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DEPARTMENT OF NATURAL RESOURCES
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November 28, 2016

Ms. Gina McCarthy, Administrator
United States Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 1101A
Washington, DC 20460

Dear Administrator McCarthy:

By this letter, the State of Delaware hereby petitions the Administrator of the Environmental Protection Agency (EPA) under §126(b) of the Clean Air Act (CAA) to find that the Conemaugh Generating Station's electric generating units (EGUs), located in Indiana County, Pennsylvania, are emitting air pollutants in violation of the provisions of Section 110(a)(2)(D)(i) of the CAA with respect to the 2008 0.075 ppm ozone NAAQS and the 2015 8-hour 0.070 ppm ozone NAAQS.

Section 110(a)(2)(D)(i) prohibits any source or other type of emissions activity within a State, "from emitting any air pollutant in amounts which will contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard." Section 126(b) of the CAA provides that, "[a]ny State or political subdivision may petition the Administrator for a finding that any major source or group of stationary sources emits or would emit any air pollutant in violation of the prohibition of Section 110(a)(2)(D)(ii) or this section."

I am aware of EPA efforts that are underway to address transported emissions, to include the recent finalization of the update to the Cross State Air Pollution Rule (CSAPR), planned future efforts beyond the CSAPR Update Rule that will be necessary to fully address interstate transport for the 2008 ozone NAAQS and for the recent 2015 ozone NAAQS, and federal Tier 3 vehicle emissions and fuel standards measures to reduce NOx emissions. While helpful, these efforts are not adequate to mitigate the impacts of upwind emissions on Delaware's air quality and are tangent to the CAA Section 126 process. EPA has effectively closed the door to CAA tools designed to bring clean air to Delaware by establishing nonattainment area boundaries that

effectively penalize areas like Delaware rather than apply the CAA to the emissions that cause our unhealthy air, by failing to act on a CAA 176 petition in the timing mandated by the CAA, by extending CAA attainment timeframes rather than bumping up areas and promulgating required federal implementation plans. From a downwind perspective, EPA has lost sight of the CAA mandate that requires attainment "as expeditiously as practicable and no later than...." CAA Section 126(b) requires that within 60 days after receipt of any petition and after public hearing, the Administrator shall make such a finding or deny the petition. We look forward to working with you and your staff during this period in which you make your finding regarding this petition and take the required actions to protect the health and welfare of Delaware's citizens. Please do not hesitate to contact me if you have any questions or need additional information regarding this petition.

Sincerely,

David S. Small
Secretary

CC: Jack Markell, Governor,
State of Delaware

Ali Mirzakhalili, Director
Department of Natural Resources and Environmental Control

Administrator Shawn M. Garvin
US EPA Region III Office

Krishnan Ramamurthy, Director
Pennsylvania Department of Environmental Protection

Attachment 1

Delaware CAA 126 Petition

Conemaugh Generating Station

The State of Delaware submits this petition for a finding under §126(b) of the Clean Air Act that the Conemaugh Generating Station's electric generating units (EGUs), located in Indiana County, Pennsylvania, significantly contribute to Delaware's non-attainment of the 2008 8-hour ozone national ambient air quality standard (NAAQS) of 0.075 ppm and the latest 8-hour ozone NAAQS of 0.070 ppm adopted by the United States Environmental Protection Agency (EPA) on October 26, 2015. *(1)*

Delaware has complied with the requirements of §110(a)(2)(D)(i)(I) of the CAA by adopting in-state control measures for the prevention of emissions that would significantly contribute to non-attainment, or interfere with maintenance, of the ozone National Ambient Air Quality Standard (NAAQS) in a downwind area. *(2)* However, Delaware's ability to achieve and maintain health-based air quality standards for its own residents is severely impacted by sources outside of the state of Delaware. This is due to the fact that more than 94% of the ozone levels in Delaware are created by the transport of air pollutants from upwind areas. Attainment and maintenance of the 2008 and 2015 8-hour ozone NAAQSs in Delaware is possible only through additional emission reductions in the upwind states that significantly contribute to non-attainment and maintenance in Delaware..

