

# 2014 Coal Combustion Products Study as required by the Coal Ash Management Act - Interim Report

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Session Law 2014-122, Subsection 4(d)(1)

January 6, 2015

**Submitted by:**

North Carolina Department of Environment and Natural Resources and the  
Environmental Management Commission

## I. Overview

Session Law 2014-122 (SL 2014-122) Subsection 4.(d)(1) requires a review of the beneficial use of coal combustion products (CCP) and the regulations as follows: “The Department of Environment and Natural Resources and the Environmental Management Commission shall jointly review Subpart 3 of Part 2I of Article 9 of the General Statutes, as enacted by Section 3(a) of this act, and 15A NCAC 13B .1701, et seq. In conducting this review, the Department and Commission shall do all of the following:

- (1) Review the uses of coal combustion products as structural fill and the regulation of this use under Subpart 3 of Part 2I of Article 9 of the General Statutes, as enacted by Section 3(a) of this act, to determine if the requirements are sufficient to protect public health, safety, and welfare; the environment; and natural resources.
- (2) Review the uses of coal combustion products for other beneficial uses and the regulation of these uses under Section .1700 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code (Requirements for Beneficial Use of Coal Combustion By-Products) and Section .1200 of Subchapter T of Chapter 2 of Title 15A of the North Carolina Administrative Code (Coal Combustion Products Management), and other applicable rules, to determine if the rules are sufficient to protect public health, safety, and welfare; the environment; and natural resources.
- (3) Evaluate additional opportunities for the use of coal combustion products as structural fill and for other beneficial uses that would reduce the volume of coal combustion residuals that are being disposed of in coal combustion residuals landfills, industrial landfills, or municipal solid waste landfills while still being protective of public health, safety, and welfare; the environment; and natural resources.
- (4) Monitor any actions of the United States Environmental Protection Agency regarding the use of coal combustion products as structural fill or for other beneficial uses.
- (5) Jointly report to the Environmental Review Commission no later than January 15, 2015, on their findings and recommendations regarding the use of coal combustion products as structural fill and for other beneficial uses.”

This interim report provides a comparison of regulations 15A NCAC 13B .1700 (13B) and 15A NCAC 02T .1200 (02T) with requirements established by SL 2014-122 and the new federal rule issued by the Environmental Protection Agency (EPA rule) on December 19, 2014. This report looks at use of CCP in structural fills and other beneficial uses currently in North Carolina. Further work is being done as required by SL 2014-122 on the evaluation of additional opportunities for the use of CCPs for other beneficial uses that would reduce the volume of coal combustion residuals that are being disposed of in landfills, while still being protective of public health, safety and welfare; the environment; and natural resources. An overview of medical issues provided by EMC Commissioner Dr. Larry Raymond related to CCP constitutes is attached as Appendix I.

A final report will be issued by April 30, 2015.

## II. Comparison of Regulations 15A NCAC 13B .1700 and 15A NCAC 02T .1200, SL 2014-122, and EPA Rule on Coal Combustion Residuals Generated by Electric Utilities

### A. PERMIT REQUIREMENTS

Regulations 15A NCAC 13B .1700 and 15A NCAC 02T .1200, and SL 2014-122 enumerate the allowable uses of CCPs. Several types of reuse according to 02T regulations including road overlay, pipe bedding and structural fills over one foot in depth require permits. Since January 4, 1994, persons proposing to use dry CCPs as structural fill material have been required to notify the Division of Waste Management (DWM) in accordance with the rules in 13B 60 days before initiating construction. Structural fills with a volume greater than 10,000 cubic yards are also required by the rule to submit construction plans. Final cover must be applied within 60 calendar days of completion of the placement of CCP. Properties, on which greater than 1,000 cubic yards of CCPs have been utilized, must have a statement recorded on the deed within 90 days which includes the volume and locations of the CCPs. Session Law 2014-122 provides the most comprehensive of the three sets of requirements, with liners, leachate collection and groundwater monitoring at the large structural fills (projects of 8,000 tons of CCPs or more per acre or 80,000 tons per project) and a formal permit.

