEP's groundwater monitoring, the total number of groundwater exceedances at the Robinson Plant has reached 632. See **Lucas Exhibit 12**.

Q. WHAT IS THE STATUS OF THE ENVIRONMENTAL AUDITS OVERSEEN BY THE COURT-APPOINTED MONITOR?

A. The federal criminal case brought against DEC, DEP, and Duke Energy Business Services resulted in a requirement that a court-appointed monitor oversee the Company's compliance with the conditions of probation. One

---

[58] This was corroborated by DEQ in a September 25, 2019, amicus brief filed at the North Carolina Supreme Court in State of North Carolina ex rel. Utilities Commission v. Attorney General, Docket Nos. 271A18 and 401A18.

[59] In the E-2, Sub 1142, rate case, the Public Staff presented 2,857 groundwater violations as identified by DEP. The updated total of 7,411 is representative of the cumulative number of violations, including the 2,857 identified in the previous rate case and the 4,554 identified since then.

of those conditions is the completion of environmental audits by an independent auditor for each of DEC's and DEP's plants with CCR surface impoundments. The scope of the audits includes a review and evaluation of environmental compliance.

The Final Audit Reports, conducted by Advanced GeoServices Corp. and The Elm Consulting Group International, LLC, have identified numerous exceedances of the groundwater quality standards at DEP's generating stations. In addition, the Audit Team identified unauthorized seeps, which are violations of the CWA and the Company's NPDES permits. Each of the 2016, 2017, 2018, and 2019 Final Audit Reports for DEP's eight coal-fired power plants are posted online[60] by the Company in accordance with the terms of the federal plea agreement.

The findings in the Audit Reports of groundwater exceedances at or beyond the compliance boundary and unauthorized seeps are summarized in **Lucas Exhibit 13** and **Lucas Exhibit 14**, respectively.

[60] *Available at* https://www.duke-energy.com/our-company/environment/compliance-and-reporting/environmental-compliance-plans (last visited February 6, 2020).

Q. WHAT IS THE STATUS OF COMPLIANCE WITH FEDERAL CCR RULE GROUNDWATER STANDARDS FOR DEP'S NORTH CAROLINA AND SOUTH CAROLINA SURFACE IMPOUNDMENTS?

A. The Company is required by the CCR Rule to monitor groundwater at the waste boundary for constituents regulated by EPA. More specifically, DEP is required to perform background sampling and then detection monitoring for Appendix III parameters. As noted earlier, the location of monitoring wells and the types of constituents that must be monitored under the CCR Rule differ somewhat from monitoring required by DEQ. The Company has compiled a table quantifying 3,164 testing results determined to be statistically significant increases over background levels for Appendix III parameters. See **Lucas Exhibit 15**. If a statistically significant increase is detected for one or more constituents, then assessment monitoring is required for Appendix IV parameters. If the testing results exceed the groundwater protection standards, the facility owner must characterize the nature and extent and initiate an assessment of corrective action. For all but one of its coal-fired power plants[61], DEP has been required to submit an assessment of corrective measures as a result of exceedances of the background levels and groundwater protection standards. Under the CCR Rule, DEP is required to file notices and reports[62], including annual

[61] The exception being Cape Fear because the CCR Rule does not apply to this site.

[62] *Available at* https://www.duke-energy.com/our-company/environment/compliance-and-reporting/ccr-rule-compliance-data (last visited March 1, 2020).

groundwater monitoring reports summarizing the detection and, if applicable, assessment monitoring activities and data. The Company has compiled a table quantifying 277 testing results from groundwater downgradient of the ash impoundments that have exceeded both the natural background levels and the groundwater protection standards for Appendix IV parameters. See **Lucas Exhibit 16**.

Q. WHEN DID DEP BEGIN CONDUCTING GROUNDWATER MONITORING AND HAS THE COMPANY CONTINUED TO INSTALL ADDITIONAL GROUNDWATER MONITORING WELLS?

A. DEP installed groundwater wells and began monitoring on a site-specific basis. Voluntary groundwater monitoring wells were installed at Cape Fear, H.F. Lee, and Mayo in 2007 and 2008. DEP states the initial requirement by DEQ to monitor groundwater at each ash impoundment was in 2009. The exceptions were Roxboro, Sutton, and Weatherspoon; groundwater monitoring began near impoundments at these plants in 1986, 1990, and 1990, respectively. In addition, groundwater monitoring was required near the landfill at Roxboro in 1987. In South Carolina, groundwater monitoring was first required by DHEC at the Robinson plant in 1995. See **Lucas Exhibit 17**. Despite the 1979 EMC adoption of the initial 2L rules and the publication of the 1982 EPRI Manual, which stated that the "monitoring of groundwater and leachate, is nevertheless necessary to provide convincing proof of a safe disposal practice,"[63] DEP did not start monitoring groundwater quality at some of its sites until three decades later. Furthermore, DEP did not engage in comprehensive groundwater monitoring until even later, as quantitatively illustrated by the table in **Lucas Exhibit 18**.

As noted by the EPA in the preamble to the CCR Rule, once monitoring wells are installed downgradient of unlined coal ash impoundments, exceedances of groundwater standards quickly become apparent.[64]

Q. WHAT ACTIONS DID DEP TAKE IN RESPONSE TO ITS GROUNDWATER MONITORING DATA?

A. In response to a Public Staff data request seeking an explanation of the action taken by the Company in response to each exceedance prior to 2009 at voluntary groundwater monitoring wells, the Company stated the following:

> From 2004-2006, an investigation was conducted on the Sutton Former Ash Disposal Area (FADA) and the "Old Ash

[63] Junis Exhibit 8 in Docket No. E-7, Sub 1146, pp 4-19.

[64] ". . . under many state programs existing impoundments are exempt from groundwater monitoring and once monitoring is put in place, new damage cases quickly emerge. This is illustrated by two lines of evidence: First, in the wake of the 2008 TVA Kingston CCR spill two states required utilities for the first time to install groundwater monitoring. Illinois required facilities to install groundwater monitoring down gradient from their surface impoundments. As a result, within only about two years, Illinois detected seven new instances of primary MCL exceedances and five additional instances with exceedances of SMCLs. The data for all twelve sites were gathered from onsite; it appears none of these facilities had been required to monitor groundwater off-site, so whether the contamination had migrated off-site is currently unknown. Similarly, North Caroline [sic] required facilities to install additional down gradient wells. In January 2012, officials from the North Carolina Department of Environment and Natural Resources disclosed that elevated levels of metals have been found in groundwater near surface impoundments at all of the State's 14 coal-fired power plants." 80 Fed. Reg. at 21455.