Section 126(b) of the CAA provides that, "[a]ny State or political subdivision may petition the Administrator for a finding that any major source or group of stationary sources emits or would emit any air pollutant in violation of the prohibition of Section 110(a)(2)(D)(i) or this section." In accordance with §126(b) of the Clean Air Act, the state of Delaware petitions the Administrator of the EPA establish a timely schedule for the above-referenced Conemaugh Generating Station electric generating facility and the state of Pennsylvania to put those entities in compliance with §110(a)(2)(D)(i) of the Clean Air Act with respect to the 2008 8-hour 0.075 ppm ozone NAAQS and 2015 8-hour 0.070 ppm ozone NAAQS. *(3)*

Background

The EPA began to address air quality issues related to ambient ozone through establishment of a related National Ambient Air Quality Standard in 1971. In 1997 the EPA first established the 8-hour ozone NAAQS to protect human health and welfare at a level of 0.08 ppm. The EPA

subsequently lowered the 8-hour ozone NAAQS to 0.075 ppm in 2008. After further evaluation, the EPA further lowered the 8-hour ozone standard to 0.070 ppm on October 26, 2015. *(1)*

The establishment of the short term ozone standard (8-hour NAAQS) was necessary to address the potential health impact of short term exposure to high levels of ozone. Short term exposure to ozone can cause rapid, shallow breathing and related airway irritation, coughing, wheezing, shortness of breath, and exacerbation of asthma, particularly in sensitive individuals and asthmatic children. Short term exposure also suppresses the immune system, decreasing the effectiveness of bodily defenses against bacterial infections. Research studies indicate that markers of cell damage increase with ozone exposure. Some studies suggest that there is a link between ozone exposure and premature death of adults and infant death. Other studies indicate a link between ozone and premature birth and adverse birth outcome, cardiovascular defects, and adverse changes in lung structure development in children. Children, the elderly, those with chronic lung disease, and asthmatics are especially susceptible to the pulmonary effects of ozone exposure. Additionally, studies have shown that ozone can adversely affects trees and vegetation, can cause reduced crop yields, and can contribute to nitrification of bodies of water.

Atmospheric ground level ozone that is harmful to human health and welfare is formed primarily by the chemical reaction of nitrogen oxides (NOx) with volatile organic compounds (VOC's) in the presence of heat and sunlight. Dry, hot, sunny days are most conducive to the formation of ozone. Because ground level ozone concentrations are highest when sunlight is the most intense, in the eastern United States the warm summer months (May 1 through September 30) are referred to as the ozone season. Weather also affects ozone concentrations and how quickly it is transported and dispersed. Periods of light winds allow ozone and ozone precursor pollutants to build up in any particular area leading to greater concentrations. However, the wind can also be responsible for transporting the ozone and ozone precursors over long distances downwind. This downwind pollutant transport can then combine with more local emissions to contribute to exceeding the ozone NAAQS in any particular location.

Delaware has experienced a number of exceedances of the health based 8-hr ozone NAAQS. *(4)* The following table identifies the number of 8-hour ozone NAAQS exceedances experienced in Delaware during the ozone seasons for the years 2000 through 2016:

Table 1
Actual Delaware Ozone Exceedances – 8-Hour NAAQS

	New Castle County - No. of Days of Exceedance	Kent County - No. of Days of Exceedance	Sussex County - No. of Days of Exceedance	Total No. of Days of Exceedance
2016 Ozone Season *#	10	2	3	11
2015 Ozone Season **	2	0	0	2
2014 Ozone Season **	3	0	0	3
2013 Ozone Season **	1	0	1	2
2012 Ozone Season **	13	14	12	19
2011 Ozone Season **	11	3	6	15
2010 Ozone Season **	14	5	9	18
2009 Ozone Season **	3	0	0	3
2008 Ozone Season **	9	8	8	14
2007 Ozone Season ***	5	0	0	5
2006 Ozone Season ***	2	4	3	6
2005 Ozone Season ***	8	2	8	16
2004 Ozone Season ***	3	0	2	5

*= 0.070 ppm Standard **= 0.075 ppm Standard ***= 0.08 ppm Standard
= Preliminary Data

