Coal Ash Management

Ellen Lorscheider
DENR DWM Solid Waste Section Chief

GEO^{3}T^2 Conference Cary NC

Overview

- How much coal ash is out there?
- Duke excavation plans
- Past structural fill rules – 15A NCAC 13B .1700
- Current CCR industrial landfill rules – 15A NCAC 13B .0500
- Status of the two mine reclamation beneficial reuse structural fill permit reviews
- Differences between a structural fill and CCR landfill as compared to CAMA and EPA rule

2

How much ash is out there?

151,660,000 tons

- 108,310,000 tons in ash basins
  - 32 ash basins
  - 2,879 total acres
- 30,300,000 tons in landfills
  - 10 landfills
  - 314 total acres
- 13,050,000 tons in ash fills
  - 14 fills

Source - http://www.duke-energy.com/pdfs/duke-energy-ash-metrics.pdf

Amount of Coal Ash at Duke Facilities

Duke Facility	Ash Basins	Total Acreage	Ash Inventory (tons)	Landfills	Total Acreage	Ash Inventory (tons)	Ash Fills	Ash Inventory (tons)	Total Volume (tons)
Allen	2	301	11,580,000	1	24.5	930,000	3	1,430,000	13,940,000
Asheville	2	78	3,410,000	0	0	0	0	0	3,410,000
Belews Creek	1	342	12,610,000	3	88.6	11,210,000	1	970,000	24,790,000
Buck	3	134	5,060,000	0	0	0	1	250,000	5,310,000
Cape Fear	5	173	5,670,000	0	0	0	0	0	5,670,000
Cliffside	3	144	6,540,000	1	23.3	620,000	0	0	7,160,000
Dan River	2	43	1,170,000	0	0	0	2	1,450,000	2,620,000
HF Lee	5	314	5,910,000	0	0	0	1	60,000	5,970,000
Marshall	1	450	22,270,000	3	53.5	7,000,000	2	5,730,000	35,000,000
Mayo	1	144	6,900,000	1	31	0	0	0	6,900,000
Riverbend	2	69	2,730,000	0	0	0	2	1,800,000	4,530,000
Roxboro	2	495	16,440,000	1	93	10,540,000	1	520,000	27,500,000
Sutton	2	137	6,320,000	0	0	0	1	840,000	7,160,000
Weatherspoon	1	55	1,700,000	0	0	0	0	0	1,700,000

Source - http://www.duke-energy.com/pdfs/duke-energy-ash-metrics.pdf

Duke Excavation Plan

All coal ash must be removed to a lined facility by 2019 at the following plants:

- **Asheville (Buncombe County)**
  - Active coal-fired plant
  - Phase 1 - Currently ash transferred to DWR structural fill at Asheville Airport
  - Phase 2 –construct on-site landfill
- **Dan River (Rockingham County)**
  - Retired coal-fired plant (converted to combined cycle turbine)
  - Phase 1 – move 1 million tons to Amelia MSW in Jetersville, VA (monofilled)
  - Phase 2 – construct on-site landfill
- **Riverbend (Gaston County)**
  - Retired coal-fired plant (no electricity production)
  - Ash to be transferred to Brickhaven and Colon structural fills
  - No option for on-site landfill
- **Sutton (New Hanover County)**
  - Retired coal-fired plant (converted to combined cycle turbine)
  - Phase 1 – 2 million tons transferred to Colon and Brickhaven structural fills
  - Phase 2 – construct on-site landfill

5

Remaining Duke Fleet

- **Allen (Gaston County)**
  - Active coal-fired
  - 1 active landfill – 3612-INDUS-2008
- **Belews Creek (Stokes County)**
  - Active coal-fired
  - 1 inactive landfill – 8503-INDUS-1984
  - 2 active landfills – 8504-INDUS, 8505-INDUS
- **Buck (Rowan County)**
  - Retired coal-fired (converted to combined cycle)
  - No solid waste facilities
- **Cape Fear (Chatham County)**
  - Retired coal-fired (no electricity production)
  - No solid waste facilities
- **Cliffside a.k.a. Rogers (Rutherford County)**
  - Active coal-fired
  - 1 active landfill – 8106-INDUS-2009
- **HF Lee (Wayne County)**
  - Retired coal-fired (converted to combined cycle)
  - No solid waste facilities
- **Mayo (Person County)**
  - Active coal-fired
  - 1 active landfill – 7305-INDUS-2012
- **Marshall (Catawba County)**
  - Active coal-fired
  - 1 inactive landfill - 1804-INDUS-1983
  - 2 active landfills – 1809-INDUS, 1812-INDUS-2008
- **Roxboro (Person County)**
  - Active coal-fired
  - 1 active landfill – 7302-INDUS-1988
- **Weatherspoon (Robeson)**
  - Retired coal-fired (no electricity production)
  - No solid waste facilities

