

Hearing Officer's Report and Recommendations

**Duke Energy Progress, LLC – Cape Fear STAR® Facility
Public Hearing April 23, 2019
Chatham County Agriculture & Conference Center
Pittsboro, NC**

Public Comment Period: March 22, 2019 through April 26, 2019

Pertaining to Draft Air Permit No. 10583R00 for:

Duke Energy Progress, LLC – Cape Fear STAR® Facility
Coal Ash Staged Turbulent Air Reactor (STAR®)
500 C P and L Road
Moncure, NC, Chatham County
Facility ID No. 1900134
Fee Class: Title V

Hearing Officer

Heather S. Carter, CPM, Regional Supervisor, Fayetteville Regional Office

Background

On July 24, 2018, the North Carolina Department of Environmental Quality (DEQ), Division of Air Quality (DAQ), received an air quality permit application (App. No. 1900134.18A) from Duke Energy Progress, LLC – Cape Fear STAR® Facility to construct and operate a new fly ash processing facility at 500 C P and L Road in Moncure, Chatham County, NC. Pending issuance of the air quality permit, the Cape Fear STAR® Facility plans to install a Staged Turbulent Air Reactor (STAR®) plant to chemically and physically convert fly ash into a low-carbon material suitable for use as a component in concrete as well as other commercial and industrial applications. The proposed plant has a production capacity of 400,000 tons of fly ash per year. During start-up of the STAR® reactor, the combustion air is pre-heated via propane-fired auxiliary burners with 60 million Btu per hour heat input capacity. Fuel and fly ash are then co-fired until the fly ash auto-ignition temperature is reached. At this temperature, residual carbon in the fly ash becomes the heat input source in the reactor, which is rated at 140 million Btu per hour heat input capacity. Additionally, ancillary sources of air pollution associated with the conveyance, preparation of and storage of material are included as emission sources.

On March 22, 2019, pursuant to the North Carolina Coal Ash Management Act (CAMA), a notice of public hearing was posted in the Sanford Herald and Chatham News & Record newspapers and on the DAQ website. The public comment period was March 22, 2019 through April 26, 2019. Copies of the air quality permit application, permit application review and draft air permit were also posted on the DAQ website for public review. Copies of the air quality permit application and related documents were available for public review in DAQ's Raleigh Regional Office (RRO) and Raleigh Central Office (RCO) throughout the public comment period. On April 23, 2019, the public hearing was held at the Chatham County Agriculture & Conference Center in Pittsboro, NC.

Air Quality Permit Application and Review

This application is for the first step of a two-step process to obtain a new Title V permit to install and operate a fly ash processing plant at the Cape Fear STAR® Facility. The proposed plant is designed to annually process up to 400,000 tons of coal combustion fly ash to produce a high-quality Class-F fly ash for use in ready mix concrete or other commercial and industrial products. It uses a proprietary technology from the SEFA Group Inc. called STAR® - Staged Turbulent Air Reactor - to chemically and physically convert fly ash into a low-carbon material that meets the American Society for Testing and Materials (ASTM) Standard C618-08, "Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete" of no more than 6 percent by weight loss-on-ignition (LOI) carbon content to be suitable for use in concrete.

Betty Gatano, P.E., Permit Engineer in DAQ's RCO, reviewed the application submitted by Duke Energy Progress LLC – Cape Fear STAR® Facility and determined that the proposed facility could comply with all applicable federal and state air quality requirements provided that the specific conditions included in the draft air quality permit are met. Nancy Jones, Meteorologist in DAQ's RCO, provided technical support in the application review process by reviewing the site-specific air dispersion modeling analysis of the proposed Cape Fear STAR® Facility to ensure compliance with the North Carolina air toxics regulations. Ms. Jones' analysis showed that "The modeling adequately demonstrates compliance, on a source-by-source basis, for all toxics modeled." This analysis demonstrates that the proposed Cape Fear STAR® Facility would not cause an exceedance of 15A NCAC 02D .1100 Acceptable Ambient Levels (AALs) for any toxic air pollutant (TAP) beyond the facility's property boundaries.

Unless the public comments received during the public hearing reveal that DAQ was in error or incomplete in its evaluation of the proposed Cape Fear STAR® Facility from an air quality standpoint, and if the applicant

will meet all federal and state laws, and rules for the protection of air quality, DAQ is obligated to issue an air permit to Duke Energy Progress LLC – Cape Fear STAR® Facility. The following hearing officer responses to written and oral public comments will address issues raised in light of these requirements.

