Paul Crissman

Progress Energy

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July 27, 2009

Mr. Dexter Matthews, Chief
Solid Waste Section
Division of Waste Management
Mail Serve Center 1646
Raleigh, North Carolina 27699-1646

Re: Carolina Power and Light Co., d.b.a. Progress Energy Carolinas, Inc.
Roxboro Steam Electric Plant
Person County, North Carolina
Landfill Waste Management Plan 3 Year Update

Dear Mr. Matthews:

Enclosed is the 3-year update to the Progress Energy Carolinas, Roxboro Steam Electric Plant Dry Fly Ash Landfill 10-year Waste Management Plan. Highlighted updates include current landfill status and waste reduction strategy changes.
Waste stream components have been reviewed and options identified for reducing the amount of material disposed of as solid waste. Waste reduction goals in the plan are based on normal plant operations.

Please contact Mr. Billy Milam at (336) 597-6284 should you have any questions concerning this submittal.

Respectfully,

Harry K. Sideris
Plant Manager

Enclosures

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Progress Energy Carolinas

Roxboro Steam Electric Plant

Dry Fly Ash Landfill
Waste Management Plan
2009 – 2011

I. Introduction

During 1996, the North Carolina General Assembly amended the solid Waste Management Act in House Bill 859 (HB859). This revision required owners of Industrial Waste Landfills, such as the Roxboro Plant's Dry Fly Ash Landfill, to establish a waste generation goal and a ten year waste management plan. The General Statutes specified that the plan should include a waste reduction goal established by the generator and management strategy, including plans for waste reduction and waste disposal for the ten-year period covered by the plan. The General Statutes require that the plan be updated at least every three years.

The Roxboro Steam Electric Plant owned and operated by Carolina Power and Light Co. d.b.a Progress Energy Carolinas Inc. is a four-unit, 2477-megawatt, coal-fired electrical generating facility located northwest of Roxboro on Hyco Reservoir in Person County.

In 1988, the Division of Waste Management (Division) issued Permit #73-02 for construction of the Dry Fly Ash Landfill (DFA LF) on a 315-acre site. The landfill, located on Company property southeast of the generating facility, is used for the disposal of Coal Combustion Products (CCPs), primarily fly ash. The approved engineering plans were prepared and submitted by Progress Energy. According to the original facility design, the planned landfill area was approximately 280 acres and extended to the East Ash Pond Dam. To date, landfill operations have utilized less than 50% of the permitted disposal area. On January 22, 2002, the Division issued Permit #73-D for expansion of the Inert Debris Landfill (IDLF), delineating a total of 8.5 acres of the landfill for disposal of non-process inert debris; the IDLF does not receive "industrial waste." The IDLF includes the existing landfill area previously designated as a "Construction and Demolition Landfill." All property within at least 0.5 mile of the Landfill site is owned by the Company.

Landfill Status

The Roxboro Dry Fly Ash Landfill is essentially a fly ash monofill. On June 28, 2002, The Division issued Permit to Construct (PTC) #73-02 which approves the updated long-term concept for facility development and the specific engineering plan for a 5-year operating period (2003-2008). The PTC approves construction of a single geomembrane liner system installed on a fly ash subgrade, and covered with a bottom ash drainage layer for leachate collection. The Lined Ash Monofill is approved to cover 71 acres of the prior 135-acre unlined landfill footprint. Construction of the liner system is planned in 5 phases. Phase I was placed in-service December 2003. Based on an average annual operating capacity of 550,000 cubic yards per year, the current facility plan provides disposal capacity through 2016. Waste reduction would potentially extend the operating life of the Lined Ash Monofill. The permitted landfill site includes more than 100 Acres of undeveloped footprint for future disposal capacity.

The current Permit to Operate for Phases I- III was issued July 12, 2007. At completion of Phase III, the liner system will cover approximately 65% of the 71-Acre Lined Monofill with an interim capacity of approximately 3,000,000 cubic yards. In 2006 and 2007, recovery and reuse projects for the Flue Gas Desulfurization (FGD) Settlement Pond and Gyspum Storage Pad at the Roxboro Plant removed or diverted more than 1,000,000 tons of ash from the landfill. An increase in the amount of fly ash received at the Roxboro landfill from the PEC Mayo Plant and other CCP inputs have resulted in a one year extension of the operating capacity of Phases I-III through 2009. Altogether, construction and recovery activities yielded sufficient lined landfill capacity. In addition to the CCPs currently landfilled, by-pass and off-spec FGD solids are planned inputs to the Lined Monofill. PEC plans to begin receiving FGD solids at the landfill as necessary.

