Coal Ash & the Future of Coal in North Carolina

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I. Introduction and Background

Coal combustion residuals are the various waste products left over after the burning of coal.[1] The primary coal combustion residual is fly ash, commonly referred to as coal ash.[2] Coal ash is the unburned particulates in coal-fired power plants made up of many different chemicals and elements, depending upon the type of coal burned.[3] In 2012, the United States "generated about 110 million tons of coal ash [from 470 coal-fired electric utilities]".[4] Because of the large amount of coal burned in the United States each year, "coal ash is one of the largest types of industrial waste generated in the United States."[5] Coal is North Carolina's primary source of energy, accounting for 38.7% of net energy production in 2014.[6] In 2007, there were 22 coal-fired power plants in North Carolina, which produced 5.5 tons of coal combustion residuals.[7]

Because coal ash poses a risk to both human and environmental health, the Environmental Protection Agency (EPA), under subtitle D of the Resource Conservation and Recovery Act, regulates its storage and disposal.[8] Utility companies can dispose of coal ash in a variety of ways, including mixing it with water and storing it in man-made impoundments also

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[1] *Coal Ash Basics*, EPA, http://www2.epa.gov/coalash/coal-ash-basics (last visited Oct.. 12, 2015)
[2] M. Ahmaruzzaman, *A Review on the Utilization of FlyAsh*, SCIENCE DIRECT (2009) at 2, *available at* http://www.sciencedirect.com/science/article/pii/S0360128509000604
[3] *Coal Ash: Characteristics, Management and Environmental Issues*, ELECTRIC POWER RESEARCH INSTITUTE (2009) at 4, *available at* https://www.whitehouse.gov/sites/default/files/omb/assets/oira_2050/2050_meeting_101609-2.pdf
[4] *Coal Ash (Coal Combustion Residuals, or CCR)*, EPA, http://www2.epa.gov/coalash (last visited Oct.. 13, 2015).
[5] *Coal Ash Basics*, EPA, http://www2.epa.gov/coalash/coal-ash-basics (last visited Oct.. 13, 2015).
[6] *North Carolina State Profile and Energy Estimates*, EIA, http://www.eia.gov/state/?sid=NC (last visited Oct.. 18, 2015).
[7] *Regulatory Impact Analysis* EPA (2010) at 30, *available at* http://www.lexissecuritiesmosaic.com/uploaded/resourcecenter/EPA-HQ-RCRA-2009-0640-0003.pdf.
[8] *Fact Sheet: Final Rule on Coal Combustion Residuals Generated by Electric Utilities*, EPA (2014) at 1, *available at* http://www2.epa.gov/sites/production/files/2014-12/documents/factsheet_ccrfinal_2.pdf

known as coal ash ponds.[9] One such pond was located adjacent to the Dan River power plant, located near Eden, North Carolina and owned and operated by Duke Energy. On February 2, 2014, two stormwater drainpipes buried under the pond collapsed, "spilling approximately 39,000 tons of coal ash and about 27 million gallons of untreated ash wastewater into the Dan River."[10] The spill was the third worst coal ash spill in United States history.[11] In response, North Carolina legislators passed the Coal Ash Management Act of 2014, which included provisions to phase out the use of coal ash ponds entirely.[12] In addition, the spill violated the Clean Water Act and as a result Duke Energy was fined more than 100 million dollars for the spill. Following the Dan River spill, the EPA was prompted to finalize a rule regarding the storage and disposal of coal ash.

II. Coal Ash Explained

Coal ash is made of up two different types of coal combustion residuals, fly ash and bottom ash.[13] Fly ash is akin to the small particulates that fly up in the smoke of a campfire. They are created when coal is burned in the broiler of a power plant.[14] These particulates are then, "captured by emissions controls, such as an electrostatic precipitator or fabric filter 'baghouse,' and scrubbers."[15] These scrubbers remove the particulates, which are then stored with other coal combustion residuals, such as bottom ash. Bottom ash is also particulates