Public Comments

From the comments received during the public comment period, it is apparent that the citizens around the proposed Cape Fear STAR® Facility are very concerned about potential impacts on their health. Among the issues they raised are the level of heavy metals in air emissions and the monitoring of toxic and criteria pollutant emissions. At the public hearing on April 23, 2019, approximately 34 people were registered in attendance. Five attendees spoke, all in opposition to the proposed Cape Fear STAR® Facility. Additionally, nine written e-mail comments (some with attachments) were received during the public comment period. All written comments received were in opposition to the proposed Cape Fear STAR® Facility. The only hardcopy comment submitted was received during the public hearing and was a duplicate of a comment also submitted via email by the same party.

The comments received, both written and oral, addressed many of the same issues. In order to make this report concise, address all issues and minimize redundancy, I have grouped the comments by topic similarity and summarized and addressed the issues of concern below. Bulleted comments in italics are direct quotes from submitted written comments, whereas bulleted non-italics are paraphrased from verbal or written comments.

Comment Category #1: General Concerns Regarding Health Impacts from Air Pollutants:

There were several comments with concerns regarding the health impacts from the air pollution proposed from the new facility. These include toxic and criteria air pollutants.

- Are there similar facilities operating that can be used to evaluate actual emissions from this process?
- *The complex modeling for toxic air emissions relies partially on ambient temperatures, mixing heights, atmospheric stability and other weather related factors. Given that we are now experiencing a rapid change in climate, it is questionable whether the variables such as atmospheric stability and ambient temperatures from 2012-2016 are a good standard for modeling of anticipated air levels of these toxins in 2020 when the plant will be activated, let alone 15 or 20 yrs from now.*
- *The level of emissions can vary widely depending on the processes being carried out at the plant at any one time. These periods of high emissions will be repeated many times over the decades this plant will operate, presenting an elevated health risk to Moncure residents.*
- Concerns about particulates from roads, based on information documented during past hauling of coal ash in enclosed trucks which showed an increase in concentrations of toxic air pollutants along truck routes. Everyone traveling these roads will be exposed, not just those within 1.5 miles of the facility. The road by the facility is a main travel route to school, to town, etc.
- *A question that remains unanswered is what impact additives used to make the coal ash suitable for various products will have on emissions.*

Hearing Officer's Response to These Comments:

- According to The SEFA Group website (<https://www.sefagroup.com/services/star-technology/star-plants>), there are three (3) other STAR® facilities outside of North Carolina:

- Morgantown STAR® Plant, 12620 Crain Highway, Newburg, MD
- McMeekin STAR® Plant, 6055 Bush River Road, Columbia, SC
- Winyah STAR® Plant, 661 Steam Plant Drive, Georgetown, SC

Emission factors derived from actual operating experience and source testing at one or more of these plants were used to calculate potential emissions for the Cape Fear STAR® Facility for Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Volatile Organic Compounds (VOC), and Carbon Dioxide (CO₂) emissions calculations.

- Matthew Porter, Meteorologist with DAQ, is currently serving as one of DAQ's designees focused on the state's Climate Assessment on the NC Climate Change Interagency Council. In an email dated 6 May 2019, he stated that NC air toxics modeling guidance conforms to U.S. EPA modeling guidance specifications contained in 40 CFR Part 51, Appendix W Guideline on Air Quality Models. As discussed in Appendix W, preferred air quality models and model performance are evaluated to address spatial and temporal (e.g., time) variabilities in various model parameters (e.g., temperature, winds, stability, mixing heights, etc.) to ensure model predictions are both conservatively accurate and reproducible. Beyond guideline considerations of hourly variabilities and associated performance, the guideline recommends that inter-annual meteorological variability be addressed such that modeling applications of the AERMOD modeling system include at least 5 years of airport meteorology or 1-5 years of on-site meteorology. The combination of 1-5 years of representative meteorology and conservative performance of the AERMOD modeling system serves as the basis for demonstrating proposed facility emissions will maintain future compliance with the NC Acceptable Ambient Levels (AALs) for all air toxics.