> Pond" (also known as the 1971 Ash Basin). The conclusion of the two phases of investigations and the Remedial Action Plan were that groundwater contamination was localized and minor. Any risk to the public or plant personnel could be adequately controlled by administrative controls and land use restrictions.

However, in paragraph 191 of the Joint Factual Statement in the federal criminal case, DEP agreed to the following statement: "In June and July 2013, Flemington's public utility concluded that boron from Sutton's ash ponds was entering its water supply. Tests of water from various wells at and near Sutton from that period showed elevated levels of boron, iron, manganese, thallium, selenium, cadmium, and total dissolved solids."[65] The Company's response to the Public Staff's Data Request did not indicate any actions taken for any other exceedances at any other sites.

When DEP detected exceedances at its unlined impoundments, it should have installed sufficient groundwater monitoring wells to determine to what extent those exceedances were attributable to the coal ash impoundments, to what extent they were attributable to other sources or natural background levels, and the extent and nature of potential groundwater degradation. Only with this information could DEP evaluate appropriate corrective action measures.

[65] Exhibit 9 of the Testimony of Public Staff Engineer Jay B. Lucas filed in Docket No. E-2, Sub 1142, on October 20, 2017.

COSTS OF CCR-RELATED ENVIRONMENTAL IMPACTS

Q. FOR CCR MANAGEMENT, HAS DEP INCURRED COSTS RELATED TO NONCOMPLIANCE WITH ENVIRONMENTAL REGULATIONS?

A. Yes. DEP has incurred costs to remediate unpermitted discharges, violations of groundwater quality standards, and other violations of environmental regulations at all DEP CCR disposal sites. There have been and will continue to be substantial costs to remedy these CCR-related environmental violations and prevent risks of future violations, particularly under the corrective action and closure requirements of the CCR Rule and CAMA. While the Company calls these "compliance" costs to meet the requirements of CAMA or the CCR Rule, they also reflect DEP's non-compliance with longstanding environmental regulations. In my opinion, the evidence of violations shows DEP would have incurred substantial corrective action costs under the 2L rules even in the absence of the CCR Rule and CAMA. I believe this is relevant to DEP's culpability and supports the recommendation of equitable sharing.

DEP DIRECT TESTIMONY ON COAL ASH PROJECTS

Q. PLEASE PROVIDE A SUMMARY OF THE COAL ASH COST RECOVERY DISCUSSION IN THE TESTIMONY OF DEP WITNESS JESSICA BEDNARCIK.

A. In her direct testimony and 19 exhibits filed on October 30, 2019, DEP witness Jessica Bednarcik discussed state and federal regulatory requirements, actions by DEQ, and coal ash related costs requested by

DEP from September 1, 2017, through February 29, 2020. Witness Bednarcik provided actual costs from September 1, 2017, through June 30, 2019, and DEP has periodically provided updates for later months.

The costs in witness Bednarcik's testimony are only those that DEP has booked for financial accounting purposes as Asset Retirement Obligations (AROs).[66] Capital costs related to coal ash are not booked as AROs (and are thus termed by the Company as "non-ARO" costs) and are located in the testimony of DEP witness Julie Turner. In response to a Public Staff data request, DEP explained its method of separating ARO and capital costs as follows:

> If there is a project or work scope that is subject to the federal CCR regulations, CAMA, or other regulation/legislation that creates a legal obligation to incur retirement costs associated with the retirement of a long-lived asset and the obligation can be reasonably estimated, the costs are recorded as ARO, i.e. basins/landfill closures. If there is a project that supports future ongoing operations and meets capitalization guidelines, these costs get recorded as Capital.

As of December 31, 2019, the total actual ARO coal ash costs expended in the period beginning September 1, 2017, and submitted for recovery in this case on a system basis were $624,043,613.

---

[66] As noted in the testimony of Public Staff witness Maness, for North Carolina retail regulatory accounting and ratemaking purposes, as determined by this Commission, DEP is accounting for and recovering its impoundment closure costs through a deferral and amortization process, rather than a financial accounting ARO process.

Q. PLEASE SUMMARIZE THE DISCUSSION IN THE TESTIMONY OF DEP WITNESS JULIE TURNER REGARDING CAPITAL INVESTMENTS IN THE COMPANY'S COAL FLEET TO MEET ENVIRONMENTAL REGULATIONS.

A. In her direct testimony filed on October 30, 2019, DEP witness Julie Turner stated the following:

> The Company has also made significant investments within its coal fleet to meet environmental regulations to allow for the continued operation of active plants, including the Coal Combustion Residual ("CCR") Rule, the Coal Ash Management Act ("CAMA") and Effluent Limitations Guidelines ("ELG"), totaling approximately $402 million. These investments included the capital additions at Roxboro Station to convert to a dry bottom ash system to comply with the CCR, totaling approximately $96 million, and the Flue Gas Desulfurization ("FGD") Wastewater Treatment replacement, to comply with National Pollutant Discharge Elimination System program and ELG, totaling approximately $130 million. . . . The DE Progress capital additions at Roxboro Station to convert to a dry bottom ash system and the FGD Wastewater Treatment replacement are completed.

The Company did not provide any exhibits or additional direct testimony supporting the $402 million cost recovery request for capital investments in the Company's coal fleet.

Q. ARE THE COSTS IN WITNESS JULIE TURNER'S TESTIMONY INCLUDED IN YOUR EQUITABLE SHARING RECOMMENDATION?

A. No. My testimony does not recommend a sharing of the costs for capital investments in the Company's coal fleet for compliance with environmental regulations in connection with the ongoing production of electricity (e.g., disposal of new waste materials). The Public Staff's equitable sharing recommendation only applies to the costs of disposing of ash a second time, where the initial disposal in unlined impoundments has caused environmental contamination and posed a risk of future environmental contamination, and associated remediation costs. It does not apply to the costs of disposal for future production ash.

Q. DID DEP PROVIDE ANY ADDITIONAL INFORMATION ON ITS COAL ASH RELATED COSTS?

A. In its E-1, Item 10, NC-1100, DEP provided its adjustments in this rate case for environmental-related costs. More specifically, NC-1103 provides the system spend ARO costs by month discussed in witness Bednarcik's testimony. NC-1105 provides the system spend capital costs by month discussed in witness Turner's testimony and further breaks down the costs by plant and account number. Over 99% of the capital costs in NC-1105 are in account numbers 311 (Structures and Improvements) and 312 (Boiler Plant Equipment) in Steam Production Plant. Less than 1% of the capital costs are booked as 353 (Transmission Station Equipment) in Steam Production Plant and 315 (Steam Accessory Electric Equipment) in Other Production Plant.