6

Structural Fill Review
Types of Structural Fills

- Regulated Structural Fills 15A NCAC 13B .1700
  - 61 in current inventory
    - 40 over 10,000 cubic yards
    - 21 under 10,000 cubic yards
- Pre-Regulatory Structural Fills (pre-January 4, 1994)
  - 18 in current inventory
    - 6 over 10,000 cubic yards
    - 12 under 10,000 cubic yards
- Structural Fills 15A NCAC 2T .1200
  - 2 existing source permits allowing CCP in structural fills > 1' depth
  - Current active project - Asheville Regional Airport

7

Structural Fills in NC by County
(15A NCAC 13B .1700)

- Brunswick – 7
- Buncombe - 1
- Cabarrus – 1
- Catawba – 4
- Columbus – 1
- Craven – 1
- Cumberland – 6
- Duplin – 3
- Durham – 1
- Edgecombe – 1
- Forsyth – 2
- Gaston – 2
- Halifax – 9
- Henderson – 1
- Iredell – 17
- Mecklenburg – 2
- Nash – 9
- Northampton – 1
- Person – 3
- Robeson – 2
- Rowan – 2
- Stokes – 2
- Washington - 1

Coastal Plains	**41**
Piedmont	**36**
Mountains	**2**
TOTAL	**79**

8

Structural Fill – with beneficial end use

9

Structural Fill – without beneficial end use

10

Asheville Regional Airport Structural Fill

NCDENR DWR Permit
15A NCAC 2T .1200
Buncombe County

Area 1 (complete & capped)
- 18 acres
- 730,000 tons of coal ash
- Project life 2007-2009

Area 2 (proposed)
- Phase 1 – 15.3 acres
- Phase 2 – 10 acres
- Phase 3 – 14.5 acres
- Total – 39.8 acres

Area 3 (still in progress)
- 31 acres
- 1.3 million tons of coal ash
- Project life 2013-2015

Area 4 (complete & capped)
- 45 acres
- 2.3 million tons of coal ash
- Project life 2010-2013

11

Session Law 2014-122 (CAMA)
Part III. SECTION 4.(b)
Moratorium on Structural Fills

- The use of CCPs as structural fill is prohibited until Aug 1, 2015 unless the structural fill meets one of these conditions:
  - The fill is constructed with a base liner, leachate collection system and cap liner or groundwater monitoring system AND establishes financial assurance
  - The fill is used as base or sub-base of a concrete or asphalt paved road constructed under the authority of a public entity
- HB 157 clarifies that all three components (liner, leachate collection, groundwater monitoring) are needed and clarifies which commission is referred to within CAMA

12

Brickhaven Mine Tract "A" Structural Fill Permit Submittal

1910-STRUC-2015

Details

- **Moncure, NC (Chatham County)**
- **DMLR Mine Permit No. 19-25**
  - 301 acres
- **Proposing to place 12.5 million tons (10 million yd^3) as structural fill at a rate of 1.7 million yd^3/yr**
- **145 acres for the lined fill area**
  - Cell 1 – 33.9 acres
  - Cell 2 – 28.3 acres
  - Cell 3 – 30.2 acres
  - Cell 4 – 17.3 acres
  - Cell 5 – 34.8 acre
- **7.5 - 8 years to complete**

Location

View of Phase 1 looking North

View of Phase 2 looking South

13

Colon Mine Structural Fill Permit Submittal

5306-STRUC-2015

Details

- **Sanford, NC (Lee County)**
- **DMRL Mine Permit No. 53-05**
  - 411 acres
- **Proposing to place 8.87 million tons (7.1 million yd^3) as structural fill at a rate of 1.6 million yd^3/yr**
- **118 acres for the lined fill area**
  - Cell 1 – 22.4 acres
  - Cell 2 – 15.3 acres
  - Cell 3 – 19.3 acres
  - Cell 4 – 31.9 acres
  - Cell 5 – 29.4 acres
- **5-5.5 years to complete**

Location

View of Phase 1 looking North

View of Phase 1 looking South

14

Draft Timeline for Structural Fill Permit and Mine Reclamation Permit Modification*

*The mine reclamation permit modification will incorporate the required erosion and sediment control measures, any additional NPDES stormwater requirements, and the renewal of existing mining permits.