At present, there are no authoritative modeling guidelines that recommend or discuss climate change effects on demonstrating compliance with the NC AALs or federal National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) Increments. Fundamentally, the term "climate" refers to much greater spatial and temporal scales (and associated uncertainties) than those scales that would be controlling in an air toxics modeling analysis for the proposed Cape Fear STAR® Facility. For example, temporal scales developed for studies of climate change are on the order of 30 years or more. And while a 30-year trend from a climate model (or statistical study) may show changing variabilities in temperatures, winds, stability and mixing heights, those trends would be very different for various regional and local spatial scales and well beyond the scope and application of the AERMOD modeling system for regulatory purposes.

- The proposed Cape Fear STAR® Facility is expected to be in compliance with the applicable air quality regulations and air permit requirements which are designed to protect the ambient air for both toxic and criteria air pollutants. These ambient standards are generally set for sensitive populations such as children and not just healthy adults. DAQ reviewed the site-specific air dispersion modeling analysis for the proposed Cape Fear STAR® Facility and determined that it demonstrates that the proposed facility would not cause an exceedance of 15A NCAC 02D .1100 AALs for any toxic air pollutant (TAP) beyond the facility's property boundaries. See the air permit review for more information. In addition, the referenced dispersion modeling analysis is considered conservative for the following reasons:
 - The NC AALs are set at a conservative value following recommendations provided by an independent scientific advisory board to protect the public health with a protective margin;
 - Computer models are designed to be conservative; and

- The company's modeled maximum impacts, based on planned operations submitted in their permit application, ranged from <1% to 4% of the AALs (see Table 8 of the air permit review).
- The draft permit contains fugitive dust requirements as listed in 15A NCAC 02D .0540, which prohibits fugitive dust from leaving the property. If dust complaints are substantiated, DAQ has the authority to require the facility to develop and implement a dust management plan. Additionally, the proposed DEQ Division of Waste Management (DWM) regulations 15A NCAC 13B .2001-.2018 will require a dust management plan be developed and implemented. These proposed rules have been through public hearing and public comment and are currently under review by DEQ.
- There are no coal-ash additives expected to be used at this location.

I do not recommend any changes to the air permit regarding these issues.

Comment Category #2: Stack Testing / Continuous Monitoring / Ambient Monitoring:

In general, commenters requested compliance monitoring, continuous emissions monitoring and ambient monitoring for all pollutants.

- *One of the most glaring problems with the current permits are that the only scrubber is for sulfur dioxide. Although this scrubber will reduce SO₂ and may reduce some particulates and other exhaust gases, it is grossly inadequate for serious reductions in heavy metal emissions. There is no reason that Duke Energy can't be required to have better technologies to reduce the heavy metals in the stack emissions. Because of the legacy of toxic air releases, the proposed STAR plants need to go above and beyond the minimal required regulations for air emissions.*
- *Duke Energy has history of lying and Clean Air Act violations, and DAQ should not rely on their monitoring alone without oversight (i.e. mobile lab that moves between sites).*
- *The application indicates that the stack has monitors for emissions, but not all of the toxic metal emissions will be monitored. It is also unclear whether the emissions records from the stacks will be available to NCDEQ.*
- *Regarding visible emissions monitoring, Duke Energy proposes to observe the STAR reactor once a month and all other sources of emissions every 6 months. Given that visible emissions will likely vary from hour to hour, day to day, week to week, depending on the processes that are active at any time, weather conditions, etc., it seems that much more rigorous monitoring is needed.*
- *Unknown amounts of unidentified hazardous waste may have been disposed along with the coal ash in the waste ponds. The potential damage from these co-contaminants poses unknown health risk factors. To verify that little to no exceedances beyond the standard limits requires a continuous air monitoring system.*
- *A mobile air quality monitoring lab should be employed to supplement data from stationary air monitors.*
- *Please install a new air monitor, appropriately located close to the STAR site and down wind, that is part of the State maintained ambient air network.*
- *This type of facility is new to North Carolina, yet the DAQ is not requiring a continuous emissions monitor (CEMS) or ambient monitoring for heavy metals and other contaminants...To ensure compliance, it is essential that the agency require continuous monitoring of this facility.*

Hearing Officer's Response to These Comments:

- Fly ash from the proposed Cape Fear STAR® Facility contains trace concentrations of heavy metals. Particulate matter (PM) emitted in the processing of fly ash will contain trace amounts of heavy metals. These particulate emissions (including heavy metals) from most of the sources at this facility will be controlled by bag filters and bin vent filters with control efficiencies of at least 99%. Facility-wide estimated heavy metal emissions are based on particulate matter emission rates in conjunction with the site-specific coal ash metals analysis (trace metal concentrations in the coal ash). The proposed Cape Fear STAR® Facility's compliance with the heavy metal toxic air pollutant (TAP) emission limits and Toxic Permit Emission Rates (TPERs) will be verified, by DAQ, using the results of particulate matter emissions testing on the STAR® reactor and one of the external heat exchangers.