Q. PLEASE PROVIDE A LIST OF COAL ASH RELATED PROJECTS THAT DEP BOOKED AS ARO.

A. **Confidential Lucas Exhibit 19** is a list of projects that DEP booked as ARO.

Q. PLEASE PROVIDE A LIST OF COAL ASH RELATED PROJECTS THAT DEP BOOKED AS CAPITAL.

A. **Lucas Exhibit 20** is a list of projects that DEP booked as capital.

<u>GROUNDWATER EXTRACTION AND TREATMENT</u>

Q. ARE YOU SPONSORING ANY ADDITIONAL TESTIMONY OR EXHIBITS WITH YOUR DIRECT TESTIMONY?

A. Yes. My testimony incorporates by reference my testimony and exhibits filed on October 20, 2017, in Docket No. E-2, Sub 1142, describing groundwater quality at the Asheville, H.F. Lee, and Sutton plants, groundwater extraction and treatment performed by DEP, and associated costs.[67]

Q. PLEASE BRIEFLY DESCRIBE DEP'S EXTRACTION AND TREATMENT OF GROUNDWATER AND RELATED LAND PURCHASES.

A. In summary, DEP contaminated the groundwater at the Asheville, H.F. Lee, Mayo, and Sutton plants in violation of the 2L rules. In the 2015 Groundwater Settlement for remediation,[68] DEP agreed to extract and treat the contaminated groundwater at the Asheville, H.F. Lee, and Sutton

[67] Page 52, lines 6 through 12, and page 66, line 5, through page 67, line 17, and Exhibits 6, 7, and 9, Direct Testimony of Public Staff Engineer Jay Lucas filed in Docket No. E-2, Sub 1142, on October 20, 2018.

[68] Settlement Agreement between DEQ and Duke Energy, executed as of September 29, 2015. Exhibit 29, Direct Testimony of Public Staff Engineer Charles Junis filed in Docket No. E-7, Sub 1146, on January 24, 2018.

plants.[69] On August 26, 2019, DEP purchased land near the Mayo plant for $82,000 to mitigate groundwater contamination.

The 2015 Groundwater Settlement is signed by the Company and states on page 5 in part: "data show constituents associated with the ash basins at concentrations over the 2L standards . . . have migrated off site," and "[e]xtraction wells will be used to pump the groundwater to arrest the offsite extent of the migration." DEP's own groundwater monitoring as reported to DEQ shows 2L violations at the Sutton plant. The 2015 Groundwater Settlement also requires accelerated remediation of contaminated groundwater at the Asheville and H.F. Lee plants. DEP has purchased land near the Asheville and H.F. Lee plants to mitigate the risk of groundwater contamination from reaching off-site property owners.

In the present rate case, the Company is seeking recovery of the groundwater extraction and treatment costs incurred at the Asheville and Sutton plants, and for the land purchase at the Mayo plant. The costs for groundwater extraction and treatment at the H.F. Lee plant and for the land purchases at the Asheville and H.F. Lee plants are not included in this rate case.

[69] DEP also agreed to pay $7 million to DEQ "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."

Q. WHAT WAS THE PREMISE OF YOUR TESTIMONY IN DOCKET NO. E-2, SUB 1142, REGARDING GROUNDWATER EXTRACTION AND TREATMENT?

A. As stated on pages 67 and 68 of my testimony in Docket No. E-2, Sub 1142, these costs should be disallowed "because they are costs due to environmental violations, and they exceed the amount of costs required for CAMA compliance in the absence of environmental violations."

Simply put, DEP is extracting and treating groundwater at the Asheville and Sutton plants because it is responsible for contaminating the groundwater with coal ash constituents such as arsenic, boron, chromium, manganese, selenium, and others. Similarly, DEP initially pursued extraction and treatment at the H.F. Lee plant but later purchased additional land near the plant to reduce its liability for groundwater contamination. The Public Staff's position in Docket No. E-2, Sub 1142, was that DEP should not place these costs on ratepayers. There is certainly no basis for DEP to extract and treat *clean* groundwater, or to extract groundwater because of natural background constituents. Indeed, DEP witness James Wells admitted during the 2017 DEP rate case that the Company would not have had to install extraction wells if there had been no groundwater exceedances.[70]

[70] Docket No. E-2, Sub 1142, testimony heard on December 7, 2017 (Transcript Volume 21, page 176, lines 4 through 8.

Q. WHY DO YOU DISCUSS EXTRACTION WELLS, TREATMENT, AND PURCHASE OF ADDITIONAL LAND SEPARATELY FROM DISCUSSION OF ENVIRONMENTAL VIOLATIONS IN GENERAL?

A. We can identify specific costs associated with extraction, treatment, and purchase of additional land. Such costs are attributable solely to DEP's violation of groundwater standards. DEP would not have incurred those costs if it had not violated the 2L rules.

Q. DID THE COMMISSION ALLOW DEP TO RECOVER COSTS FOR GROUNDWATER EXTRACTION AND TREATMENT IN DOCKET NO. E-2, SUB 1142?

A. Yes. The Order stated that "[t]he Commission determines that there is insufficient evidence that the Company would have had to have engaged in any groundwater extraction and treatment activities absent the obligations imposed upon it by CAMA and/or the CCR Rule."[71]

The Public Staff asks that the Commission take a fresh look at the treatment of DEP's groundwater extraction and treatment costs and DEP's related purchases of land. As of the last rate case, the Asheville, H.F. Lee, Mayo, and Sutton plants had 725, 250, 0, and 723 groundwater violations, respectively.[72] No party, including DEP, contested the number of groundwater violations. As of this rate case investigation, these four plants

[71] Order Accepting Stipulation, Deciding Contested Issues, and Granting Partial Rate Increase, February 23, 2018, Docket No. E-2, Sub 1142, p 183.