Jan 23, 2015: Determination of completeness
March 11, 2015: Receipt of amended application by applicant- addresses technical issues of proposed federal rule
March 12-18, 2015- Review of submittal
March 20, 2015- Draft Structural Fill Permit ready for department review
March 23, 2015: Draft Structural Fill Permit & Mine Reclamation Permit Modification issued for public notice and comment
March 23 to May 16, 2015: 30-60 day public comment period.
April 13 and April 16, 2015- Public hearings on structural fill, mine permits and wetland permits
No later than July 1 – August 1, 2015: Within 60 days after public comment period, final permit decision on Structural Fill & Mine Reclamation Permit Modification

15

Buffer Requirements for Structural Fills (.1700 Rules)

- 25 feet between edge of waste and property boundary
  - CAMA- 50 feet
- 100 feet between edge of waste and any source of drinking water
  - CAMA – 300 feet to dwelling or well
- 50 feet between edge of waste and bodies of surface water
- 50 feet between edge of waste and jurisdictional wetlands
- 2 feet between bottom of waste and seasonal high groundwater table
  - CAMA - 4 feet
- Cannot be located within a 100-year flood plain
  - CAMA – 50 feet of wetland unless ACOE issues permit or waiver

16

Buffer Requirements for CCR Landfills (.0500 Rules)

- 50 feet between edge of waste and property boundary
- 500 feet between edge of waste and private dwelling or well
- 50 feet between edge of waste and rivers/streams
- 4 feet between bottom of waste and seasonal high groundwater table
  - EPA – 5 feet to uppermost aquifer
- Cannot discharge into wetlands and waters of the state
- Cannot restrict the flow of a 100-yr flood
- EPA – Not in seismic zone unless demonstration
- EPA - 200 feet from outermost damage zone of fault
- EPA – Not in unstable area unless demonstration

17

CCR Landfills vs. Structural Fills in North Carolina

- Permitting
- Construction
- Operations
- Facility Inspections
- Environmental Monitoring
- Waste Management and Planning
- Complaint Investigation
- Annual Reporting

18

Permitting
CCR Landfill vs. Structural Fill

- A CCR landfill is regulated under the 15A NCAC 13B .0500 rules with siting, design and operational requirements and requires a permit to construct and permit to operate.
- A structural fill is regulated under the 15A NCAC 13B .1700 rules and does not require a permit. The fill is given a notification. However, there are still siting, design, construction and operational requirements.
- CAMA – requires permit if >8000 tons/acre or 80,000 tons/project (<8000 tons/acre or 80,000 tons/project is "deemed" permitted).

19

Construction
CCR Landfill vs. Structural Fill

- Construction of a CCR landfill requires a liner system, leachate collection system and closure cap system.
- Construction of a structural fill does not require a liner system or leachate collection system.
  - EPA – Structural fill >12,400 tons must demonstrate releases are comparable to products made without CCR
  - CAMA – requires liner, leachate collection, cap system if >8000 tons/acre or 80,000 tons/project
- Both CCR landfills and structural fills shall construct exterior slopes no greater than 3 to 1.

20

Operations
CCR Landfill vs. Structural Fill

- Both a CCR landfill and structural fill shall operate:
  - to prevent surface water runoff
  - to establish dust control measures
- Each landfill sub-cell is closed and capped to prevent leachate accumulation on the liner before moving onto the next sub-cell, with precipitation diverted away from open working face.
- CCP placed in a structural fill
  - compacted 1 foot lifts (.1700 structural fill only)
    - CAMA - CCP placed uniformly and compacted, PE specifies for specific end use

21

Facility Inspections
CCR Landfill vs. Structural Fill

- A CCR landfill is inspected annually by an Environmental Senior Specialist.
  - EPA – weekly by trained professional and annually by PE
- A structural fill does not have a defined inspection schedule. However, periodic inspections are performed.
  - CAMA requires annual inspections

22

Environmental Monitoring CCR Landfill vs. Structural Fill

- A CCR landfill is required to monitor the groundwater and surface water surrounding the landfill semi-annually for detection monitoring.
- EPA – existing CCR landfills: minimum of eight (8) independent samples from each background and downgradient GW well must be analyzed for Appendix III and IV no later than 30 months after publication
- EPA – new CCR landfills: minimum of eight (8) independent samples from each background and downgradient GW well must be analyzed for Appendix III and IV during first six (6) months of operation
- A structural fill is not required to conduct environmental monitoring. However, the fill shall be effectively maintained and operated to ensure no violations of the 15A NCAC 2L groundwater standards
  - EPA – Fill >12,400 tons must demonstrate releases are comparable to products made without CCR

23

Waste Management & Planning CCR Landfill vs. Structural Fill

- A CCR landfill is required to submit a waste management plan outlining the plan for waste management during the life of the landfill.
- A structural fill is not required to submit a waste management plan.