The new EPA rule issued December 19, 2014 defines the criteria for beneficial use and allows the states to develop and monitor requirements for structural fill and other reuse operations. Per the EPA rule “Beneficial use of CCR means the CCR meet all of the following conditions:

- (1) The CCR must provide a functional benefit;
- (2) The CCR must substitute for the use of a virgin material, conserving natural resources that would otherwise need to be obtained through practices, such as extraction;
- (3) The use of the CCR must meet relevant product specifications, regulatory standards or design standards when available, and when such standards are not available, the CCR is not used in excess quantities; and
- (4) When unencapsulated use of CCR involving placement on the land of 12,400 tons or more in non-roadway applications, the user must demonstrate and keep records, and provide such documentation upon request, that environmental releases to groundwater, surface water, soil and air are comparable to or lower than those from analogous products made without CCR, or that environmental releases to groundwater, surface water, soil and air will be at or below relevant regulatory and health-based benchmarks for human and ecological receptors during use.”

Note: The EPA’s term “coal combustion residuals” (CCR) when referring to beneficial use is synonymous with CCP as defined in SL 2014-122.

A chart is provided below to characterize the differences among the requirements:

Allowable Use	Deemed Permitted per 02T	Must acquire a permit per 02T	No permit required per 13B	SL 2014-122	US EPA CCR Rule 2014
Combustion fuel	x				
Material for manufacturing (Concrete, asphalt, bricks, etc.)	x		x		
Disposal at a landfill	x		x		x
Use at a landfill	x		w/DWM approval		
Material for traction control during snow and ice events	x		w/DOT approval		
Substitute for blasting grit, roofing granules, and filter cloth precoat	x		x		
Flowable fill for backfill of trenches	w/DHHS approval				
Stabilization of residuals	x		x		
Soil additive / amendment, or other agricultural purpose	x		W/NCDA approval		
Overlay for roads, residential driveways, farm roads, and high-traffic farm areas		x	w/DOT approval		
Bedding for pipes, railroad beds, and underground storage tanks		x	x		
For the extraction or recovery of materials and compounds contained within CCP.			x		
Base or Subbase under a structure or footprint of a paved road, parking lot, sidewalk, or similar structure ( $\leq 1'$ thick)	x		Notify DENR		
Base or Subbase under a structure or footprint of a paved road, parking lot, sidewalk, or similar structure ( $> 1'$ thick)		x	Notify DENR		
Base or Subbase under a structure or footprint of a paved road, parking lot, sidewalk, or similar structure ( $< 8,000$ ton / year or $< \text{total of } 80,000$ tons / project) deemed permitted				deemed permitted	
Base or Subbase under a structure or footprint of a paved road, parking lot, sidewalk, or similar structure ( $> 8,000$ ton / year or total of $80,000$ tons / project) permit requirements				need permit	

## B. NEW EXPEDITED PERMIT TIMEFRAMES REQUIRED BY SESSION LAW 2014-122

The Session Law creates a new permitting program under GS 130A-309.215(a) for projects involving 8,000 tons of CCP per acre or 80,000 tons of CCP in the total project. Permit applicants are required to submit information 60 days before initiation of a structural fill project. With the exception of local government approval or franchise, and an environmental impact analysis, the requirements for a properly contained structural fill are similar to those of a landfill. Like a landfill, there is significant pre-application work necessary for an applicant to prepare a permit application. The expedited permit review timeframes established in GS 130A-309.203 are described below:

Staff	Applicant	Time
	Completion of design and submittal of the permit application	Typically 6-12 months
Receipt of comprehensive Structural Fill application, review and issuance of the draft permit		4-5 months
Public comment period		1-2 months
Final permit issuance		1-2 months
	Construction and certification that construction meets permit conditions.	Typically 6-12 months