[72] Revised Lucas Exhibit No. 6, Supplemental Testimony of Public Staff Engineer Jay Lucas filed in Docket No. E-2, Sub 1142, on November 15, 2017.

have 1,685, 1,402, 328, and 1,778 groundwater violations, respectively. From a factual standpoint, there was no reason for DEP to extract and treat groundwater and purchase land unless DEP was responsible for the contamination, and the exceedance reports show that DEP's coal ash impoundments contaminated the groundwater. From a legal standpoint, counsel advises me that it is an error to conclude that CAMA or the CCR Rule would have required extraction and treatment of the groundwater and land purchases at the Asheville, H.F. Lee, Mayo, and Sutton plants if DEP had not violated groundwater quality standards.

SPECIFIC DISALLOWANCES

Q. PLEASE BRIEFLY DESCRIBE THE SPECIFIC DISALLOWANCES THAT YOU RECOMMEND.

A. The Public Staff recommends disallowance of specific costs associated with: (1) groundwater extraction and treatment at the Asheville and Sutton plants, as well as the purchase of land at the Mayo plant to mitigate the risk of spreading groundwater contamination; (2) bottled water costs; (3) permanent alternative water supply connections for properties as required by CAMA; (4) permanent alternative water supply connections for ineligible properties; (5) water treatment systems as required by CAMA; and (6) fines and penalties, or the equivalent, for environmental violations.

1. I recommend that the expenditures for groundwater extraction and treatment at the Asheville and Sutton plants not be included in DEP's pro forma adjustment set forth in the E-1, Item 10, NC-1103. I also

recommend that the land purchase at the Mayo plant to mitigate the risk of spreading groundwater contamination not be included. This position is consistent with the Public Staff's position in the Sub 1142 rate case and the pending appeal before the North Carolina Supreme Court. The reasoning for my position is discussed in my testimony above. For the period of September 2017 through December 2019, the costs amounted to $1,240,328 on a system basis. I recommend that the Commission disallow these costs because they are due solely to environmental violations and they exceed the amount of costs required for CAMA compliance in the absence of environmental violations.

2. The Public Staff has confirmed that the expenditures for bottled water, which include the bottled water itself, the delivery company, personnel associated with the delivery, and the consulting firm that managed the overall bottled water delivery program, provided to households in the vicinity of DEP plants have been excluded by DEP in its pro forma adjustment set forth in the E-1, Item 10, NC-1103. For the period of September 2017 through December 2019, the costs amounted to $395,005 on a system basis. This adjustment conforms

to the precedent of the Commission's determination in the Sub 1142 rate case.[73]

3. The Company was required to connect eligible residential properties to permanent alternative water supplies per N.C. Gen. Stat. §130A-309.211(c1). I recommend these costs be disallowed by exclusion from DEP's pro forma adjustment set forth in the E-1, Item 10, NC-1103. For the period of September 2017 through December 2019, the costs amounted to $1,087,612 on a system basis. These permanent water supply costs and the bottled water costs discussed above are the direct result of the legislature deciding that coal ash constituents from DEP's impoundments created an unacceptable risk to people's groundwater wells in the vicinity of the coal ash impoundments. As noted in Commissioner Clodfelter's dissent in the E-7, Sub 1146 Order, there is no logical distinction between the permanent water supply costs and the bottled water costs that the Commission required DEP to exclude in the last rate case.

4. The Company has voluntarily connected businesses and residential properties to permanent alternative water supplies that were otherwise not eligible under N.C. Gen. Stat. §130A-309.211(c1). The costs were not required by CAMA, as described above. There is no

[73] Order Accepting Stipulation, Deciding Contested Issues, and Granting Partial Rate Increase, February 23, 2018, Docket No. E-2, Sub 1142, p 184.

logical distinction between them and the Company's bottled water costs that the Commission required DEP to exclude in the last rate case. DEP has informed the Public Staff that it excluded the above costs from the rate request, and, therefore, no adjustments are necessary.

5. As an alternative to connections to permanent water supplies, the Company was able to install, operate, and maintain water treatment systems per N.C. Gen. Stat. §130A-309.211(c1). Where this alternative was chosen, I recommend the costs be disallowed. For the period of September 2017 through December 2019, the costs amounted to $2,774,583 on a system basis. The water treatment system costs, similar to the permanent water supply and bottled water costs, are the direct result of the legislature deciding that DEP's coal ash management had created an unacceptable risk to people's groundwater wells in the vicinity of the coal ash impoundments. There is no logical distinction between the water treatment system costs and the bottled water costs that the Commission determined should be excluded in the last rate case.

6. Fines and penalties, or the equivalent, for environmental violations should be excluded from rate recovery. Included in this category are costs that must be excluded pursuant to the probation conditions of DEP's federal plea agreement. DEP has informed the Public Staff

that it excluded the above costs from the rate request, and, therefore, no adjustments are necessary.

The above exclusions are in addition to the recommended disallowances presented in the testimony of witnesses Bernard Garrett and Vance Moore.

EQUITABLE SHARING

Q. DO YOU HAVE A RECOMMENDATION REGARDING THE REMAINING CCR-RELATED COSTS?

A. Yes. Certain costs are so clearly and directly due to the Company's failure to comply with environmental regulations that none of those costs should be assigned to ratepayers. For most of the coal ash-related costs at issue in this rate case, the Company bears a great deal of culpability due to noncompliance with environmental regulations, but the Public Staff's view of culpability is different from traditional imprudence. The Public Staff did not conduct a prudence review of DEP decision-making at the time DEP constructed the ash basins, primarily due to the virtual impossibility of conducting a comprehensive review of Company records over the 1950s to 1980s timeframe. Instead, the Public Staff focused its investigation on the area where the Company's performance has been measured against its legal duty in recent years: groundwater and surface water compliance issues at ash basins. Even where some Company actions or omissions appear imprudent, such as failure to deploy a comprehensive groundwater monitoring system at a much earlier date, the quantification of costs directly resulting from the acts or omissions would be speculative. Also, even where DEP's management was arguably prudent in light of the knowledge they had at the time, the Company bears some degree of responsibility for its extensive environmental violations. In this situation, an equitable sharing of those costs is reasonable and appropriate, both as a reflection of DEP's culpability for environmental violations and as a proxy for costs of violations that exist but cannot be precisely quantified.

An equitable sharing is particularly appropriate in light of the extent of the Company's failure to prevent environmental contamination from its CCR impoundments, in violation of state and federal laws. The nature and extent of some of the Company's CCR-related environmental problems found at earlier dates are addressed in the Joint Factual Statement signed by Duke Energy as part of the federal plea agreement discussed earlier in my testimony.