24

Complaint Investigation CCR Landfill vs. Structural Fill

- Complaints for both a CCR landfill and structural fill are investigated by an Environmental Senior Specialist
  - EPA – for CCR landfills, enforcement via citizen suits

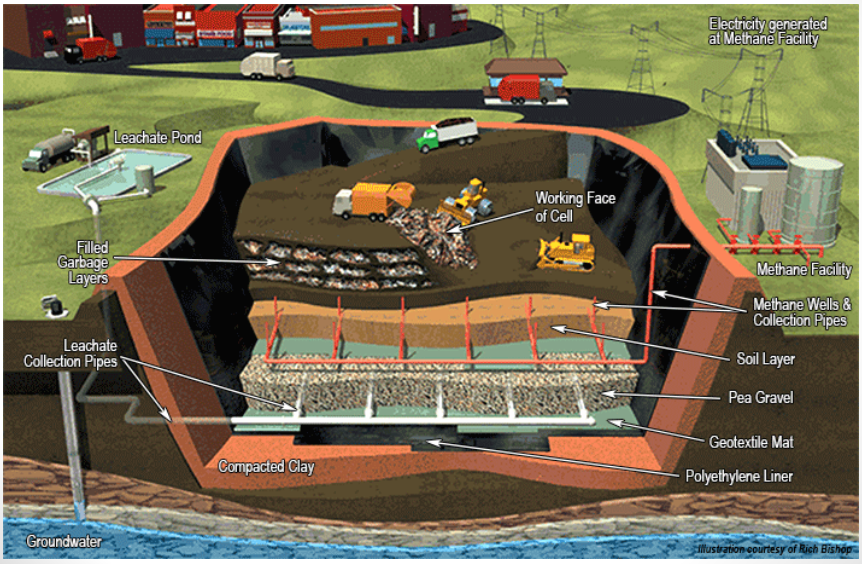
25

Annual Reporting CCR Landfill vs. Structural Fill

- Generators of CCRs are required to submit an annual summary of
  - Volume of CCRs produced
  - Volume of CCRs disposed in landfill
  - Volume of CCPs beneficially used in structural fill
  - Volume of CCPs used for other beneficial uses

26

Typical Construction of CCR Landfill



27

CCR Landfills at Duke Energy Progress Power Plants

Permit ID	County	Permit Name	Status	Liner System	Most Recent PTO Date	Next Permit Needed	Previous Landuse	Acres	FGD	Ash	GW Monitoring
1804-INDUS-1983	Catawba	Marshall Steam Station Dry Ash Landfill	Closed (June 2008)	unlined	NA	NA	greenfield	61			✔
1809-INDUS	Catawba	Marshall Steam Station FGD Landfill	Active	lined w/ LCS	Nov 2011	11/21/16	greenfield	31.9	✔		✔
1812-INDUS-2008	Catawba	Marshall Steam Station Industrial Landfill #1	Active	double lined w/ LCS & LDS *	Mar 2011	3/7/16	Phase 1 greenfield, Phase 2 retired ash pond	93.4		✔	leak detection system
3612-INDUS-2008	Gaston	Allen Steam Station RAB Landfill	Active	double lined w/ LCS & LDS	Dec 2010	12/9/14	retired ash basin	47	✔	✔	leak detection system
8106-INDUS	Rutherford	Cliffside Steam Station	Active	lined w/ LCS	Sept 2010	9/7/15	greenfield	85	✔	✔	✔
8503-INDUS-1984	Stokes	Belews Creek Steam Station Pine Hall Rd Landfill	Closed (Dec 2007)	unlined	NA	NA	greenfield	37.9		✔	✔
8504-INDUS	Stokes	Belews Creek Steam Station Craig Rd Landfill	Active	lined w/ LCS	Nov 2007	1/24/18	greenfield	90	✔	✔	✔
8505-INDUS	Stokes	Belews Creek Steam Station FGD Landfill	Active	lined w/ LCS	Jan 2008	1/24/18	greenfield	22.6	✔		✔
7302-INDUS-1988	Person	Roxboro Steam Electric Plant	Active	lined w/ 40mL LLDPE-GM	July 2007	8/31/15	lined landfill / unlined landfill / ash basin	71	✔	✔	✔
7302-INDUS-1988	Person	Roxboro Steam Electric Plant	Closed 2002	unlined	NA	NA	unlined landfill / retired ash basin	113		✔	✔
7305-IN2828DUS-2012	Person	Mayo Steam Electric Plan	Active	double lined w/ LCS & LDS	July 2014	7/1/19	greenfield	104	✔	✔	✔

*LDS - leak detection system, LCS - leachate collection system

Questions?

Ellen Lorscheider ellen.lorscheider@ncdenr.gov
North Carolina Department of Environment and Natural Resources
Division of Waste Management
919 707 8245

30