PEC plans to submit an Amendment to Permit for Construction (PTC) for the Phase IV and V in the landfill area in 2009. According to the approved Facility Plan, Phase IV liner construction is planned for 2010. Phase V liner construction is planned for 2011. Concurrently, PEC plans to evaluate the feasibility of developing a lateral expansion to the site-approved South End. Approximately 100 to 130 Acres within the original site-

approved disposal area are available for lateral expansion. As noted in the currently approved plans, the lateral expansion would extend the Lined Monofill from Phase III to the South.

II. Waste Stream Characterization

Fly ash is a powdery non-hazardous substance resulting from the combustion of coal. Generally, ash is composed of silica, aluminum, iron, and calcium in their oxide forms. Magnesium, potassium, sodium, and titanium are also present to a lesser degree, as are even smaller concentrations of trace metals. Fly ash also contains small amounts of unburned carbon. Fly ash that is low in carbon content can be sold as an ingredient in concrete.

Coal rejects (including spilled coal) are also landfilled. At the Roxboro Plant, coal is transported on conveyor belts from the coal pile to coal crushers. From the crusher, the coal is transported by conveyor belts to the tripper, which directs the coal into silos that feed the pulverizers. The pulverizers reduce the coal to powder-sized particles that are injected into the boilers as fuel. Materials that cannot be broken up in the pulverizer (rocks, pyrites, etc.) are rejected by the pulverizer along with usable coal. Rejects or spilled coal that is primarily coal is returned to the coal pile for reuse, while material that is primarily rock or soil, is sent to the Landfill. Approximately 60% of reject material can be returned to the coal pile as usable coal. The remaining material, mostly rock mixed with pyrites is disposed in the landfill. The quantity of coal rejects disposed of in the landfill is directly proportional to the amount of electricity generated by the plant.

Gypsum — All units at Roxboro Plant have installed Flue Gas Desulfurization equipment known as Scrubbers for the removal of SO_2 from the flue gas stream. The final scrubber at Unit 1 came on-line in Fall 2008. The byproduct of this SO_2 removal process is a material known as synthetic gypsum (calcium sulfate). There are several options for the disposal and/or recycling of this material. These options include the use of the gypsum in the manufacture of wallboard or stabilized road base construction, landfilling of the material on site or in an offsite approved landfill.

III. Waste Reduction Options

Fly Ash

Of the total amount of fly ash produced annually (577,000 tons) during an average year, approximately 50% is suitable as an ingredient in concrete. The installation of a carbon separation operation (see section IV) improved the amount of usable ash as an ingredient in concrete. Although there are numerous reasons for minimal ash utilization (e.g., limited market demand, high flyash transport costs, etc), the most constraining factor limiting fly ash entry into the primary market arena (i.e., concrete admixture) is the amount of residual carbon content remaining in the ash. That is, only low carbon fly ash is suitable for use as a concrete admixture, and the relative yield and availability of low carbon ash is comparatively small.

Ironically, with the installation of low nitrogen oxide (NOx) burners for air pollution control, the available supply of low carbon fly ash was reduced further. The use of low NOx burners leads to a higher unburned carbon content in the fly ash; "residual" energy remains in the fly ash as unburned carbon.

Other potential uses for fly ash are as a structural fill, flowable fill material, and cinder block. These are low value options, which are dependent on the distance to the construction project due to high cost of transportation and the low cost of natural materials (i.e., soil).

Coal Rejects

The Roxboro Plant generates an estimated 2,300 tons of spilled and reject coal per year. Approximately 60% of this volume can be returned to the coal pile and re-burned. Materials too dense to pass through any of the plant's 36 pulverizers are periodically rejected as a waste (generally less than 500 tons annually). Rejects are typically small rocks, rock containing pyrites (iron sulfide), and coal. Unfortunately, there are no alternative disposal options. Eliminating the non-coal material before it reaches the pulverizer is not practical because it is such a small percentage incorporated in the coal.

Gypsum

The Roxboro Plant generates an estimated 420,000 tons of Gypsum annually. This material is currently being stockpiled. Land is currently being developed by CertainTeed to build a wall board plant adjacent to Roxboro E.G. Plant. This wall board plant is expected to utilize the plant's gypsum production as well as the stockpile. During construction of the wall board plant, CertainTeed will be shipping an estimated 40,000 tons annually of gypsum to be utilized in production at other sites.