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[9] Elizabeth Connors, *Coal-ash management by U.S. electric utilities*, SCIENCE DIRECT (2015) at 1, *available at* http://www.sciencedirect.com/science/article/pii/S0957178715300011
[10] A. Dennis Lemly, *Damage Cost of the Dan River Coal Ash Spill*, SCIENCE DIRECT (2014) at 1, *available at* http://www.sciencedirect.com/science/article/pii/S0269749114004953
[11] *Duke Energy Responsible For Third Worst Coal Spill in U.S. History*, WATERKEEPER (February 4, 2014), http://waterkeeper.org/2014/02/04/third-worst-coal-spill-in-us-history/ (last visited Oct.. 15, 2015).
[12] Ethan Goemann, *Surveying the threat of Groundwater Contamination From Coal Ash Ponds*, DUKE LAW (2015) at 16, *available at* http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1318&context=delpf
[13] *Coal Ash: Characteristics, Management and Environmental Issues*, ELECTRIC POWER RESEARCH INSTITUTE (2009) at 2, *available at* https://www.whitehouse.gov/sites/default/files/omb/assets/oira_2050/2050_meeting_101609-2.pdf
[14] *Id.*
[15] *About Coal Ash > What Are CCPs > Fly Ash,* AMERICAN COAL ASH ASSOCIATION, https://www.acaa-usa.org/About-Coal-Ash/What-are-CCPs/Fly-Ash (Oct.. 14, 2015).

released from the burning of coal, but which fall to the bottom of the broiler.[16] These particulates either collect on the walls of the broiler or fall though the grates on the bottom into an ash hopper.[17] The composition of both fly ash and bottom ash varies considerably.

Coal ash is made up of a variety of particulates, depending on the type of coal used. Coal ash consists of the inorganic materials present in the coal that are not destroyed during combustion.[18] These materials can vary depending upon the type of rock in which the coal was formed. The major materials present are oxidized forms of silicone, aluminum, iron, and calcium, which make up 90% of coal ash particulates.[19] The minor materials, which make up around 8%, are magnesium, potassium, sodium, titanium, and sulfur.[20] The other trace materials in coal ash, which make up less than 1%, are arsenic, cadmium, lead, mercury, and selenium. [21]

In 2013, 53.4 million tons of fly ash was produced in the United States, of which 43.67% was reused in other applications.[22] In that same year, 14.5 million tons of bottom ash was produced, of which 39% was reused.[23] Both fly ash and bottom ash are primarily used as a substitute for Portland cement[24] in concrete.[25] Coal ash has also been used in other cementing applications for the past 60 years.[26] Using coal ash in concrete makes it stronger and increases its

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[16] *Coal Ash: Characteristics, Management and Environmental Issues*, ELECTRIC POWER RESEARCH INSTITUTE (2009) at 2, *available at* https://www.whitehouse.gov/sites/default/files/omb/assets/oira_2050/2050_meeting_101609-2.pdf
[17] *Id.*
[18] *Id.* at 3.
[19] *Id.* at 4.
[20] *Id.*
[21] *Id.*
[22] *2013 CPP Production & Use Survey Report*, AMERICAN COAL ASH ASSOCIATION (2014) at 1, *available at* https://www.acaa-usa.org/Portals/9/Files/PDFs/2013ReportFINAL.pdf.
[23] *Id.*
[24] Portland Cement is an ingredient in regular concrete.
[25] *Coal Ash: Characteristics, Management and Environmental Issues*, ELECTRIC POWER RESEARCH INSTITUTE (2009) at 6, *available at* https://www.whitehouse.gov/sites/default/files/omb/assets/oira_2050/2050_meeting_101609-2.pdf
[26] *Id.*

overall quality. Coal ash can also reduces the energy use and carbon dioxide emissions associated with the regular production of concrete.[27]

Coal ash that is not reused, which represented about 40 million tons or 57% of the total amount produced in 2013, is funneled back into the environment, by way of landfills or wet impoundments such as coal ash ponds. In the case of landfills, the ash is loaded onto trucks and then wetted to prevent fly up. It is then transported to a landfill that may or may not be located at the power plant at which it was produced. However, the wet impoundments, or coal ash ponds, are usually located on the same premises as the power plant at which the coal was produced. These ponds are simply pools of water into which the fly and bottom ash are disposed. The ash then settles to the bottom of the pond. "About 60% of fly ash [that is not recycled] is [disposed of] in dry landfills, and 40% is [disposed of] in wet impoundments."[28]

These ash ponds pose a serious risk to the environment if not properly engineered and maintained because of the vast toxic elements present in the ash. Most ponds have an engineered liner to prevent the water from leeching out into the surrounding soil and eventually into ground water. Many power plants also monitor nearby ground water for possible contamination. Other practices to reduce any coal ash spills include the "use of liners, leachate collection systems, diversion ditches, caps, and vegetation."[29] Any escaped ash can contaminate nearby lakes, streams, and rivers. Even more alarming, because coal power plants produce electricity by generating steam to turn turbines, they require large amounts of water. As a result, these plants tend to be located near bodies water, and the risks associated with coal ash ponds increase with proximity to surface water. The Dan River coal ash spill is evidence of this.

