ENVIRONMENTAL MANAGEMENT COMMISSION
AIR QUALITY COMMITTEE MEETING SUMMARY
March 7, 2018
Archdale Building-Ground Floor Hearing Room
11:00 AM - 12:00 PM

MEETING BRIEF

During their March 7, 2018 meeting, the Air Quality Committee (AQC) of the Environmental Management Commission (EMC):

- Heard a concept from Division of Air Quality's (DAQ) staff on upcoming rulemaking to readopt H74 Group 5 air quality rules.
- Received an update on GenX emissions and other emerging contaminants in North Carolina.
- Provided comments for DAQ staff to consider as they continue to study and monitor GenX and other emerging contaminants in North Carolina.

AQC MEMBERS IN ATTENDANCE

Dr. Stan Meiburg, AQC Chairman;
Mr. Charles S. Carter, AQC Vice Chair;
Mr. Gerard Carroll;
Ms. Marion Deerhake; and
Dr. Suzanne Lazorick

OTHERS IN ATTENDANCE

Mr. Steve Keen, EMC;
Mr. William "Bill" Puette, EMC;
Dr. Albert R. Rubin, EMC;
Mr. John D. "JD" Solomon, EMC Chair;
Mr. Philip Reynolds, EMC Counsel;
Mr. Mike Abraczinskas, Division of Air Quality Director;
Mr. Michael Pjetraj, Division of Air Quality Deputy Director;
DAQ Staff; and
Members of the public

PRELIMINARY ITEMS

Agenda Item #1, Call to Order and the State Government Ethics Act, N.C.G.S. §138A-15(e)
Chairman Meiburg called the meeting to order and inquired, per General Statute §138A-15(e), as to whether any committee member knows of any known conflict of interest or appearance of conflict with respect to matters before the Environmental Management Commission's Air Quality Committee. No conflicts were identified.

Agenda Item #2, Review and Approval of the November 8, 2017 and February 7, 2018 Meeting Minutes
Chairman Meiburg inquired if everyone had been able to review the minutes from the November meeting and if there were any changes or corrections. No changes were cited. Chairman Meiburg asked for a motion to approve

the November 8, 2017 minutes. Commissioner Deerhake made a motion to approve the minutes and Commissioner Lazorick seconded. The November minutes were unanimously approved.
Chairman Meiburg also inquired if everyone had been able to review the minutes from the February special meeting and if there were any changes or corrections. He noted that Commissioner Carroll's name contained typographical errors in a couple places; specifically, spelling "Carrol" instead of "Carroll". Next, page eight contains a typographical error; specifically, spelling "did no hear anything" instead of "did not hear anything". Chairman Meiburg asked for a motion to approve the February 7, 2018 minutes with the requested changes. Commissioner Deerhake made a motion to approve the minutes and Commissioner Carroll seconded. The February minutes were unanimously approved.

Chairman Meiburg commended DAQ staff for providing well-written and detailed meeting minutes for the November and February meetings.

RULEMAKING CONCEPTS

Agenda Item #3, Proposed Rule Revisions and Session Law 2013-413 (H74) Readoption of Group 5 Air Quality Rules 15A NCAC 02D .0600, .2100, .2300, and .2600 (547) (Joelle Burleson, DAQ)

Description:
Ms. Burleson stated that the DAQ is currently working on the fifth group of air quality rules to be considered for readoption. Group 5 contains 15A NCAC 02D Section .0600, *Monitoring: Recordkeeping: Reporting*, Section .2100, *Risk Management Program*, Section .2600, *Source Testing*, and Section .2300, *Banking Emission Reduction Credits*.

Anticipated changes for the Group 5 package include administrative updates such as updating website addresses, updating regulatory references, any needed updates to reflect the current electronic nature of business, updating rule formatting for consistency with current publication requirements. Other changes may include updating text to reflect North Carolina's current attainment status relevant to national ambient air quality standards where referenced. Also, the DAQ is researching whether any existing language needs to be clarified or updated for approvability based on agency experience with review of rules by the Rules Review Commission and its staff.

The stakeholder process is scheduled to start in the coming weeks, and the DAQ plans bring draft rules to the AQC by fall of 2018. Additional amendments may be identified as stakeholder input continues. Amendments to some rules in the identified sections may be delayed until a later group depending on the nature of analysis needed, the nature of comments received and associated time needed to address them as well as other factors such as subject matter related litigation at the State or federal level or issuance of new related federal or State legislative requirements.

Discussion:
Chairman Meiburg asked if there were any questions. No questions were identified.

Motion:
No motion required.

DRAFT RULES

None.