Additionally, there is substantial evidence[74] of violations beyond those admitted in the federal criminal case. For example, there are violations of N.C. Gen. Stat. § 143-215.1 – unlawful surface water discharges such as seeps – some of which have led to penalties and some that will be corrected through dewatering and decanting of CCR basins as set out in the SOCs entered into by DEP, shown in **Lucas Exhibits 7 through 9**. In addition, immediately following the Dan River Spill in 2014, and again two years later, DEQ found numerous dam safety issues at DEP's CCR impoundments.[75] There is also evidence of numerous DEP groundwater violations. In

[74] The Public Staff presented prior evidence of environmental impacts in Exhibits 3, 5, 6, and 7, Direct and Supplemental Testimony of Public Staff Engineer Jay Lucas filed in Docket No. E-2, Sub 1142, on October 20, 2017 and November 15, 2017.

[75] Exhibit 3, Direct Testimony of Public Staff Engineer Jay Lucas filed in Docket No. E-2, Sub 1142, on October 20, 2017.

general, DEP did not engage in comprehensive groundwater monitoring[76] until required to do so by its NPDES permits beginning in 2011.

The groundwater violations[77] currently reported to DEQ from DEP monitoring wells are a further indication of the breadth of environmental contamination caused by the Company. The 7,411 North Carolina groundwater violations listed in **Lucas Exhibit 11**, exceeding the 2L standards or IMACs and PBTVs at or beyond the compliance boundary, are attributable to migration of contaminants from DEP's ash basins. The 632 South Carolina exceedances of the Federal MCLs and Secondary MCLs are listed in **Lucas Exhibit 12**. The CCR Rule Appendix III Parameters 3,164 testing results determined to be statistically significant increases are listed in **Lucas Exhibit 15**. The CCR Rule Appendix IV Parameters 277 testing results from groundwater downgradient of the ash impoundments that have exceeded both the natural background levels and the groundwater protection standards are listed in **Lucas Exhibit 16**. It is notable that the number of 2L violations has increased by 4,554, or 159%, since my testimony in the last DEP rate case.

The failure of Duke Energy to comply with environmental regulations in its management of CCR was undoubtedly a contributing factor to the adoption

[76] See the number of groundwater monitoring wells installed by decade in **Lucas Exhibit 18**.

[77] DEQ affirmed this fact in a September 25, 2019 amicus brief filed at the North Carolina Supreme Court in State of North Carolina ex rel. Utilities Commission v. Attorney General, Docket Nos. 271A18 and 401A18.

of both the CCR Rule and CAMA, which in turn led to significant new compliance costs. In fact, the final CCR Rule cites environmental damage caused by Duke Energy facilities[78] as part of the justification for the CCR Rule.

Moreover, DEP's non-compliance with its NPDES permits and the CWA and the DEQ 2L rules would undoubtedly have led to cleanup costs from environmental litigation or enforcement even if the CCR Rule and CAMA had never been adopted. Those cleanup costs largely overlap with CCR Rule and CAMA compliance costs because impoundment closure and other corrective action under CAMA became the required cleanup method. In the absence of CAMA, it is possible some other remedial action short of impoundment closure by excavation or extremely expensive beneficiation, such as cap in place, would have sufficed. The cost differential is speculative at best. However, given the existence of widespread environmental violations, we do know extensive corrective action would

[78] "All CCR surface impoundments pose some risk of release—whether from a catastrophic failure or from a more limited structural failure, such as occurred at Duke Energy's Dan River plant." 80 Fed. Reg. at 21393. The EPA also referenced the Dan River Spill when it stated: "[a] recent CCR spill incident demonstrates that inactive surface impoundments that have not been properly decommissioned (i.e., by breaching, dewatering, and capping or by clean-closing) continue to pose a significant risk to human health and the environment." *Id.* at 21458-21459.

"Certain states (*e.g.,* Indiana) consider surface impoundments as temporary storage facilities as long as they are dredged on a periodic basis (*e.g.,* annually). Under these states' rules, such impoundments are exempt from any solid waste regulations that would require groundwater monitoring, and from requirements for corrective action. Such requirements are likely to decrease the instances in which contamination above an MCL has migrated off-site will be detected." 80 Fed. Reg. at 21456. The EPA references Duke Energy's Gibson Generating Station in Indiana, a proven damage case, as an example. *Id*.

have been required to achieve compliance with pre-existing environmental laws and regulations even without CAMA and the CCR Rule.

In these circumstances, it would be unreasonable to charge ratepayers for all the CCR compliance costs above the specific and limited disallowances the Public Staff has recommended. Due to its environmental violations, DEP has a great deal of culpability for the compliance costs related to remediation and ash basin and storage unit closures, and would likely have incurred substantial coal ash corrective action costs even without the CCR Rule and CAMA, whereas ratepayers are not culpable at all for those costs.

For the foregoing reasons, I believe the equitable sharing of CCR management costs, as further discussed and effectuated through the deferral and amortization approach recommended by Public Staff witness Maness, is reasonable in addition to the specific disallowances I have recommended.

INSURANCE COVERAGE FOR ENVIRONMENTAL LIABILITY

Q. DID THE COMMISSION ADDRESS DEP'S CLAIMS FOR INSURANCE COVERAGE IN DOCKET NO. E-2, SUB 1142?

A. Yes. In DEP's last rate case in 2017, the Commission determined that if any insurance proceeds are ultimately received or recovered for mitigation and remediation costs associated with CCR sites, DEP shall place all such insurance proceeds in a regulatory liability account and hold such proceeds "until the Commission enters an order directing DEP regarding the appropriate disbursement of the proceeds."[79]

Q. HAS DEP RECEIVED OR RECOVERED ANY INSURANCE PROCEEDS FOR ENVIRONMENTAL DAMAGES?

A. No. The Company is currently in active litigation against its insurance carriers for recovery of mitigation and remediation costs associated with CCR sites.

Q. DOES THE PUBLIC STAFF HAVE A RECOMMENDATION REGARDING INSURANCE PROCEEDS ULTIMATELY RECEIVED OR RECOVERED BY THE COMPANY?

A. The Public Staff recommends that insurance proceeds received or recovered by the Company and placed in a regulatory liability account, as ordered by the Commission in the previous rate case, be disbursed back to ratepayers or used to offset the costs to ratepayers of the Company's coal ash costs.

---

[79] E-2, Sub 1142, Jan. 23, 2018 Order Accepting Stipulation, Deciding Contested Issues and Granting Partial Rate Increase, page 20.