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[27] *Id.*
[28] *Id.*
[29] *Id.* at 7.

III. Dan River Spill

On February 2nd, 2014, employees from Duke Energy at the Dan River Steam Station discovered a stormwater pipe located next to a coal ash pond was spewing the pond's contents into the Dan River. The following day Duke Energy notified the public of the situation, and state and local officials intervened. As coal ash continued to spill into the river, it took Duke Energy a total of six days to plug the leak.[30]

The ash pond in question was built in 1956 and underwent several modifications, the last of which occurred in 1980.[31] A 2009 report by the EPA, analyzing coal ash ponds nationwide, noted that there was storm pipes that ran under both of the containment ponds at the Dan River power plant.[32] It is unknown what caused the storm pipe to finally break.

When the pipe broke, it released 39,000 tons of coal ash and 27 million gallons of untreated ash water into the Dan River. Initial testing of the water, days after the spill, indicated high levels of toxic chemicals, including arsenic, chromium, iron, lead and other toxic metals typically found in coal ash.[33] These levels went down as the weeks passed and the ash settled to the bottom of the river. After two weeks, the plume of pollution had stretched 25 miles downstream.[34] Duke Energy agreed to a 3 million dollar cleanup effort with the EPA to assess

[30] Taft Wireback, *Dan River Coal Ash Disaster*, CITY OF GREENSBORO (February 2015), http://www.greensboro.com/news/dan_river/dan-river-coal-ash-disaster-stopping-the-leak-took-days/article_e699ed65-723f-5823-8112-10b0d57e4bff.html (last visited Oct.. 16, 2015).
[31] *Duke Energy Dan River Coal Ash Spill Updates*, CATAWBA RIVER KEEPER (February 2014), http://www.catawbariverkeeper.org/issues/coal-ash-1/duke-energy-dan-river-coal-ash-spill-what-do-we-currently-know-what-do-we-need-to-know (last visited Oct.. 17, 2015).
[32] *Id*.
[33] *Dan River Highly Toxic*, WATERKEEPER, (February 2014), *http*://waterkeeper.org/2014/02/06/dan-river-highly-toxic/ (Oct.. 16, 2015).
[34] Taft Wireback, *Dan River Coal Ash Disaster*, CITY OF GREENSBORO (February 2015), http://www.greensboro.com/news/dan_river/dan-river-coal-ash-disaster-most-ash-settled-up-to/article_363fdca7-bb76-5072-9c6d-43ddcde131ec.html (last visited Oct.. 16, 2015).

and remove coal ash deposits from the Dan River.[35] On July 17, 2014, Duke Energy announced it had completed clean up of the Dan River. 4,000 tons of coal ash was removed from sites on the River near fresh water sources.[36] The other 35,000 tons of ash remains buried under the sediments on the bottom of the Dan River. It is unknown what effect this will have on plants and animals in the area.

The costs of the spill to both the environment and local community vary. One study analyzed the spill's impact on the value of local ecology, recreation, human health and aesthetics. The study only looked at costs for the first six months of the cleanup, and estimated a total cost of 300 million dollars.[37] "A 6-month damage cost analysis for the Dan River coal ash spill breaks down as follows: Ecological Impacts = $113,412,000; Recreational Impacts = $31,507,500; Human Health and Consumptive Use = $75,565,500; Property Damage and Real Estate Values = Not Calculated; Esthetic Values = $75,000,000."[38]

A year after the spill, Duke Energy agreed to a settlement with the Federal Government for 68 million dollars in criminal fines and 34 million dollars in environmental and conservation projects.[39] The settlement not only covers the Dan River coal ash spill, but also other alleged Clean Water Act violations across the state. "The alleged violations include failing to maintain equipment at the Dan River and Cape Fear plants, and discharging coal ash or coal ash