INFORMATIONAL ITEMS

Agenda Item #5, Update on GenX Air Emissions from Chemours Facility (Michael Abraczinskas and

Michael Pjetraj, DAQ)
Director Abraczinskas presented the update for emerging contaminants in air emissions. An emerging contaminant is a compound that does not have a specific limit in environmental regulations. There is little to no information about how the compounds behave in the natural environment and their potential health effects. This creates a significant challenge for regulatory agencies; specifically, how to prioritize compounds without regulations, where to expend resources for research, how to minimize adverse impacts, and communicate issues.

Emerging contaminants became an issue in North Carolina due to the following: 1) Environmental Protection Agency (EPA) water monitoring in 2013-2015 via the Third Unregulated Contaminant Monitoring Rule (UCMR) for 28 chemicals; 2) a 2014-2016 North Carolina State University (NCSU) and EPA study of Perfluorooctanoic Acid (PFOA), Perfluorooctane Sulfonate (PFOS), and other per- and poly-fluorinated chemicals in the Cape Fear River; 3) the Department of Environmental Quality (DEQ) 2014-2016 study on 1,4-dioxane in the Cape Fear River; 4) the EPA National Exposure Research Laboratory (NERL) report findings in 2015; and 5) research findings published in November 2016 on PFOA/PFOS, GenX and other related chemicals attributed to the Chemours facility south of Fayetteville, North Carolina. It is important to note that analytical techniques and lab capabilities significantly advanced during this timeframe; especially for measuring small concentrations of these chemicals.

GenX, also termed C3 dimer acid, is the trade name for an unregulated anthropogenic chemical used to manufacture nonstick coatings. The Fayetteville Chemours facility began producing GenX commercially in 2009 to replace PFOA. The same chemical is also produced as a byproduct during other manufacturing processes at the facility and may have been present in the environment prior to 2009.

What can we do about it? If there are not national regulatory standards developed by EPA, State standards adopted by the EMC, national health advisories or other health values, or guidance from various states or countries, North Carolina can consider establishing a state-specific health goal. The North Carolina Department of Health and Human Services (DHHS) established a 140 ppt health goal for GenX in drinking water. The North Carolina Secretaries' Science Advisory Board (NCSAB) is reviewing all relevant information supporting the provisional health goal. There is also ongoing work for assessing inhalation risks, and as the NCSAB's work evolves, the DAQ will provide updates to the AQC.

Historically, the DuPont facility began chemical manufacturing in 1971 along the border of Cumberland and Bladen Counties. Around 1980, the facility began manufacturing products with fluorinated compounds. GenX manufacturing began after a 2009 Consent Agreement was signed by EPA and Dupont pursuant to the Toxic Substances Control Act (TSCA). It is important to note that GenX has been a byproduct of the vinyl ether production line for a significant amount of time. The facility later transitioned its site ownership to Chemours.

The emerging contaminant issue significantly evolved over the course of 2017. Surface water issues in the Cape Fear River Basin were the primary focus early to mid-2017, groundwater issues were discovered in the facility's test wells and in private drinking wells above the provisional health goal in mid-2017, and air emission contributions were discovered mid- to late-2017. As the information became apparent to DEQ, many questions arose pertaining to the issue. Upon further analysis, some of the sampled wells with GenX were upgradient from typical groundwater flows. This information was the beginning of an in-depth analysis from an air quality standpoint. The DAQ asked the company how they believed GenX appeared downwind in an air quality perspective, but upgradient from a water quality perspective. The company, along with the DAQ, speculated air deposition to be probable culprit for the contaminant appearing upgradient. The DAQ's preliminary check of Chemours' air emissions inventory did not show GenX; however, upon further investigation of supporting documentation of itemized volatile organic compound species, GenX emissions were listed in small quantities (pounds/year). The DAQ sent the Chemours plant a letter in September 2017 requesting additional information as to whether GenX and other emerging contaminants are currently, or have been emitted as an air contaminant since 2012.

Deputy Director Pjetraj presented the update for Chemours facility response and the DAQ's analysis since then. As noted before, the DAQ assessed the air emissions inventory to isolate the individual chemicals and compounds of concern. The Chemours facility reported estimated emissions to the DAQ based on the Advanced System for Process Engineering (ASPEN) chemical process model for the following contaminants of concern: 1) C3 dimer acid fluoride; 2) C3 dimer acid (GenX); and 3) C3 dimer acid ammonium salt. As they begin to analyze the fate of the air emissions, the DAQ first looked at some wind data, and then conducted some air dispersion modeling. The last 19 years of wind data from the Fayetteville Regional Airport summarizes that there are two predominant wind directions; from the southwest and from the northeast. With this information in hand, one would hypothesize that there would be maximum impacts from air emissions in these directions.