COMPARISON OF DUKE ENERGY AND DOMINION RATE CASES REGARDING CCR MANAGEMENT

Q. PLEASE DESCRIBE THE TREATMENT OF CCR-RELATED COSTS IN DOMINION'S 2016 RATE CASE.

A. In Docket No. E-22, Sub 532, the 2016 rate case filed by Dominion Energy North Carolina (Dominion), the resolution of CCR remediation costs was the result of an agreement and stipulation of settlement between the Public Staff and Dominion, which was accepted by the Commission.[80] The stipulation allowed for a five-year amortization period, with a return on the unamortized balance for coal ash costs in that case. The Public Staff supported this treatment of CCR-related costs because (1) the Public Staff was not aware of the extent of groundwater contamination and environmental degradation from Dominion's CCR, and (2) the magnitude of the costs at issue in that case was much lower than in subsequent cases. Importantly, the stipulation in the Dominion 2016 rate case did not have precedential value.[81]

---

[80] "Based upon the entire evidence of record, the present Stipulation to allow the test year CCR costs to be recovered in this case by amortization over a five-year period with the unamortized balance to earn a return and the authorization to treat future CCR costs incurred through 2018 as a regulatory asset (which is the mechanism to facilitate the deferral of future CCR costs) is proper and in the public interest under the facts and circumstances of this case." Order Approving Rate Increase and Cost Deferrals and Revising PJM Regulatory Conditions (Dominion 2016 Order), Docket No. E-22, Sub 532, at 62 (Dec. 12, 2016). *See also id.* at 10, 57-58.

[81] "This Stipulation shall not be cited as precedent by any of the Stipulating Parties with regard to any issue in any other proceeding or docket before this Commission or in any court." Agreement and Stipulation of Settlement, Docket No. E-22, Sub 532, at 16 (Oct. 3, 2016). See also, *id.* at 10-11 ("The Public Staff's agreement in this proceeding to the deferral and amortization of CCR expenditures incurred through June 30, 2016, shall not be construed as a recommendation that the Commission reach any conclusions regarding the prudence and reasonableness of the

Q. PLEASE DESCRIBE THE TREATMENT OF CCR-RELATED COSTS IN DEC AND DEP'S 2017 RATE CASES.

A. In DEC and DEP's 2017 rate cases in Docket Nos. E-7, Sub 1146, and E-2, Sub 1142, respectively, the Public Staff found extensive environmental contamination and violations from ash impoundments. The Public Staff also noted the extraordinary amount of coal ash costs, resulting in no additional electric service for customers, as another factor. Accordingly, the Public Staff recommended that CCR-related costs of DEC and DEP be allocated equitably, with 50% paid by shareholders and 50% paid by customers. The equitable sharing recommendation applied to coal ash costs beyond the costs for which the Public Staff recommended a complete disallowance based on imprudence or unreasonableness, and was based upon DEC and DEP's culpability in creating adverse environmental impacts.

In those rate cases, the Commission allowed DEC and DEP to recover their CCR-related costs as requested, with the exception of management penalties of $70 million on DEC and $30 million on DEP. The Commission also disallowed $9.5 million in the previous DEP rate case for coal ash disposal costs at the Asheville plant based upon the testimony of Public Staff witnesses Garrett and Moore. The Public Staff asks that the

Company's overall CCR plan, or regarding any specific expenditures other than the ones to be recovered in this case."); Dominion 2016 Order at 63 (". . . the Commission's determination in this case shall not be construed as determining the prudence and reasonableness of the Company's overall CCR plan, or the prudence and reasonableness of any specific CCR expenditures other than the ones deferred and authorized to be recovered in this case.").

Commission take a fresh look at the coal ash costs in the present case, and adopt equitable sharing based on a review of the "other material facts of record" under N.C. Gen. Stat. § 62-133(d). The "other material facts of record" are the extensive environmental violations caused by DEP's coal ash and the extraordinary magnitude of costs that produce no new electricity as noted by Public Staff witness Maness.

Q. PLEASE EXPLAIN THE DIFFERENCE BETWEEN THE PUBLIC STAFF'S RECOMMENDATIONS FOR CCR COST RECOVERY IN THE DOMINION 2016 RATE CASE AND THE 2017 DEC AND DEP RATE CASES.

A. In the 2017 DEC rate case, Public Staff witness Charles Junis provided testimony[82] that discussed the Public Staff's investigation of Dominion's environmental compliance record in its 2016 rate case. Dominion's environmental compliance record at that time appeared better than DEP's, and the Public Staff, therefore, recommended that DEP's cost recovery in its 2017 rate case should be treated differently.

---

[82] Page 107, line 1, through page 109, line 15, and Exhibits 17, and 27-32, Direct Testimony of Public Staff Engineer Charles Junis filed in Docket No. E-7, Sub 1146, on January 24, 2018.

Q. PLEASE DESCRIBE DEP'S AND DEC'S TESTIMONY IN THEIR 2017 RATE CASES COMPARING THEIR CCR MANAGEMENT RECORD TO THAT OF DOMINION.

A. On pages 10 through 12 of his rebuttal testimony filed on November 6, 2017, in Docket No. E-2, Sub 1142, DEP witness Julius Wright discussed Dominion's environmental compliance record and indicated that DEP and Dominion were "similarly situated." He further stated, "I believe the Commission's CCR cost recovery methodology in the Dominion case was correct and should be applied in the same way in this proceeding."

On pages 11 through 15 of his rebuttal testimony filed on February 6, 2018, in Docket No. E-7, Sub 1146, DEC witness Julius Wright responded to the testimony of Public Staff witness Charles Junis regarding Dominion's environmental compliance record by providing examples of CCR-related groundwater contamination[83] at Dominion's coal-fired power plants.

The extent of groundwater contamination at Dominion's plants, however, was not known to the Public Staff at the time of the Public Staff's Dominion testimony in 2016. In addition, Dominion's groundwater contamination remained far less extensive than that of DEP, and the finding of criminal negligence on the part of DEP was another differentiating factor.

---

[83] E.g., on pages 11 and 12 of his rebuttal, witness Wright states, "For example, in 2002 Dominion initiated a groundwater monitoring plan at is [sic] [Chesapeake Energy Center] to address groundwater protection standard exceedances of arsenic attributed to wet ash from the unlined former ash settling basins."