On October 1, 2015, the EPA strengthened the 8-hour ozone NAAQS to 70 ppb based upon scientific evidence of ground level ozone's negative effect on public health and welfare. Relative to the 2008 8-hour ozone standard, the updated 8-hour ozone NAAQS is expected to further improve public health protection, particularly for at-risk groups, and also improve the health of trees, plants, and ecosystem. If the 2015 8-hour ozone standard of 70 ppb had been in effect for the past several years, based upon monitoring data, it is estimated that Delaware would have experienced a higher number of 8-hour ozone exceedances compared to the actual exceedances of the 2008 8-hour ozone standard of 75 ppb. The following table provides a comparison of the actual 8-hour ozone NAAQS exceedances and the estimated exceedance that would have occurred if the 70 ppb standard had been in effect:

Table 2
Comparison of Actual vs Estimated Days of Ozone Exceedance
2008 8-hour Ozone NAAQS vs 2015 8-hour Ozone NAAQS

Ozone Season	Actual Number of Days of 75 ppb Ozone Standard Exceedance	Actual Number of Monitor-Days of 75 ppb Ozone Standard Exceedance	Estimated Number of Days of Ozone Standard Exceedance Assuming 70 ppb Standard	Estimated Number of Monitor-Days of Ozone Standard Exceedance Assuming 70 ppb Standard
2010	18	28	36	91
2011	15	20	25	73
2012	19	39	28	107
2013	2	2	6	7
2014	3	3	8	17
2015	2	2	10	16
2016	6	17	11*	34*

*2015 8-hour ozone NAAQS limit of 70ppb in effect, actual exceedances shown (preliminary data)

It can be seen in the above table that if the more stringent 2015 8-hour ozone NAAQS of 70 ppb were in effect during the 2010 through 2015 ozone seasons that Delaware would have exceeded that standard at a much higher rate than it experienced under the 2008 8-hour ozone NAAQS of 75 ppb. As shown in the above table, for the 2010 through 2015 ozone season, the number of 8-hour ozone NAAQS exceedance day would increase from 59 days under the 2008 NAAQS to 113 days under the 2015 NAAQS.

As discussed earlier, NOx is a precursor pollutant to the formation of atmospheric ozone. NO_X is a generic term for a group of reactive gasses that are composed of nitrogen and various amounts of oxygen (including nitrogen oxide and nitrogen dioxide). NO_X is formed in the combustion process as a result of high temperature chemical reactions of the nitrogen contained in the fuel and the nitrogen contained in the ambient combustion air along with oxygen in the combustion air. Fossil fuel-fired electric generating units are some of the largest emitters of NOx, with EGUs powered by coal-fired steam generators without NOx emissions controls exhibiting some of the highest NOx emission rates (in terms of lb/MMBTU).

Uncontrolled, higher nitrogen content fuels, such as coal and residual fuel oil, tend to result in higher NO_X emissions than lower nitrogen content fuels (such as natural gas). Various combustion configurations tend to result in varying NOx emission rates (in terms of pounds of NOx emitted per million BTU of fuel heat input (lb/MMBTU)) due to amounts of excess air required for combustion, rate of fuel combustion, combustor geometry, peak combustion temperatures, and duration of combustion gasses at peak temperatures, etc. Combustion controls, such as low NOx burners and overfire air, are commercially available NOx reduction technologies adaptable and applicable to most EGU combustion systems. Post combustion NOx

controls, such as selective non-catalytic reduction (SNCR) and selective catalytic reduction (SCR), are commercially available highly effective NOx reduction technologies that are applicable to most EGU exhaust gas streams. These NOx controls are generally available for both new EGU installations and for retrofit on existing EGUs. Utilization of combustion controls and post combustion controls, singly or layered together for a single EGU, can result in significant reductions in the EGUs NOx emissions rate, greater than 90% reduction from uncontrolled levels for some EGUs.