Air dispersion modeling for GenX compounds is being conducted to assess 2012-2016 air emissions via the ASPEN chemical process model. The fate of air contaminants emitted into the environment depends on several factors, but one of the most important factors is the source or stack release characteristics. After air contaminants are released to the atmosphere, their transport, dispersion, and transformation are governed by meteorological principles and many other physical and chemical processes.

To identify areas most likely to be impacted by the atmospheric deposition of GenX compounds from Chemours, the DAQ has conducted computer simulations for: 1) actual air emissions data over the identified 5-year period; 2) actual emission point information including stack dimensions, velocities, temperatures, base elevations, and associated configurations; and 3) actual hourly meteorology over the identified 5-year period. The DAQ is also assessing the ultimate course for emerging contaminants emitted into the atmosphere and the possible effects on surface water and groundwater.

The air dispersion modeling provides information that helps the DAQ identify areas that were must likely impacted by the deposition of air contaminants in the past five years. The results show that the maximum impact is to the northeast and southwest which is consistent with the predominant wind directions. There are still many uncertainties including the magnitude of the actual emissions, the chemical and physical transformations of interest that were not accounted for in the modeling, and the deposition rates of the different forms of air contaminants. It is important to note that the modeling results do not showcase air concentration levels, risks associated with inhalation, or showcase quantification of compounds deposited for an area. The Division of Waste Management conducted residential groundwater samples in the immediate vicinity surrounding the Chemours facility. The results of their sampling match the air deposition model output.

Stack testing will be utilized to capture and quantify specific pollutants emitted into the atmosphere from a process through the stack. Chemours submitted a protocol to define which sources will be tested and a test method for the targeted contaminants. The DAQ required the Chemours facility to target multiple pollutants such as GenX, Nafion byproducts 1 and 2, hexafluoropropylene oxide (HFPO), and E1. None of the contaminants mentioned have an EPA method for measuring and quantifying the chemicals. Chemours is developing a test methodology based on EPA test methodologies with a few changes. The methodologies depend on the type of material being sampled and have quality assurance protocols.

The fluoromonomer, Nafion, and polymer processing aid (PPA) processes will be stack tested for the GenX contaminant. Test locations will include the Division, VE south scrubber, and the PPA stacks. Shake-down testing began January 9th and 12th to ensure that the samplers could access the ports, that there was no cyclonic flow within the stacks, and that samples could be measured in a lab without contamination. Full scale testing began the week of January 22nd and split samples were submitted for independent assessment by EPA. The results of the full-scale testing are expected to be available early March. Additional testing began February 26th, but was only partially successful due to adverse weather events. Another round of testing will begin on March 19th. The purpose of this testing is to quantify GenX emissions from sources that the facility and DAQ believes

to be emitting GenX. Also, the testing will be conducted for sources that the facility and DAQ believes to not be emitting GenX. This methodology helps ensure that no sources of GenX emissions are missed.

To gather additional data on GenX emissions, the DAQ started collecting rainwater during recent heavy rain events. They purchased temporary rain collection equipment, followed standard lab protocols in preparation for sampling, and gained authority to ship the rain samples to a qualified lab for analytical analysis. The samples were split and the second sample was sent to EPA for a full PFAS analysis. The January 28th and 29th rainwater sample had GenX values ranging from a non-detect to 630 ppt, while the February 4th and 5th rain event had values in all areas ranging from 9.98 ppt to 286 ppt. It is important to note that the DAQ set out a "control" container in Raleigh for the January rain events that resulted in a non-detect. The closest sampler from the Chemours plant was 0.9 miles and the furthest sample was collected 2.9 miles from the plant.

There are plans to establish a network of wet deposition monitors. The Chemours facility was required by the State to purchase rain samplers that will be turned over to the DAQ for deployment near-field to the facility. The DAQ plans to deploy four source-oriented monitors; two sets northeast and two sets southwest of the facility. This methodology for GenX will quantify near-field deposition rates, confirm cause/effect relationships, and quantify "background" concentrations of PFAS in rainwater. It is important to note that background sites in Asheville, Raleigh, Candor, and Wilmington will also be monitored for the contaminants.

Samples from the National Atmospheric Deposition Program (NADP) in North Carolina will be sent to an EPA lab for analysis of PFAS. Samples from the Clinton Crops site in Sampson County and the Jordan Creek site in Scotland County will contain specimens from December through February.