## C. MONITORING

Monitoring Requirements include the use of a Toxicity Characteristics Leaching Procedure (TCLP) to be performed on the ash. The 13B regulations require only that the test be taken, not that results be sent to the Division of Waste Management. The 02T regulation require that if TCLP analysis exceeds the following thresholds that the CCPs may not be reused:

	Leachate Concentration Limits mg/l	Ceiling Concentration Limits mg/kg	Monthly Average Concentration Limits mg/kg
Arsenic	5	75	41
Barium	100		
Cadmium	1	85	39
Calcium			
Chromium	5		
Copper		4300	1500
Lead	5	840	300
Magnesium	5		
Manganese			
Mercury	0.2	57	17
Molybdenum		75	75

<b>Nickel</b>		420	420
<b>pH</b>			
<b>Phosphorus</b>			
<b>Potassium</b>			
<b>Selenium</b>	1	100	100
<b>Silver</b>	5		
<b>Sodium</b>			
<b>Zinc</b>		7500	2800

As stated prior, the EPA rules require documentation for unencapsulated use of CCRs involving placement on the land of 12,400 tons or more in non-roadway applications: environmental releases to the groundwater, surface water, soil and air are comparable to or lower than those from analogous products made without CCRs; or that such environmental releases will be at or below relevant regulatory and health-based benchmarks for human and ecological receptors during use.

#### **D. ANNUAL REPORTING**

The 13B regulations and SL 2014-122 require that generators of coal combustion by-products report:

1. Volume of coal combustion by-products produced;
2. Volume of coal combustion by-products disposed;
3. Volume of coal combustion by-products used in structural fill facilities; and
4. Volume of coal combustion by-products used for other uses

The 13B regulations do not require the end user of the CCPs to report information to the Department of Environment and Natural Resources or to the generator, nor do the regulations require maintenance or operation plans be provided by user of the CCPs.

The 02T regulations have requirements for the generator to provide the following information to the end user:

1. Name and address of distributor;
2. Materials Safety Data Sheet; and
3. Guidance on safe transportation and storage to prevent runoff to surface water and to prevent wind erosion.

The end user, in this case the owner or operator of the structural fill project, must provide an operation and maintenance plan which includes maintenance of wastewater treatment systems and equipment, safety measures, sampling and analysis protocol and spill controls. The owner or operator must report to the Division of Water Resources by March 1 of each year the following information:

1. Source, volume and type of CCP for use or used;
2. Date CCPs distributed; and
3. Name of each recipients of CCPs and a description of end use.

**E. EPA FINAL COAL COMBUSTION RESIDUALS RULE – OVERVIEW OF BENEFICIAL USE IMPACTS**

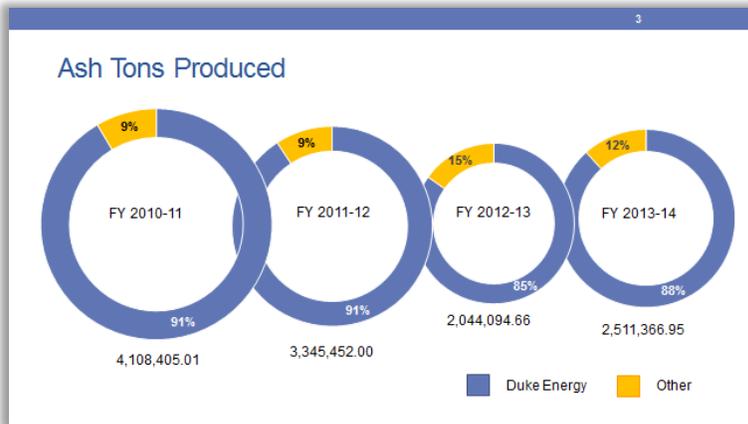
On December 19, 2014, the US EPA released a prepublication copy of the final rule: *Hazardous and Solid Waste Management of Coal Combustion Residuals from Electric Utilities*. The rule consists of an amendment to Title 40 Chapter I Part 257 Subpart D of the Code of Federal Regulations. Part 257 of Subpart D incorporates the criteria for classification of solid waste disposal in landfill and surface impoundment facilities.