IV. Waste Reduction Strategy

Consistent with North Carolina's Waste Reduction Goals, Progress Energy has incorporated waste reduction projects in plant operations. Current performance of these projects has reduced waste quantities significantly, as recognized by our Governor's Award for Waste Reduction. Progress Energy's CCP management goals focus on alternatives to land disposal. To date, a substantial amount of resources have been committed to projects that divert fly ash and gypsum from land disposal and utilize the materials to manufacture new products.

In 1998, Progress Energy and an ash marketer completed the installation of a prototype two-unit carbon-separation processing system, the first of its kind in the Southeast and the second of its kind in the country. The fly ash is separated into high-carbon and low-carbon products. The high-carbon ash is referred to as high LOI (loss-on-ignition) and the low-carbon ash is referred to as low LOI. The lower-carbon product is sold and used in the manufacture of concrete. Progress Energy has also considered plans to reuse the higher-carbon fly ash as fuel.

A simplified block diagram of the project is shown in Figure 1; the details of the fly ash separation and fly ash re-burn project phases (hereafter referred to as Phases I and II, respectively) are discussed in detail below:

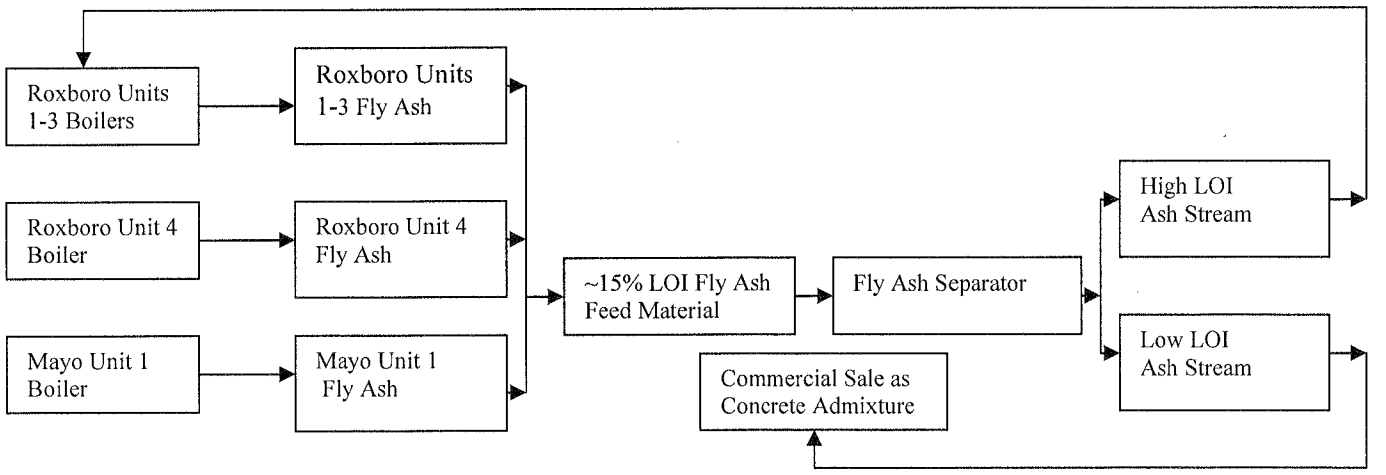

Figure 1. Process Flow Diagram for Recycling of Residual Dry Fly Ash

Partial use of the carbon-separation processing system has diverted more than 1,500,000 tons of fly ash that otherwise would have been destined for the landfill. In 2008, the company diverted approximately 110,433 tons. Progress Energy along with our ash marketer continues to explore new markets for ash products and expects this system to divert even more fly ash from the landfill in the future.

Phase I – Fly Ash Separation

Phase I of this project involved the design, fabrication, installation, and operation of the equipment required to physically separate the dry fly ash feed material into high and low carbon streams (Figure 1). Separation Technologies, Inc. developed this technology based on an electrostatic separation principle wherein negatively charged particles (i.e., those that are carbon depleted in the feed material) are attracted to a positively charged electrode, and conversely, the positively charged particles (i.e., those that are carbon enriched) are attracted to a negatively charged electrode. When the feed material is fed into a counter rotating conveyor belt located between two closely spaced parallel electrodes in a high magnetic field, this process yields continuous and high volume separation of the ash (refer to Figure 2 below).