[NOTE: Based on comments received and recommendations made in the hearing officer's report from the Duke Progress Energy, LLC – H.F. Lee Steam Electric Plant STAR® facility public hearing, Duke Energy Progress, LLC re-analyzed the Cape Fear site coal ash to determine concentrations of heavy metals, using a more appropriate methodology, and submitted an updated site-specific coal-ash metals analysis and revised air modeling analysis on 9 November 2018.]

A continuous emissions monitoring system (CEMS) for sulfur dioxide (SO₂) and carbon dioxide (CO₂) will be installed on the STAR® reactor. By continuously monitoring SO₂ emissions, the Cape Fear STAR® Facility will ensure compliance with the SO₂ emission standard. NO_x emissions testing will be conducted on the STAR® reactor to verify emission rates submitted in the permit application. Results of all testing are submitted to the DAQ for review and approval. PM emissions from the STAR® reactor and external heat exchangers will be controlled by fabric filters with monthly visual and parametric monitoring and annual internal inspection & maintenance (I&M) required. Bin vent filters will be installed on storage silos & domes and on the ball mill classifier with monthly visual monitoring and periodic I&M required. Results of all monitoring and I&M are required to be made available for DAQ review. PM emissions testing is required on the STAR® reactor and one of the external heat exchangers to verify compliance with applicable PM emission standards. Results of all testing are submitted to DAQ for review and approval.

Monthly visible emissions observations will also be required for the majority of the new equipment to ensure proper operation and compliance with the opacity standard. The proposed Cape Fear STAR® Facility is required to be in compliance with the opacity standard at all times, irrespective of the monitoring frequency. If monthly monitoring is determined to be inadequate, in the future, DAQ may modify the permit to require an increased monitoring frequency. Any time the margin of compliance with a standard/limit is narrow DAQ may require additional testing, monitoring, addition of controls, etc., by the facility.

Additionally, the STAR® reactor at the H. F. Lee facility will be tested for CO and VOC emissions within 90 days of initial start-up. The data from those tests can be evaluated in conjunction with testing already conducted at other STAR® facilities and used to verify/confirm CO and VOC emission estimates for the proposed Cape Fear STAR® Facility.

- The proposed Cape Fear STAR® Facility is anticipated to be in compliance with all applicable federal and state air quality regulations, which are designed to protect the ambient air with respect to toxic and criteria air pollutants, provided that the specific conditions included in the draft air quality permit are met. These conditions require continuous emissions monitoring, compliance monitoring, recordkeeping,

reporting and compliance stack testing. Based on monitoring and testing required in the draft permit, additional ambient monitoring is not required.

In addition to the above, based on my review I am recommending the permit include a requirement for the Cape Fear STAR® Facility to submit semi-annual reports of actual monthly and rolling 12-month total SO₂ emissions, based on CEMS data. Additionally, I am recommending that the permit include 15A NCAC 02D .0611 “Monitoring Emissions,” permit condition which should establish the inspection, maintenance and recordkeeping requirements for the dry Flue Gas Desulfurization scrubber installed on the STAR® reactor.

Comment Category #3: Reevaluate the Commercial and Industrial Solid Waste Incineration Units (CISWI) / Non Hazardous Secondary Material (NHSM) Determination:

- *...This facility is not being permitted under CISWI because the Division of Air Quality (DAQ) granted the SEFA group a “Non-Hazardous Secondary Material” (NHSM) designation for their STAR process, and considers it recycling. Of interest, the DEQ notes that NHSM waste combusted is “generally a byproduct of manufacturing.” The coal ash proposed for incineration is not a “byproduct of manufacturing.” It is a solid waste as defined by federal law. Clearly, the impoundments from which the ash will be excavated were intended as disposal.*

Hearing Officer's Response to This Comment:

The DAQ CISWI/NHSM determination appears well-researched and its conclusions sound. See the permit review for more information. Specifically, the permit review states:

In June 2015, the DAQ determined STAR reactors, such as the one to be built at Cape Fear, would not be subject to CISWI. The fly ash from a coal-fired power plant's particulate collection infrastructure as well as fly ash received from coal ash landfills or ponds, when used as an ingredient product in the reactor in accordance with 40 CFR 241.3(b)(4), is considered a non-hazardous secondary material (NHSM) and not a solid waste.