[35] *Case Summary: Duke Energy Agrees to $3 Million Cleanup for Coal Ash Release in the Dan River,* EPA (May 2014), http://www2.epa.gov/enforcement/case-summary-duke-energy-agrees-3-million-cleanup-coal-ash-release-dan-river (last visited Oct.. 14, 2015).
[36] Keri Brown, *Dan River Coal Ash Spill*, WFDD (February 2015), http://wfdd.org/post/dan-river-coal-ash-spill-long-term-impact-unknown (last visited Oct.. 16, 2015).
[37] A. Dennis Lemly, *Damage cost of the Dan River coal ash spill*, SCIENCE DIRECT (2014) at 6, *available at* http://www.sciencedirect.com/science/article/pii/S0269749114004953.
[38] *Id*.
[39] Dave Dewitt, *Duke Energy Pleads Guilty, Agrees to $102 Million Fine*, WUNC (May 2015), http://wunc.org/post/duke-energy-pleads-guilty-agrees-102-million-fine#stream/0 (last visited Oct.. 16, 2015).

wastewater at the Dan River, Asheville, Lee and Riverbend plants."[40] Duke Energy pled guilty to nine misdemeanor charges, including criminal negligence for violating the Clean Water Act.[41] Duke Energy will also be on corporate probation for five years.[42]

IV. Relevant Legislation

A. Federal Law: Clean Water Act

The massive multi-million dollar settlement between federal prosecutors and Duke Energy makes it unclear as to the extent of Duke Energy's violations of the Clean Water Act (CWA). The Dan River spill was a clear violation of the CWA. The CWA "authorizes regulation and enforcement of requirements that govern waste discharges into U.S. waters, and financial assistance for wastewater treatment plant construction and improvements."[43] Any person or company that discharges waste into one of the United States' waterways is subject to the CWA and must obtain a permit for said discharge.[44] Any discharges without a permit are illegal.[45] Permits must be obtained through the National Pollutant Discharge Elimination System (NPDES), which is established under the CWA.[46]

Duke Energy had a permit to discharge wastewater at the Dan River plant, but the wastewater had to meet certain requirements.[47] These requirements included treating the

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[40] Taft Wireback, *Duke to Pay Millions in Federal Court Over Coal Ash*, CITY OF GREENSBORO (February 2015), http://www.greensboro.com/news/dan_river/duke-to-pay-millions-in-federal-court-fines-over-coal/article_6512e508-b94b-11e4-a8d5-2f2453f25127.html (last visited Oct.. 16, 2015).
[41] Dave Dewitt, *Duke Energy Pleads Guilty, Agrees to $102 Million Fine*, WUNC (May 2015), http://wunc.org/post/uke-energy-pleads-guilty-agrees-102-million-fine#stream/0 (last visited DATE).
[42] Taft Wireback, *Duke to Pay Millions in Federal Court Over Coal Ash*, CITY OF GREENSBORO (February 2015), http://www.greensboro.com/news/dan_river/duke-to-pay-millions-in-federal-court-fines-over-coal/article_6512e508-b94b-11e4-a8d5-2f2453f25127.html (last visited Oct.. 17, 2015).
[43] David M. Bearden, Environmental Laws, FEDERATION OF AMERICAN SCIENTISTS (2013) at 2, *available at* https://www.fas.org/sgp/crs/misc/RL30798.pdf
[44] *Id*. at 29.
[45] *Id.*
[46] *Id.*
[47] *Permit to Discharge Wastewater under the NPDES*, NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (2013) at 1, *available at* http://portal.ncdenr.org/c/document_library/get_file?uuid=38c490a7-5b93-4540-a593-d8ae3014d724&groupId=38364

wastewater to meet certain standards for pH, iron content, oil and grease content, and others. The permit also stipulated a certain maximum amount of pollutants which could be released into the Dan River each month. The ruptured storm pipe and subsequent spill greatly exceeded Duke Energy's permitted wastewater release, both in type of pollutant released and amount released. Due to accidents like the Dan River spill, the EPA recently established guidelines pertaining to coal ash disposal.

B. Disposal of Coal Combustion Residuals from Electric Utilities

The final rule on disposal of coal combustion residuals from electric utilities was signed by the head of the EPA on December 19, 2014, and went into effect on October 19, 2015.[48] The rule, "establishes a comprehensive set of requirements for the disposal of coal combustion residuals (CCRs or coal ash) in landfills and surface impoundments."[49]The main thrust of the rule is that it classifies coal ash as a solid waste, subjecting it to the solid waste provisions in subtitle D of the Resource Conservation and Recovery Act.[50] The rule also outlines new guidelines for both coal ash landfills and wet impoundments.[51] The guidelines apply to all existing disposal sites, as well as expansions to existing sites, as well as the building of new sites.[52] The guidelines contain requirements regarding five main areas of coal ash disposal: structural integrity; groundwater; operating and record keeping; and closure.