While the new federal rules do not consider beneficial reuse of coal combustion residuals (CCRs) as disposal and therefore do not regulate structural fills, it does establish some requirements for large scale beneficial use projects involving unencapsulated use placement on the land of 12,400 tons or more in non-roadway applications and states that projects involving the placement of CCRs in sand or gravel pits and quarries, CCR piles and any practice that does not meet the definition of a beneficial use, are considered to be a landfill subject to the new federal rules.

**III. Structural Fills and Beneficial Use of CCP in North Carolina**

Ash is produced across North Carolina by large utilities as well as small power generators. At present Duke Energy has six power plants which are generating energy with coal and produce ash. There are also eight other power generators who produce ash. Several power generators have ceased burning coal or producing ash in recent years.

Coal combustion residuals (CCR) as defined in SL 2014-122 is a byproduct of coal power generation which is disposed of into impoundments or landfills, when beneficially used it is a coal combustion product (CCP). The byproducts consist of fly ash, bottom ash, boiler slag and flue gas desulfurization residue (FGD). Fly ash and bottom ash are often used as construction materials in products such as cement, block or as structural fill. The FGD byproduct, sometimes called synthetic gypsum, is often used to manufacture dry wall, is not used as structural fill and is seldom disposed. Duke’s power plants generate the majority of the CCPs and CCRs, as shown in the following chart.



Reporting of the quantities of CCR and CCP which is generated, disposed of, and used as structural fill or other uses is required by regulation 13B to be submitted each year. The two tables below show the amounts of ash and the amounts of FGD generated at each facility and the quantities disposed in landfills or used in structural fill or other product.

<b>Coal Combustion Ash 2013-2014</b>				
<b>Facility</b>	<b>Ash Tons Produced</b>	<b>Ash Tons Disposed in Landfills</b>	<b>Ash Used in Structural fill</b>	<b>Ash Tons Other Uses</b>
Marine Corps Air Station, Cherry Point	3,663.50	3,663.50	0.00	0.00
Duke Energy Allen Steam Station	178,540.00	239,160.00	0.00	0.00
Duke Energy Belews Creek SS	543,902.00	198,052.00	0.00	293,820.00
Duke Energy Buck SS	0.00	0.00	0.00	0.00
Duke Energy Cliffside SS	235,747.00	192,691.00	0.00	1,509.00
Duke Energy Dan River SS	0.00	0.00	0.00	0.00
Duke Energy Marshall SS	452,206.00	381,082.00	132.00	15,192.00
Duke Energy Riverbend	0.00	0.00	0.00	0.00
Edgecombe Genco, LLC	22,858.84	0.00	11,793.55	11,065.29
University of North Carolina at Chapel Hill	23,875.06	0.00	0.00	23,875.06
Progress Energy Carolinas - Asheville	0.00	0.00	0.00	0.00
Progress Energy Carolinas - Mayo Steam Electric Plant	144,674.00	108,739.00	0.00	35,935.00
DAK Americas	0.00	0.00	0.00	0.00
Progress Energy - Roxboro Steam Electric Plant	662,522.00	542,806.00	26,024.00	93,692.00
Westmoreland Partners, Roanoke Valley Energy Plant	118,220.04	118,220.04	0.00	0.00
Capital Power Corporation - Southport Facility	52,074.00	52,074.00	0.00	0.00
Capital Power Corporation - Roxboro Facility	15,685.00	15,685.00	0.00	0.00
Blue Ridge Paper Products - Canton Mill Waynesville	56,945.00	56,945.00	0.00	0.00
Ingredion	454.51	156.61	0.00	297.90
<b>Totals</b>	<b>2,511,366.95</b>	<b>1,909,274.15</b>	<b>37,949.55</b>	<b>475,386.25</b>