I do not recommend any changes to the air permit regarding this issue.

Comment Category #4: Concern Regarding Coal Ash from Off-Site:

- Is Duke Progress Energy, LLC going to bring coal ash from any other location to the Cape Fear site?
- Is DAQ going to keep track of where the coal ash comes from?

Hearing Officer's Response to These Comments:

Bringing in coal-ash from off-site may affect regulatory determinations regarding certain applicable rules such as Prevention of Significant Deterioration (PSD). Note, coal ash is already prohibited from being brought in from off-site by the NC Coal Ash Management Act §130A-309.216 *Ash beneficiation projects* as follows:

(a) On or before January 1, 2017, an impoundment owner shall (i) identify, at a minimum, impoundments at two sites located within the State with ash stored in the impoundments on that date

that is suitable for processing for cementitious purposes and (ii) enter into a binding agreement for the installation and operation of an ash beneficiation project at each site capable of annually processing 300,000 tons of ash to specifications appropriate for cementitious products, with all ash processed to be removed from the impoundment(s) located at the sites.

I do not recommend any changes to the air permit regarding this issue.

Comment Category #5 Coal Ash Contaminated with PCBs:

- *Coal ash can be contaminated with other substances, such as polychlorinated biphenyls (PCBs). PCBs can form when coal is burned with other waste, or can be present when PCBs have been disposed of improperly at electric generating plants—ending up in the ash.*

Hearing Officer's Response to This Comment:

Ann Quillian, of Duke Energy, stated that in October 2018, Duke Energy analyzed 31 coal ash samples taken at the Cape Fear site using EPA Method 8082A: Polychlorinated Biphenyls (PCBs) by Gas Chromatography. Twenty-nine (29) of the samples were non-detect, and two (2) samples were above the detection limit. Results for the samples above the detection limit were 0.017 ppm and 0.029 ppm.

PCBs are characterized as having high thermal and chemical resistance. This means that they do not readily break down when exposed to heat or chemical treatment. Effective destruction of PCBs via incineration requires high temperatures, at least 1000°C (1832°F). The Cape Fear STAR® Facility reactor will reach temperatures of approximately 1400°F; therefore, if PCBs exist in the coal ash at the Cape Fear STAR® Facility they are expected to remain in the fly ash final product and any emissions will be controlled as particulate matter emissions via the bag filters. The worst-case, most conservative, estimation of potential emissions of PCBs in a year from the proposed Cape Fear STAR® Facility, assuming 400,000 tons/year of fly ash processed all at the highest concentration of 0.029 ppm, would be approximately 0.023 lb/year. The Toxic Permitting Emission Rate (TPER) listed in 15A NCAC 02Q .0711 for PCBs is 5.6 lb/yr for an obstructed stack.

I do not recommend any changes to the air permit regarding this issue.

Comment Category #6: Environmental Justice (EJ):

Comments received were generally regarding the need for a cumulative impacts analysis of the Moncure community.

- *DEQ is required to do an environmental justice study. The so-called study is a farce. Air pollution, which is the worst of what this STAR plant which re-burns coal does, doesn't stay within one and one half miles. Air moves. Remember wind? And then the low-income and minority residents of the Moncure area live mostly along the truck and train routes that carry coal ash, to Brickhaven, and with the STAR plant, away from the Cape Fear site. You want to give us justice? Then stop killing us off. That's the first step.*
- *The Department of Environmental Quality (DEQ), including its Divisions, must make environmental justice (EJ) a priority, not simply a box to check or a public relations exercise. It is helpful that the*

Division prepared an EJ snapshot of the Moncure community. However, it is disappointing that the full environmental justice analysis for this facility was not completed in time to give the impacted community an opportunity to review it before the public hearing was held and the close of the comment period. The "Snapshot" is silent regarding existing polluting industry near the proposed activity. For example, the Brickhaven coal ash landfill is located approximately 2 miles from the Cape Fear plant. US EPA's EJ SCREEN tool reveals ~5 facilities reporting to the Toxic Release Inventory (TRI) within 2 miles of the Cape Fear plant¹. In order to identify any disproportionate impacts on the surrounding community it is incumbent upon DAQ to assess what the addition of emissions from the STAR facility to existing air emissions (including those not reporting to EPA) will have on the community, and to consider other permitted sites (such as the Brickhaven coal ash landfill).