To address the NOx emissions from EGU sources located in the state of Delaware, Delaware has promulgated a number of rules and regulations that effectively control the NOx emissions from these EGUs which also fulfils Delaware's obligation under §110(a)(2)(D)(i)(I) of the Clean Air Act. These rules and regulations have been previously submitted to the EPA in Delaware's June 2007 and subsequent state implementation plan (SIP) revisions, including the June 2012 revision. *(5)* The referenced rules and regulations include the following:

- 7 DE Admin Code 1112, Control of Nitrogen Oxide Emissions, which set RACT-based NOx emission rate standards for major stationary sources, including EGUs. *(6)*

- 7 DE Admin Code 1146, Electric Generating Unit (EGU) Multi-Pollutant Regulation, which included short term NOx emission rate limits (lb/MMBTU on rolling 24-hour average) and annual NOx mass emissions caps for coal-fired and residual oil-fired EGUs. *(7)*

- 7 DE Admin Code 1148. Control of Stationary Combustion Turbine Electric Generating Unit Emissions, which set NOx emission rate limits or approved NOx control technology requirements (such as water injection) for combustion turbines with a nameplate rating of 1 MW or greater that had not previously controlled their NOx emissions rate in accordance with the NOx RACT requirements of 7 DE Admin Code 1112. *(8)*

In addition to the NOx control regulations noted above, Delaware has participated in regional and federal initiatives, where applicable, that were designed to limit the NOx emissions from EGU sources whose NOx emissions may impact compliance with ozone standards in downwind states. These regional and federal initiatives include the following:

- The Ozone Transport Commission (OTC) NOx Budget Program. *(9)* In 1990, the OTC was created by amendments to the Clean Air Act. The OTC consisted of northeast and mid-Atlantic states with persistent summertime ozone problems. These OTC states include Connecticut, Delaware, the District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and portions of Virginia. The OTC was tasked with advising the EPA on ozone transport issues and for helping to develop and implement regional solutions to ozone problem experienced by the member states. Recognizing that the interstate transport of pollutants to downwind states

contributed to summertime ozone problems in those downwind states, the OTC created and implemented its NOx Budget Program. The NOx Budget Program was a cap-and-trade program to limit the total regional emission of NOx from fossil-fueled electric generating units and large boilers located in OTC states, and became effective in 1999. Cap and trade programs effectively reduce the total amount of emissions, usually for a geographic area, by placing a cap on the total emissions occurring in that geographic area without setting unit by unit limits. For the OTC NOx Budget Program, affected states were allocated a NOx emissions cap for the subject NOx emitting sources in the respective state, and the subject units were required to hold and surrender a NOx allowance for each ton of NOx emitted in order to comply with program requirements. This program did not include any unit specific NOx emissions rate requirements. The OTC NOx Budget Program effectively ended when the EPA began administering the EPA's NOx Budget Trading Program.

- The EPA NOx State Implementation Plan (SIP) Rule. *(10)* In 2003 the EPA implemented its NOx State Implementation Plan (SIP) Rule utilizing the NOx Budget Trading Program, a NOx emissions cap and trade program similar to that used for the OTC NOx Budget Program. Relative to the OTC NOx Budget Program, the EPA's NOx Budget Trading Program was expanded to include additional states (for a total of 20 states and also the District of Columbia) and established more stringent NOx emissions allowance allocations. The EPA's NOx State Implementation Plan (SIP) Rule was intended to reduce the regional transport of ozone and ozone-forming pollutants in the Eastern United States. The NOx State Implementation Plan (SIP) Rule was in place until 2009, when it was replaced by the EPA's Clean Air Interstate Rule (CAIR).

- The EPA Clean Air Interstate Rule (CAIR). *(11)* In 2005, the EPA promulgated its CAIR program that required states to reduce the emissions of SO2 and NOx to help meet health based air quality standards for fine particulate matter and ozone. The EPA indicated in the proposal for the CAIR that NOx and SO2 emissions in 23 states and the District of Columbia contributed to unhealthy levels of fine particulate matter in downwind states, and that the NOx emissions from 25 states and the District of Columbia contributed to unhealthy levels of 8-hour ozone in downwind states. EPA indicated that the reduction of SO2 and NOx emissions from EGUs would serve to reduce the interstate transport of pollutants related to these emissions. CAIR established a cap-and-trade program covering EGUs to limit the emissions of SO2 and NOx from these sources as an option for compliance with the reduction requirements. (All states subject to the CAIR selected this compliance option.) SO2 and NOx emissions mass caps were established for individual states and allowances were issued by the EPA to cover those allowable emissions from subject sources. The cap-and-trade program was intended by the EPA to provide subject sources flexibility in meeting the mass emissions limitations through the installation of controls, fuel switching, or trading/purchase of excess allowances from other subject sources. The NOx

emissions limitations of CAIR became effective in 2009, and the SO2 emissions limitation of CAIR became effective in 2010. The EPA made a number of changes to the CAIR subsequent to its original proposal, the most notable was the establishment of a process to provide for EPA to establish CAIR Federal Implementation Plans (FIPS) for states that failed to timely establish state plans for the implementation of CAIR. This ensured that the controls of the cap-and-trade program were uniformly established in all subject states on a timely basis.