The structural integrity requirements were meant to reduce catastrophic failures in disposal sites, such as those seen at the Kingston plant spill and the Dan Rivers spill. Disposal site owners are required to build sites in accordance to the new rule requirements and must

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[48] *Final Rule: Disposal of Coal Combustion Residuals from Electric Utilities*, EPA (Oct.. 16, 2015) http://www2.epa.gov/coalash/coal-ash-rule (last visited Oct. 21, 2015).
[49] *Fact Sheet: Final Rule on Coal Combustion Residuals Generated by Electric Utilities*, EPA (2014) at 1, *available at* http://www2.epa.gov/sites/production/files/2014-12/documents/factsheet_ccrfinal_2.pdf
[50] *Id.*
[51] *Id.*
[52] *Id.*

periodically inspect sites for any faults.[53] Some site owners must also create emergency plans to protect local communities in the event of an accident.[54]

The groundwater requirements were developed to protect groundwater by using a system of monitoring wells near disposal sites in conjunction with immediate corrective actions for sites that show groundwater contamination.[55] Disposal sites must also be situated in such a way that they do not pose a risk to underground aquifers, and current sites not satisfying this requirement must be removed.[56] Finally, all new disposal sites must have a liner to prevent leeching into groundwater.[57]

The operating and record keeping requirements are meant to ensure disposal sites are managed properly such that they do not pose a risk to human or environmental health.[58] The requirements also cover air criteria to reduce air pollution at dry impoundment sites. [59] Runoff controls and flood controls are also covered by these requirements. [60] Owners of disposal sites are required to keep a log of compliance with the new requirements, and to make this information publicly available online.[61]

The final requirements deal with the closure of existing disposal sites. An existing disposal site must be closed if: it fails to meet the structural or location requirements such that it cannot be operated safely; it is found to be contaminating groundwater above the allowed

[53] *Id.*
[54] *Id.*
[55] *Id.*
[56] *Id.*
[57] *Id.* at 2.
[58] *Id.*
[59] *Id.*
[60] *Id.*
[61] *Id.*

standards; or, the site is no longer being used to store additional waste; or waste is not being removed from the site for beneficial use.[62]

The EPA's final rule established national standards for the storage and removal of coal combustion residuals, but it did not require the states to adopt the standards.[63] It instead uses a system of "self-implementation."[64] This system relies on the disposal site owners to implement the regulations and primary enforcement would be through citizen suits.[65] However, there are a few limitations to these citizen suits. If a state has already filed suit against a disposal site owner, then a citizen may not file suit. A citizen suit might also fail in circumstances where a disposal site owner is adhering to state, but not federal standards.

C. North Carolina State Law: Coal Ash Management Act of 2014

The Coal Ash Management Act of 2014 (CAMA) was passed in North Carolina in response to the Dan River coal ash spill. It was the first legislation of its kind in the county; no other state has passed regulations on the management of coal ash waste. CAMA created a nine-member commission, the Coal Ash Management Commission, to act as a pseudo-regulatory body regarding matters pertaining to coal ash ponds.[66] The Commission has the power to, "review and approve classifications of coal ash ponds, closure plans for coal ash ponds, and any additional studies requested by the General Assembly."[67] CAMA nullified existing local ordinances and state statues regarding coal ash management by implementing a uniform,

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[62] *Id*. at 4.
[63] *Id*. at 2.
[64] Steven A. Burns, *EPA's coal ash rule relies on unique enforcement framework*, AMERICAN BAR ASSOCIATION (2015) at 1, *available at* http://www.americanbar.org/content/dam/aba/administrative/environment_energy_resources/congressional_relations/ABA_TR_v046n04__epas_coal_ash_rule_relies_on_unique_enforcement_framewor....authcheckdam.pdf
[65] *Id*.
[66] Coal Ash Management Act of 2014, N.C. Gen. Stat. § 130A-309.202(f) (2014).
[67] Ethan Goemann, *Surveying the Threat of Groundwater Contamination from Coal Ash Ponds*, DUKE LAW (2015) at 13, *available at* http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1318&context=delpf

statewide system.[68] This could in theory prevent towns and counties more adversely affected by coal ash from legislating against it.[69]