- *Before going forward, please investigate the current disproportionate burden of pollution already faced by this community. And please address the additional pollution this would add to the cumulative impacts on this community.*

Hearing Officer's Response to These Comments:

While Environmental Justice reports are not required for all permit applications, DEQ is committed to going above what the law requires to identify any potential communities of concern. Based on the air modeling for this type of facility, DEQ applied a 1.5-mile radius to broaden the area of study for potentially impacted communities, which is much broader than the identified radius of maximum impact. Based on the available data for race, ethnicity and poverty, DEQ EJ staff found the data for the area are similar to or better than the state average. However, in the preparation of the full EJ Report additional areas will be considered as well as an identification and investigation of the truck and train routes.

A full EJ report is typically finalized and released as a work product at the end of the permitting process because public comments are incorporated to address any additional concerns received by DEQ. The EJ Snapshot was released at the beginning of the public comment period so that the public could review initial results and comment on the Snapshot regarding additions they wish to see addressed in the full EJ Report. The full EJ report will include other industrial facilities present nearby and EJ staff will look into the EJSCREEN TRI results. EJ staff will also consider including nearby industries when conducting Snapshots moving forward.

Acceptable Ambient Levels (AALs) are generally set for sensitive populations such as children and not just healthy adults. DAQ reviewed the site-specific air dispersion modeling analysis for the proposed Cape Fear STAR® Facility and determined that it demonstrates that the proposed facility would not cause an exceedance of 15A NCAC 02D .1100 AALs for any toxic air pollutant (TAP) beyond the facility's property boundaries.

I do not recommend any changes to the air permit regarding this issue.

Comment Category #7: Other Comments and Alternative Options:

- How long is this reactor expected to be in service?
- Are the carbon dioxide (CO₂) emissions from this plant, comparatively speaking, small or large?
- Concerns about greenhouse gas emissions and Duke Energy's claims that the CO₂ produced will be offset by the reduction in CO₂ emissions from the concrete industry.
- *This is not doing much to help our State in the spirit of Executive Order 80.*

- *There are known technologies that can create strong, extremely durable, water resistant, saltwater resistant, flame resistant, excellent insulators – without burning of coal ash.*
- *Coal ash contains varying amounts of Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM).*
- *Coal ash should be isolated from the environment and stored above-ground on utility property.*
- Concerns about land values and noise pollution.
- Is there going to be a study on the finished product (concrete that contains the processed fly ash) to determine exposure over the years?
- Objection to calling this process “coal ash beneficiation,” instead it could be called a coal ash incinerator.

Hearing Officer's Response to These Comments:

- According to Duke Energy Progress, LLC, the Cape Fear STAR® Facility is expected to be operated until all the ash has been processed or until the year 2029, which is the basin closure deadline set out in the Coal Ash Management Act.
- Duke Energy Progress, LLC projects approximately 155,000 tons of CO₂e emissions (sum of Greenhouse Gas emissions calculated as CO₂ equivalent), annually, from the proposed Cape Fear STAR® Facility. The table below depicts a general comparison of annual, potential CO₂e emissions from other sources and industries as follows:

Type of Source/Industry	Potential CO ₂ e Emissions (tons/year)*
Large Coal-fired Power Plant (25,000 mmBtu/hr combined heat input)	22,500,000 tons/yr
Large Gas-fired Turbine Plant (15,000 mmBtu/hr combined heat input)	7,600,000 tons/yr
Large Biomass-fired Boiler (250 mmBtu/hr heat input)	229,000 tons/yr
Large Coal-fired Boiler (250 mmBtu/hr heat input)	225,000 tons/yr
Large Fuel Oil-fired Boiler (250 mmBtu/hr heat input)	179,000 tons/yr
Cape Fear STAR Facility	155,000 tons/yr (Projected)
Large Gas-fired Boiler (250 mmBtu/hr heat input)	128,000 tons/yr
Medium Biomass-fired Boiler (100 mmBtu/hr heat input)	91,000 tons/yr
Medium Coal-fired Boiler (100 mmBtu/hr heat input)	90,000 tons/yr
Medium Fuel Oil-fired Boiler (100 mmBtu/hr heat input)	71,000 tons/yr
Medium Gas-fired Boiler (100 mmBtu/hr heat input)	51,000 tons/yr