The DAQ is exploring and studying all options for control technologies that will eliminate or significantly reduce the air emissions of interest. It is important understand the secondary impacts of adding such control equipment to reduce PFAS. The DAQ will assess whether solid waste, waste water, and secondary air pollutants are generated as byproducts from the controls. A trial carbon adsorption technology was approved for two processes at the Chemours facility on February 9, 2018. Installation and operation will take over the next three to six months and the DAQ will oversee that it is completed expeditiously.

What is next? The DAQ is looking beyond GenX and what possible needs must be fulfilled. It is important to ask whether appropriate field and lab equipment is utilized, how to prioritize species of volatile organic compounds, and if an emissions inventory shows emissions of other PFAS.

Discussion:
EMC Chairman Solomon asked whether the ASPEN model was industry-standard software and if the Chemours facility was reporting emissions to the DAQ since 2012. Deputy Director Pjetraj affirmed it is industry-standard software and that the facility has been reporting emissions since 2012. AQC Chairman Meiburg asked for clarification regarding the emissions of interest; specifically, whether they were generated before the DAQ asked for the facility's data. Also, it was originally assumed that the emissions were reported as volatile organic compounds. Director Abraczinskas specified that the DAQ assessed the historical documentation since 2010 and found that the facility had specifically listed C3 dimer acid fluoride, C3 dimer acid (GenX), and C3 dimer acid ammonium salt emissions. AQC Chairman Meiburg noted that process changes pursuant to the Consent Agreement assisted the facility to give up the use of other perfluorinated compounds. Director Abraczinskas stated the reason why the DAQ asked for data that was already available was to ensure accuracy and to ask for a broader suite of emerging contaminants. EMC Chairman Solomon specified that his main point was in the facility's normal monitoring, they were providing this information based on their data collection from an industry-standard model. AQC Chairman Meiburg noted that the emissions of emerging contaminants should not to be read as direct measurements; however, it is a reconstruction of what fraction of volatile organic compounds were in the contaminants of interest by using the ASPEN model.

EMC Commissioner Rubin asked whether the DAQ only considered stacks from the GenX facility or all stacks from adjacent facilities including vinyl ethers for calculating emissions. Deputy Director Pjetraj noted that there are three primary locations that the DAQ is focused on. They are 1) vinyl ethers north; 2) vinyl ethers south; and 3) the polymer processing aid (PPA) processes. The DAQ also has emission estimates for all the stacks of interest, but the DAQ will require source testing to verify the actual emissions.

AQC Chairman Meiburg asked whether there is understanding on how the emerging compounds behave in the atmosphere and what transformation byproduct they form. Deputy Director Pjetraj stated that there is uncertainty at this point since there are many factors to consider. Most of the stacks that the emissions come from are controlled with scrubbers, so it may be in particulate, vapor, and/or mist forms. C3 dimer acid fluoride has the potential to hydrolyze and rapidly convert into GenX. The DAQ received information that humidity can impact the hydrolyzation of the compound into GenX. AQC Chairman Meiburg asked for Deputy Director Pjetraj to correct the following statement, if incorrect: the GenX compounds reported in the emission inventories appear to be small; but the larger amount of the C3 dimer acid fluoride compound hydrolyzes in the atmosphere and converts into GenX material. Deputy Director Pjetraj affirmed that was the case. Director Abraczinskas noted that the DAQ has been in contact with EPA and various researchers regarding transformation timeframe uncertainties. AQC Chairman Meiburg noted that airborne transport of perfluorinated compounds is new territory since they usually require direct exposure through a medium. Director Abraczinskas stated that there are a few studies on the deposition of PFOA, but it appears that current data appears to be a first of its kind.

EMC Chairman Solomon asked whether there was a precedent for the levels/concentrations the State is assessing. Director Abraczinskas specified that the State is on a different scale for the emerging contaminants; however, the emissions that Deputy Director Pjetraj presented are uncertain and there are no measurements to support the numbers. EMC Chairman Solomon noted that the models are on a different scale than what they are typically predicting and wanted to know if the models account for that. Director Abraczinskas specified that the models are only utilized to understand areas of potential maximum impact of air deposition. EMC Chairman Solomon wanted to know how the model is accounting for outliers when mapping atmospheric deposition. AQC Chairman Meiburg stated that quantitative measurements in parts per trillion of perfluorinated compounds have made significant advancements in recent years. There is some confidence in the community for concentrations in the tens of parts per trillion; however, caution must be used when the detection limit is close to zero. It is also important to note that prudence must be utilized for sampling protocols.