CAMA greatly affected how coal ash was stored in North Carolina almost immediately. It disallowed the creation of new coal ash ponds, as well as the modification or expansion of current ponds. It also outlawed the storage of coal ash at ponds other than those on the same site as the coal burning power plant.[70] All existing coal ash ponds in N.C. were to be classified by the North Carolina Department of Environment and Natural Resources (DENR) as low, intermediate, or high risk,[71] depending on information DENR deems "appropriate," including:

> (1) Any hazards to public health, safety, or welfare resulting from the impoundment.
> (2) The structural condition and hazard potential of the impoundment.
> (3) The proximity of surface waters to the impoundment and whether any surface waters are contaminated or threatened by contamination as a result of the impoundment.
> (4) Information concerning the horizontal and vertical extent of soil and groundwater contamination for all contaminants confirmed to be present in groundwater in exceedance of groundwater quality standards and all significant factors affecting contaminant transport.
> (5) The location and nature of all receptors and significant exposure pathways.
> (6) The geological and hydrogeological features influencing the movement and chemical and physical character of the contaminants.
> (7) The amount and characteristics of coal combustion residuals in the impoundment.
> (8) Whether the impoundment is located within an area subject to a 100-year flood.[72]

[68] *Id*.
[69] *Id*. at 14.
[70] Coal Ash Management Act of 2014, N.C. Gen. Stat. § 130A-309.208 (2014).
[71] *Id*. at § 130A-309.211(b) (2014).
[72] *Id*. at § 130A-309.211(a) (2014).

A pond's classification determines the time frame in which it is to be shut down and its waste removed.[73] Once DENR determines a pond's classification, it submits it to the Commission, which reviews it and approves or denies it. The time frame for the closing classifications are as follows: high-risk ponds must be closed by December 31, 2019; intermediate risk ponds by December 31, 2024; and low risk ponds by December 31, 2029.[74] This means Duke Energy will be required to shut down all coal ash ponds in North Carolina by the start of 2030.

V. Conclusion

Coal ash, as well as other coal combustion residuals, poses a serious risk to both human and environmental health. This risk is evidenced by the recent legislative changes addressing its regulation at both the state and federal level. The final EPA rule is a good start at a national regulation scheme, but it is only a small step. The weak self-implementation rule creates a system where disposal site owners are not incentivized to change their practices until after something has gone wrong. This is not a system of prevention, but rather s system of clean up. The EPA rule is also too lenient in its classification of coal combustion residuals as solid waste, which puts it in the same category as household waste. A more fitting classification, one that was pushed for by environmentalists, was that of a hazardous waste product, due to coal ashes composition of many toxic substantives. This classification would have put greater regulatory standards on coal ash disposal sites, which in theory would lead to better human and environmental outcomes.

The North Carolina Coal Ash Management Act serves as a good model for a state run regulatory scheme, but it too needs improvements. Liners should be required for all coal ash

[73] *Id*. at § 130A-309.212 (2014).
[74] *Id*. at § 130A-309.212(a)(2)-(3) (2014).

ponds, not just those designated as intermediate or high risk. These low risk ponds have been shown to pose risks to human health through groundwater contamination.[75] The provisions that regard groundwater contamination also need revision. At present, the law requires a site owner to, "assess the cause, significance and extent of the violation of standards" then submit a plan to deal with the contamination. The plan must be approved by the North Carolina Coal Ash Commission before any actions to curtail the contamination can be taken.[76] Such lengthy requirements, when combined with a situation that only gets worse with time, create more problems than they solve. A simplified approach, such as the immediate action implemented in the EPA's finalized rule makes more sense. These lengthy requirements are especially worrisome due to the fact that the EPA has classified ten of North Carolina's coal ash ponds hazard level as "high" or "significant."[77] Continued efforts are needed on the part of both legislators and disposal site owners to ensure accidents like the Dan River spill do not happen again.

[75] Ethan Goemann, *Surveying the Threat of Groundwater Contamination from Coal Ash Ponds*, DUKE LAW (2015) at 17, *available at* http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1318&context=delpf
[76] *Id*. at 19.
[77] *Coal Combustion Residuals (CCR) - Surface Impoundments with High Hazard Potential Ratings*, EPA (July 2014), http://www3.epa.gov/epawaste/nonhaz/industrial/special/fossil/ccrs-fs/index.htm (last visited Oct.. 15, 2015).