Despite critical differences between the cases, witness Wright concluded that the Commission should apply the same standard to DEP and DEC in their 2017 rate cases as it did in the Dominion 2016 rate case, in which the Commission allowed Dominion to recover its CCR remediation costs.

Q. DID THE PUBLIC STAFF DISCOVER ANY NEW INFORMATION IN DOMINION'S SUBSEQUENT RATE CASE IN DOCKET NO. E-22, SUB 562?

A. Yes. In last year's Dominion rate case in Docket No. E-22, Sub 562, Dominion's environmental compliance issues became more apparent than in the Dominion 2016 rate case. The extent of CCR-related environmental non-compliance is detailed in my testimony in that case[84] and includes substantial groundwater exceedances and environmental contamination.

Q. WHAT DOES THE PUBLIC STAFF CONCLUDE REGARDING ITS COMPARISON OF THE ENVIRONMENTAL COMPLIANCE RECORDS OF DEP AND DOMINION?

A. At the time of the Dominion 2016 rate case and the DEP and DEC 2017 rate cases, the extent of Dominion's CCR-related noncompliance—as it was known to the Public Staff—paled in comparison to DEP's environmental noncompliance record. However, in 2019, the Public Staff

[84] Page 68, line 1, through page 74, line 4, and Exhibits 1 and 12-14, Direct Testimony of Public Staff Engineer Jay B. Lucas filed in Docket No. E-22, Sub 562, on August 23, 2019.

found that Dominion had far greater environmental compliance problems than observed in 2016.

Based on its investigation in the Dominion 2019 rate case, the Public Staff believes that Dominion has a poor environmental compliance record, yet one that is better than that of DEP. One distinction is that Dominion did not plead guilty in a federal criminal case as DEP did. Another distinction is that the Public Staff has evidence of thousands of groundwater violations for DEP, whereas the number of Dominion groundwater exceedances is lower, and evidence of violations by Dominion is less clear due to a different state regulatory framework and poor recordkeeping on the part of Dominion.

The Public Staff recommended in the Dominion 2019 rate case that 40% of Dominion's CCR environmental remediation costs be paid for by shareholders. In its February 24, 2020, Order Granting Partial Rate Increase, the Commission announced its decision of a 10-year amortization of Dominion's coal ash costs, with no return on the unamortized balance. This results in a sharing that allocates approximately 26% of the costs to shareholders, and 74% to ratepayers. The Public Staff recommends a 50%-50% equitable sharing in the present case. It is reasonable and appropriate to allocate a higher percentage of coal ash costs to DEP shareholders than was allocated to Dominion shareholders in the Notice of Decision because the environmental violations of DEP are far more extensive and far better documented.

Q. HOW DID THE COMMISSION TREAT CCR REMEDIATION COSTS IN THE DOMINION 2019 RATE CASE?

A. The Commission issued its Order Accepting Public Staff Stipulation in Part, Accepting CIGFUR Stipulation, Deciding Contested Issues, and Granting Partial Rate Increase in the Dominion Rate Case, Docket No. E-22, Sub 562, on February 24, 2020.

The Commission determined that it would not apply equitable sharing as recommended by the Public Staff, but instead effectuated a "fair and reasonable balance" between shareholders and ratepayers. According to the Commission:

> . . . there is a well-established history of allocating prudently incurred costs, specifically in the context of extraordinary, large costs such as environmental clean-up and plant cancellation, between ratepayers and shareholders in order to strike a fair and reasonable balance. The Commission concludes that in the present case, fairness dictates this same treatment.
>
> Feb. 24, 2020 Order at 131.

In making its decision, the Commission stated that "[a] number of material facts in evidence call into question the prudence of DENC's actions and inaction and the risks accepted by DENC management at several of its CCR sites." Id. at 132. The Commission also pointed to the magnitude of the costs – approximately $377 million on a system level or $22 million on a North Carolina retail level ($181 per customer). Id. Lastly, the Commission raised concerns regarding the matching principle and intergenerational equity, stating that "DENC's CCR Costs address many decades' worth of coal-ash waste and the closure of coal ash basins related to electric service provided to customers in the past." Id. The Commission goes on to state that "DENC's present and future ratepayers are being burdened with costs arising from past service." Id.

Importantly, the Commission cites its obligation under N.C.G.S. 62-133(d) to consider these material facts of record when setting just and reasonable rates. Id. In sum, the Commission found the following:

> A fair and reasonable balance is found which requires DENC's shareholders to bear some of the risk of clean-up costs associated with CCR liabilities and protects the ratepayers from unreasonably high rates. The Commission concludes that the Company shall not be entitled to earn a return on the unamortized balance of CCR Costs during the amortization period, in light of: (1) the Commission's obligation to set just and reasonable rates that are fair to both the utility and the ratepayer in accordance with N.C.G.S. § 62-133(a); (2) the Commission's historical treatment of extraordinary, large costs, such as MGP environmental remediation costs and plant cancellation costs; and (3) the Commission's obligation to consider all other material facts of record that will enable it to determine what are just and reasonable rates in accordance with N.C.G.S. § 62-133(d). Id.

In addition to not allowing a return on the unamortized balance of the CCR costs, the Commission amortized the costs over a ten-year period consistent with its historical treatment of major plant cancellations, thus allocating to shareholders approximately 26% of the costs, and to ratepayers approximately 74% of the costs. Id. at 134-135.

Q. HOW DOES THE COMMISSION'S TREATMENT OF CCR REMEDIATION COSTS IN THE DOMINION 2019 RATE CASE DIFFER FROM THE PUBLIC STAFF'S EQUITABLE SHARING RECOMMENDATION IN THIS CASE?

A. Both the Commission's "fair and reasonable balancing" approach and the Public Staff's "equitable sharing" approach in the Dominion rate case were intended to allocate CCR-related costs between shareholders and ratepayers in order to achieve just and reasonable rates. The Public Staff recommends—via its equitable sharing approach—that the CCR costs in the present DEP rate case also be allocated between shareholders and ratepayers.

Further, in the present case, the Public Staff recommends a 50/50% allocation between ratepayers and shareholders for the prudently incurred coal ash remediation costs that have been deferred. The Commission used a 10-year amortization period in the Dominion Order to carry out its "fair and reasonable balancing," resulting in 26% of costs borne by shareholders. Here, in order to allocate 50% of costs to shareholders, Public Staff witness Maness recommends a longer amortization period of 26 years.