<b>Coal Combustion FGD 2013-2014</b>			
<b>Facility</b>	<b>FGD Tons Produced</b>	<b>FGD Tons Disposed</b>	<b>FGD Tons Other Uses</b>
Marine Corps Air Station, Cherry Point	0.00	0.00	
Duke Energy Allen Steam Station	88,254.00	4,347.00	83,060.00
Duke Energy Belews Creek SS	389,226.00	262,990.00	146,361.00
Duke Energy Buck SS	0.00	0.00	0.00
Duke Energy Cliffside SS	219,354.00	135,219.00	92,412.00
Duke Energy Dan River SS	0.00	0.00	0.00
Duke Energy Marshall SS	369,968.00	28,418.00	327,373.00
Duke Energy Riverbend	0.00	0.00	0.00
Edgecombe Genco, LLC	0.00	0.00	
University of North Carolina at Chapel Hill	0.00	0.00	
Progress Energy Carolinas - Asheville	84,495.00	1,081.00	83,414.00
Progress Energy Carolinas - Mayo Steam Electric Plant	138,499.00	383.00	138,116.00

DAK Americas	0.00	0.00	
Progress Energy - Roxboro Steam Electric Plant	427,472.00	0.00	427,472.00
Westmoreland Partners, Roanoke Valley Energy Plant	0.00	0.00	
Capital Power Corporation - Southport Facility	0.00	0.00	
Capital Power Corporation - Roxboro Facility	0.00	0.00	
Blue Ridge Paper Products - Canton Mill Waynesville	0.00	0.00	
Ingredion	0.00	0.00	
<b>Totals</b>	<b>1,717,268.00</b>	<b>432,438.00</b>	<b>1,298,208.00</b>



CCP Structural Fill under construction in Halifax County

A total of 61 regulated structural fills have been constructed in North Carolina: 42 in the coastal plains; 36 in the piedmont; and 2 in the mountains. Proposed end uses for these structural fills include roads, airport runways and hangars, industrial parks, warehouses, a museum, retail buildings, parking lots, an automobile dealership and lined landfills. Although a description of the nature and purpose of the project is a requirement of the notification under the 13B regulations, some properties on which structural fills have been completed were not developed with the proposed end use. Properties on which infrastructure development did not occur have had a greater incidence of compliance issues resulting from lack of comprehensive post-closure care. Most of the structural fills on which infrastructure development did occur, have buildings and/or other paved areas limiting erosion and storm water infiltration, and have well maintained vegetative areas.

**A. 15A NCAC 13B .1700 STRUCTURAL FILLS**

A preliminary inventory of the structural fills is shown below which categories the structural fills as those which notified according to the 13B regulations and fills which were constructed prior to the regulations. A total of 79 fills are known which fall into these two categories

1. 15A NCAC 13B Structural Fills – 61 total
  - 40 over 10,000 cubic yards
  - 21 under 10,000 cubic yards
2. Pre-13B regulations Structural Fills (pre January 4, 1994) – 18 total
  - 6 over 10,000 cubic yards
  - 12 under 10,000 cubic yards



Structural Fill used for construction of airport hangar at Lake Norman Airport.



EB Grain Warehouses constructed on CCP Structural Fill on Hwy 301 north of Rocky Mount.

**B. 15A NCAC 2T .1200 STRUCTURAL FILLS**

Coal Combustion Products (CCP) Distribution Permits are issued by the Division of Water Resources (DWR) for the treatment, storage, transportation, and beneficial use of certain CCPs. The DWR permitting program is limited to CCP that are recovered from permitted wastewater treatment systems. The table below shows the permitted distribution facilities, their associated ash distribution and wastewater disposal permit numbers, locations, and amount of CCP distributed from each facility from 2011 - 2013.