*These are general emission estimates not site-specific, as many variables affect emissions from each source/industry type

- The cement industry acknowledges that the manufacture of Portland cement emits approximately one ton of CO₂ for every ton of Portland cement produced. Therefore, for each ton of fly ash used in place of traditional cement a reduction of slightly less than one ton of CO₂ is achieved. A STAR® facility producing 300,000 tons per year of product will presumably displace 300,000 tons per year of Portland cement in concrete and thereby prevent the generation of approximately 300,000 tons of CO₂ during the cement manufacturing. The Cape Fear STAR facility will potentially emit 155,000 tons of CO₂ per year while producing up to 400,000 tons of fly ash. Additional information is available in Background Document for Life-Cycle Greenhouse Gas Emission Factors for Fly Ash Used as a Cement Replacement in Concrete, EPA 530-R-03-016, November 7, 2003.
- Governor Cooper's Executive Order 80 sets emission reduction goals for the state of North Carolina to strive to achieve. Those goals include a reduction in statewide greenhouse gas emissions of 40% below 2005 levels, an increase in zero emission vehicles, and energy consumption reductions in state owned buildings of 40% from 2002-2003 levels. The NC Climate Change Interagency Council is charged with developing holistic approaches and programs so that North Carolina can strive to accomplish all the goals in Executive Order 80 while ensuring that North Carolina's vibrant economy continues to expand. A specific directive of the council is the development of a North Carolina Clean Energy Plan by October 2019 that will seek stakeholder input in the expansion of clean energy technologies, energy efficiency measures, and clean transportation solutions. A key outcome from this process is the level of greenhouse gas emissions expected under current conditions and reductions achievable under alternative future scenarios with recommended policy, administrative, and voluntary actions taken by public and private entities. Until such time when legislative or regulatory proposals are considered and acted upon, projects such as this proposed facility must be evaluated based on the current state and federal rules and regulations in place. DAQ will continue to develop an emissions inventory of key sources and monitor the effects of large projects on projected emissions levels.
- There were several requests for disposing of the ash by alternative means. NCGS 130A-309.216 *Ash Beneficiation Projects* mandates three sites in North Carolina for coal ash to be processed for cementitious purposes.

I do not recommend any changes to the air permit regarding these issues.

While most of the remaining comments received were thoughtful and worth considering in the proper forum, many of the comments received were not directly related to the proposed Cape Fear STAR® Facility air quality permit application or the air quality permitting process. As such, these comments fall outside the purview of this public hearing and are therefore not directly addressed in this report.

Conclusions and Recommendations

North Carolina General Statute 143.215.108(c)(5a)b requires that an applicant satisfies to the Department that it "has substantially complied with the air quality and emission control standards applicable to any activity in which the applicant has previously engaged, and has been in substantial compliance with federal and state laws, regulations, and rules for the protection of the environment." The proposed Duke Energy Progress LLC – Cape Fear STAR® Facility is a new facility, having no previous permit with the DAQ and therefore no compliance history.

After considering all the public comments addressing whether or not DAQ should issue an air quality permit for the proposed Duke Energy Progress LLC – Cape Fear STAR® Facility to allow the construction and operation of a STAR® plant on C P and L Road in Moncure, NC, it is the recommendation of the hearing officer that the Director issue the Air Quality permit after considering the following recommendations:

Additions to the draft air permit:

- (a) The air permit should include semi-annual reporting of monthly and 12-month rolling total emissions of SO₂ based on CEMS data.
- (b) 15A NCAC 02D .0611 should be included to establish required inspection, maintenance, and recordkeeping required for the dry Flue Gas Desulfurization scrubber installed on the STAR® reactor.

Additionally, I recommend DAQ staff remain sensitive to the health of the nearby communities and to the concerns that will remain should the STAR® plant begin operation. This can be accomplished through thorough frequent inspections and prompt responses to the citizen's air quality concerns and complaints.



Heather S. Carter, CPM, Hearing Officer

June 04, 2019
Date

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Public Hearing April 23, 2019
Chatham County Agriculture & Conference Center
Pittsboro, NC**

SUPPORTING DOCUMENTATION

Permit Application Review
Draft Permit
Notice of Public Hearing
Public Hearing Attendance Forms
Nine E-mailed Public Comments
One Hardcopy/Paper Public Comment
Environmental Justice Final Report
Audio of Public Hearing Comments