AQC Chairman Meiburg asked whether the DAQ obtained Chemours facility operating/process data during the rainwater sampling timeframe. Deputy Director Pjetraj stated that the DAQ is currently collecting this information. There are many variables involved with the rainwater sampling including what processes are involved, changes in processes, how heavy the rain is falling, and which way the wind is blowing. AQC Chairman Meiburg noted that his point was to showcase that even after all the data is collected, there are many variables to consider and the answer will not rapidly appear from this sampling process.

Commissioner Carroll asked where the red circled “630 ppt” value came from for rainwater GenX values. Deputy Director Pjetraj stated that the value was from the January 28th and 29th rain event.

Commissioner Deerhake thanked staff for their efforts and asked which dispersion model is being utilized for modeling emissions of contaminants. Deputy Director Pjetraj specified that the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) is the model of choice. Commissioner Deerhake asked whether the DAQ considered utilizing Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) for source attribution modeling. Director Abraczinskas noted that AERMOD was utilized in preliminary air dispersion modeling and HYSPLIT for hourly data. Commissioner Deerhake stated that she has had experience with HYSPLIT in the past and that it is a back-calculation model developed by the National Oceanic and Atmospheric Association (NOAA) for using meteorological data to find the source of problems. Commissioner Deerhake asked whether there was information about dry deposition in the presentation. Deputy

Director Pjetraj noted that the deposition model utilizes both wet and dry deposition for estimations. The HYSPLIT model also showcases wet and dry deposition for the area of interest. Commissioner Deerhake asked whether the model gave a distribution between wet and dry deposition to the extent that prompted efforts on rain monitoring. Deputy Director Pjetraj noted that that the DAQ will look more into that issue, but the purpose of the modeling runs was to anticipate concentrations in the environment. Rainwater appeared to be the best medium for measuring concentrations in ppt. Commissioner Deerhake asked if the DAQ had enough information to determine the distribution of human exposure between groundwater and atmospheric attributed exposures. Deputy Director Pjetraj noted that data is not currently available; however, it is inferred that contaminant concentrations upgradient of groundwater flows may be attributed to atmospheric deposition.

Commissioner Deerhake remarked that it is unfortunate that the emerging contaminant issue arose; however, it has raised awareness of atmospheric deposition of pollutants. It is an issue for which she has wanted to increase awareness over the years; specifically, nitrogen and ammonia deposition from animal feeding operations. It is important to understand the role of nitrogen deposition from nitrogen oxides or ammonia for nutrient impairments to the State from a water quality perspective. Conversations with Water Resources staff have indicated that the State is still not obtaining water quality goals for nitrogen despite apparent compliance with current rules. This emphasizes the need to factor atmospheric deposition to understand sources, research methods of reducing dispersion of deposition to waterways, and the possible implications of human and ecological exposure. EMC Chairman Solomon asked what species of nitrogen would be the focus of the deposition analysis. Commissioner Deerhake specified that the species of interest are nitrogen oxides, ammonia, and ammonium. It is also important to note that ammonia is a precursor for fine particulates in the atmosphere. Ammonia is not a criteria pollutant; however, this does not indicate that North Carolina cannot research what role it has in deposition. The purpose of these statements is to note that there is a great opportunity to integrate air quality monitoring for the nitrogen species of interest while monitoring for GenX. Commissioner Rubin noted that air quality monitoring for nitrogen species and ammonia potentially impacting water quality could occur at the control sites in Asheville, Raleigh, Candor, and Wilmington. Commissioner Deerhake stated that analyzing nitrogen species would likely cost less compared to the GenX analysis.

Commissioner Lazorick asked what it meant that the DAQ must gain authority to ship samples for GenX. Director Abraczinskas stated that it is an internal process to initiate the lab analysis.

MARCH EMC AGENDA ITEMS

***Agenda Item #6, Petition for Rulemaking to Limit North Carolina's Carbon Dioxide Emissions to Protect a Stable Climate System and Preserve the Natural Resources of North Carolina (EMC Chairman Solomon and AQC Chairman Meiburg)**

Chairman Meiburg stated that the Committee may choose to wait to hear the agenda items containing an asterisk (*) during the full Commission. The Committee affirmed to hear the asterisked items during the full Commission meeting the following day.

INFORMATION ITEMS

Agenda Item #10, Director's Remarks
Director Abraczinskas thanked DAQ and Rules Review Commission staff for their efforts on 93+ pages of technical corrections for Group 2 rules. He also thanked staff involved in the GenX project.

MEETING ADJOURNMENT

Chairman Meiburg asked for additional questions or comments, and upon hearing none, noted that the next meeting of the AQC would be May 9, 2018. Chairman Meiburg adjourned the meeting.