As discussed earlier in my testimony, the Public Staff's recommendation for a longer amortization period for DEP is due to the fact that evidence of environmental violations and environmental contamination is much more extensive for DEP than it was for Dominion. It is also due to the fact that the amount of CCR costs DEP is seeking to recover is higher, $624 million on a system basis, or $381 million on a North Carolina retail level ($276 per customer or about two-thirds of Dominion's remediation expenses per customer).

<u>Commission's Order dated January 22, 2020</u>

<u>(Portion regarding CCR Remediation Costs)</u>

Q. WHAT DID THE COMMISSION REQUIRE THE PUBLIC STAFF TO INVESTIGATE AND REPORT ON REGARDING DEP'S CCR REMEDIATION COSTS?

A. The Order required the Public Staff to provide total estimated costs and an estimated breakdown of the costs for DEP's CCR remediation for each site and for each impoundment as follows: (1) as initially proposed by DEP, and (2) pursuant to the 2019 Settlement Agreement entered into by and between DEP and DEQ.

Q. DID YOU HAVE ANY DIFFICULTIES COMPLYING WITH THE COMMISSION'S ORDER?

A. Yes. I was able to determine DEP's projected CCR remediation costs by site (or plant), but not by impoundment. DEP does not always individually perform remediation for each impoundment but will issue one contract to remediate the entire site or plant without separating costs between the various ash storage areas. For example, **[BEGIN CONFIDENTIAL]** [redacted]

[redacted]. **[END CONFIDENTIAL]**

Q. PLEASE EXPLAIN THE RECENT HISTORY OF DEP'S CCR REMEDIATION COSTS AND ACTIONS TAKEN BY DEQ.

A. For ratemaking purposes, DEP's CCR remediation costs first became a large issue in its 2017 rate case. During that proceeding, DEP was in the process of excavating CCR from the Asheville and Sutton plants because DEQ had designated them as high-risk under CAMA.[85]

DEQ designated the other five coal-fired plants in North Carolina as intermediate risk, which gave DEP more time to close those CCR impoundments and allowed DEP to use cap-in-place for remediation. Those five plants are: Cape Fear, H.F. Lee, Mayo, Roxboro, and Weatherspoon. The one remaining plant, Robinson, is in South Carolina and not under the jurisdiction of DEQ or CAMA; however, DEP is excavating the Robinson

[85] 2014 N.C. Sess. Law 122, Section 3.(b), as amended by 2015 N.C. Sess. Law 110.

impoundments under a Consent Order from the SCDHEC as discussed earlier in my testimony.

Q. IN 2017, WHAT WERE DEP'S ESTIMATED TOTAL CCR REMEDIATION COSTS?

A. In September 2017, DEP estimated that total CCR remediation costs for its eight coal-fired power plants would be **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL].** This projection is for the years 2015 through 2079. **Confidential Lucas Exhibit 21** provides a breakdown of this estimate by plant. DEP based this estimate on its plan to use cap-in-place to remediate many of its CCR impoundments.

Q. WHAT SIGNIFICANT CHANGE OCCURRED THAT REQUIRED DEP TO REVISE ITS ESTIMATE?

A. On April 1, 2019, DEQ issued orders (Excavation Orders) to DEP and DEC to excavate all impounded coal ash at six plants – Allen, Belews Creek, Cliffside, Marshall, Mayo, and Roxboro. The Excavation Orders eliminated cap-in-place as an option for these six plants, greatly increasing potential costs.

Q. AFTER DEQ ISSUED THE EXCAVATION ORDERS, WHAT WERE DEP'S ESTIMATED TOTAL CCR REMEDIATION COSTS?

A. In September 2019, DEP estimated total CCR remediation costs for its eight coal-fired power plants as **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**. This projection is for the years 2015 through 2079.

Confidential Lucas Exhibit 22 provides a breakdown of this estimate by plant.

Q. WHAT HAPPENED AFTER DEQ ISSUED THE EXCAVATION ORDERS?

A. DEC and DEP filed a contested case challenging the Excavation Orders. However, on December 31, 2019, DEP, DEC, DEQ, and community and environmental groups entered into the 2019 Settlement Agreement that resolved the appeal of the Excavation Orders, as well as other ongoing litigation between DEP and DEC and the community and environmental organizations. The 2019 Settlement Agreement still requires excavation of a majority of the CCR in DEC's and DEP's unlined impoundments (80 million tons), but it allows approximately 24 million tons of CCR in unlined impoundments to remain in place. The 2019 Settlement Agreement also acknowledges that DEQ, in the future, could grant variances that would allow the CCR beneficiation projects at the Cape Fear and H.F. Lee plants to extend operation from 2029, the CAMA-established closure deadline, to 2035. Extensions would allow for longer use of the beneficiation projects and could possibly avoid construction of coal ash landfills at the plant sites.

Q. WHAT EFFECT DID THE 2019 SETTLEMENT AGREEMENT HAVE ON DEP'S ESTIMATED TOTAL CCR REMEDIATION COSTS?

A. The 2019 Settlement Agreement decreased DEP's estimated total CCR remediation costs for its eight coal-fired power plants to **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**, compared to the estimated cost of **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]** following the Excavation Orders. This projection is for the years 2015 through 2079. **Confidential Lucas Exhibit 23** provides the effect of the 2019 Settlement Agreement savings on the amounts in **Confidential Lucas Exhibit 22**.

Q. DOES LUCAS EXHIBIT 23 PROVIDE DEP'S CURRENT ESTIMATED TOTAL CCR REMEDIATION COSTS?

A. No. DEP periodically evaluates and updates CCR remediation costs at all eight coal-fired plants. Changes other than the 2019 Settlement Agreement have affected current costs. DEP's current estimated total CCR remediation costs are **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL].** This projection is for the years 2015 through 2079. **Confidential Lucas Exhibit 24** provides a breakdown of this estimate by plant.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Appendix A

Jay B. Lucas

I graduated from the Virginia Military Institute in 1985, earning a Bachelor of Science Degree in Civil Engineering. Afterwards, I served for four years as an engineer in the Air Force performing many civil and environmental engineering tasks. I left the Air Force in 1989 and attended the Virginia Polytechnic Institute and State University (Virginia Tech), earning a Master of Science degree in Environmental Engineering. After completing my graduate degree, I worked for an engineering consulting firm and worked for the North Carolina Department of Environmental Quality in its water quality programs. Since joining the Public Staff in January 2000, I have worked on utility cost recovery, renewable energy program management, customer complaints, and other aspects of utility regulation. I am a licensed Professional Engineer in North Carolina.