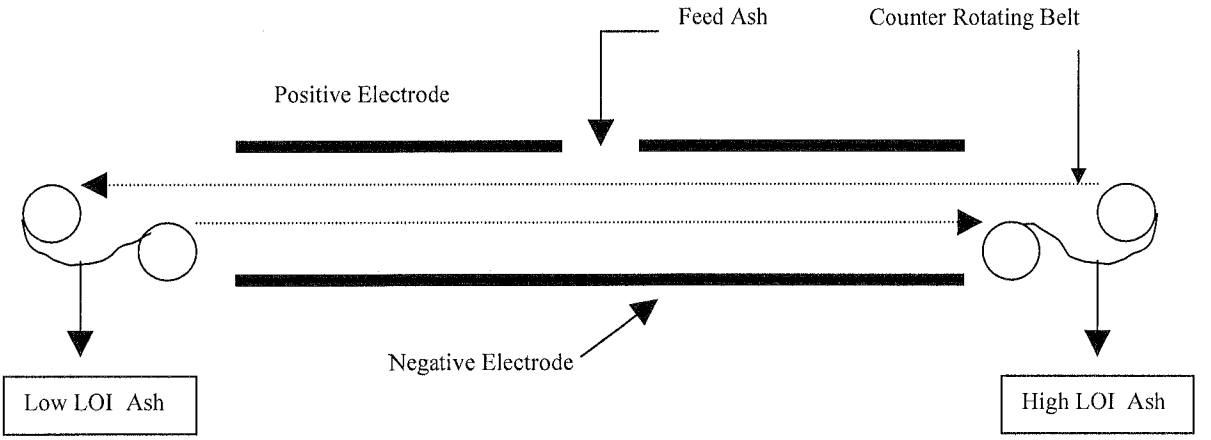

Figure 2. Diagram of Fly Ash Electrostatic Separator

The construction of the first separation process flow unit was completed in July 1997. The second unit was completed in August of 1998. Construction included appropriately sized ash storage silos (i.e., for the feed fly ash, low LOI fly ash, and high LOI fly ash), fly ash feed system (i.e., rotary feed valves, vibrating screen, fluidized conveyers), electrostatic separator(s), positive-pressure conveying system (i.e., for transfer of the low/high LOI ash to their respective silos), and a dust collection system (i.e., to maintain the fly ash feed and separator systems under slightly negative pressure). A portion of the ash conditioning system allows landfilling of ash during maintenance of the separator system or during times when ash generation exceeds capacity of the system. Each unit is able to process 180,000 tons/year.

Phase II – Ash Re-Burn

The scope for Phase II of this project includes development of the optimum design configuration, and installation of the necessary equipment for transport and re-injection of the high LOI ash into one of the Roxboro unit boilers. The conceptual design configuration includes pneumatic transfer of the high LOI ash to a storage silo. From the silo, the high LOI ash will be placed on coal belts and mixed with coal during coaling

up operations. A pilot test burn of this material was performed in 1998. Currently the economics associated with the Ash Re-burn are not favorable and Progress Energy is not pursuing this option.

Strategy Updates

Progress Energy's ash marketing contract has been renewed. New technologies and marketing proposals are being evaluated, with the primary objective being maximum beneficial ash reuse. Proposals are evaluated to determine cost effectiveness on achieving this goal.

In support of the Flue Gas Desulphurization system installation at the Roxboro Plant, ash containing flowable fill was utilized where possible. One structural fill containing approximately 95,000 cubic yards of ash was completed. Additionally, as mentioned previously, an ash recovery project utilized an estimated 650,000 cubic yards of ash in support of this construction. All of these activities supported the goal of reducing landfill volumes.

V. Waste Reduction Goal

The original waste reduction goals were based on the successful installation and operation of carbon separation equipment at the Roxboro Plant with the resulting increase in ash sales. The installation of low NOx burner air pollution abatement equipment has made ash/carbon separation more difficult. Also, original design capacity of the carbon separation equipment was estimated at 250,000 tons/unit/year. However, historical operating data indicate capacity is only 180,000 tons/unit/year of feed ash. As a result, early estimates of reductions were unrealized. Ash generated in excess of the carbon separation unit's capacity is landfilled. The separation process is 60% efficient, that is, 40% of the ash goes to the landfill. The current economic condition caused a decline in sales. The current operation has sales just over 110,000 tons/year. This has resulted in diverting 110,000 tons of fly ash that would otherwise have to be landfilled.

The demand for electricity, scheduled unit outages, demand for the mineral product, and utilization of the carbon separation equipment will impact waste reduction. Low value options, such as structural fills will be investigated, but these involve transportation of ash to the structural fill project. Power production of the plant has steadily increased to meet the demand of a growing service area. The plan will be periodically reviewed and updated to reflect changes in waste generation, recycling options, and regulatory mandates.