### Active CCP Distribution Permits

Permit #	Permittee	Plants Permitted (Wastewater Permit #)	County	CCP Distributed (Dry Tons)		
				2011	2012	2013
WQ0000020	Duke Energy Progress, Inc	Asheville Steam Electric Power Plant NC0000396	Buncombe	735,206	648,689	665,589
		Cape Fear Steam Electric Power Plant NC0003433	Chatham	82	0	0
		Sutton Steam Electric Power Plant NC0001422	New Hanover	89	0	89
		Mayo Steam Electric Power Plant NC0038377	Person	0	0	0
		Roxboro Steam Electric Power Plant NC0003425	Person	5,980	15,673	49,919
		Weatherspoon Steam Electric Power Plant NC0005363	Robeson	0	0	0
		Lee Steam Electric Power Plant NC0003417	Wayne	0	0	0
WQ0000452	Duke Energy Carolinas, LLC.	Marshall Steam Station NC0004987	Catawba	113,628	64,525	25,287
		Allen Steam Station NC0004979	Gaston	16,443	3,725	84,416
		Riverbend Steam Station NC0004961	Gaston	0	0	0
		Dan River Steam Station NC0003468	Rockingham	0	0	0

The primary uses of CCP distributed according to permits issued by the DWR are for construction products and for structural fills. A large structural fill project, the Asheville Regional Airport Structural Fill is a lined fill, with a leachate collection system and groundwater monitoring is as follows:



#### Asheville, NC (Buncombe County)

- Permit WQ0000020
- Area 1 – 18 acres, constructed 2007-2009
- Area 2 – proposed 32 acres, not constructed yet
- Area 3 – 31 acres, constructed 2013-spring 2015
- Area 4 – 45 acres, constructed 2010-2013
- Total acres – 126 acres
- End use – Primarily paved runways

### C. SL 2014-122 STRUCTURAL FILLS

Applications for two permits allowing structural fills greater than 80,000 tons per project were received on November 21, 2014. These sites are former clay mines for which reuse as a structural fill will restore the original grade of the site proposed. Additional future use is not currently stated. A site visit was conducted on December 5, 2014 by Department staff. The Completeness Review, performed in accordance with § 130A-309.203, was issued on December 19, 2014. A draft permit will be issued 90 days after completeness is determined followed by a public comment period of 30 to 60 days. The Department shall issue a final permit decision on an application for a permit within 60 days after the comment period on the draft permit decision closes.

More details regarding the two proposed structural fills follows:

- 1) Brickhaven Mine Tract A Structural Permit
  - Moncure, NC (Chatham County)
  - Mine Permit No. 19-25
  - 301 acres
  - Proposing to place 12.5 million tons (10 million cubic yards) as structural fill (1.7 million cubic yards / year)
  - 145 acres for the lined fill area
  - Phase 1 – 60.6 acres in 2 cells
  - Phase 2 – 55.2 acres in 2 cells
  - Phase 3 – 29 acres in 1 cell
  - 7.5-8 years to complete
  
- 2) Colon Mine Structural Fill
  - Sanford, NC (Lee County)
  - Mine Permit No. 53-05
  - 411 acres
  - Proposing to place 8.87 tons (7.1 million cubic yards) as structural fill (1.6 million cubic yards / year)
  - 118 acres for the lined fill area
  - Phase 1 - 36.9 acres in 2 cells
  - Phase 2 - 81.8 in 3 cells
  - 5-5.5 years to complete

### IV. Recommendations and Conclusion

In conclusion, it is the recommendation that CCP regulations as set forth in 15A NCAC 13B be revised to incorporate the protective measures established by SL 2014-122 and any additional requirements determined to be necessary for the protection of public health, safety and welfare; the environment; and natural resources, and the regulations in 15A NCAC 02T be repealed so that structural fill rules are all located in 15A NCAC 13B. The new federal definition of beneficial use of CCR should be addressed in the state requirements by regulation or statute regarding the four criteria of beneficial use and additional draft criteria under evaluation provided in Appendix II.