- The EPA Cross-State Air Pollution Rule (CSAPR). *(12)* Subsequent to the promulgation of CAIR, legal actions lead the US Court of Appeals for the DC Circuit to make the decision in 2008 to remand the CAIR back to the EPA to make the rule more consistent with the requirements of the Clean Air Act. However, the courts left the requirements of CAIR in place until the EPA finalized a replacement rule. In response, the EPA promulgated its Cross-State Air Pollution Rule (CSAPR) in 2011. Additionally, in conjunction with the rule the EPA established federal implementation plans (FIPS) for each state subject to the CSAPR in order to implement the rule as rapidly as possible. In the rulemaking process the EPA identified for subject states what portions of each state's emissions significantly contributed to ozone or PM2.5 pollution in downwind states. The CSAPR established mass emissions limitations of SO2 and NOx from power plants in subject states to eliminate the portion of those emissions that are significant contributions to non-attainment or maintenance of fine particulate matter and ozone air quality standards in downwind states. The CSAPR established annual mass emissions limitations for SO2 and NOx and additional ozone season NOx mass emissions limitations for NOx. Between the original CSAPR and subsequent actions, there were 26 states subject to the ozone season NOx mass emissions limitations to address the 1997 Ozone NAAQS, 18 states were subject to annual SO2 and NOx mass emissions limitations of the rule to address the 1997 Annual PM2.5 NAAQS, and 21 states were subject to annual SO2 and NOx mass emissions limitations to address the 2006 24-hr PM2.5 NAAQS (a combined total of 23 states for addressing the two PM2.5 NAAQS). Relative to previous mass-based emissions rules, the CSAPR significantly restricted the trading of allowances that could be utilized for compliance purposes by establishing state variability limits that ensure that a state's actual mass emissions would fulfill its Clean Air Act "good neighbor" obligations. The EPA determined that Delaware was not required to participate in CSAPR.

- In 2012 the CSAPR was challenged in court, and the US Court of Appeals for the DC Circuit vacated the CSAPR and the implementing FIPs. The Court remanded the rule to the EPA to address the Courts findings, and directed the EPA to continue administering CAIR pending the promulgation of a valid rule to replace CAIR. As of this ruling, CAIR cap-and-trade programs for annual SO2, annual NOx, and ozone season NOx remained in place. *(12)*

- In April of 2014 the US Supreme Court reversed the DC Circuit court's opinion vacating CSAPR. In June of 2014 the EPA filed a motion with the U.S. Court of Appeals for the DC Circuit to lift the stay of the CSAPR, and in October of 2014 the Court of Appeals for the DC Circuit granted the EPA's motion. In November of 2014 the EPA issued a ministerial rule that aligned the dates in the CSAPR rule text with the revised court-ordered schedule, including 2015 Phase 1 CSAPR implementation and 2017 Phase 2 CSAPR implementation. *(12)*

- In November of 2015 the EPA proposed an update to the CSAPR by issuing the proposed CSAPR Update Rule. *(13)* Starting in 2017, this proposal would reduce summertime nitrogen oxides (NO_X) emissions from power plants in 23 eastern states, by establishing NOx mass emission caps, in order to reduce the impact of those power plant emissions on downwind states. In its proposal, the EPA has requested comments regarding the potential application of short term NOx emission limits on these same power plants. The EPA determined that Delaware was not required to participate in the CSAPR Update.

- On September 7 of 2016 the EPA finalized the update to the CSAPR by issuing the Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS, Final Rule. *(14)* The CSAPR Update Rule addresses the ozone season (May – September) transport of ozone pollution in the eastern United States that crosses state lines to help downwind states and communities meet and maintain the 2008 ozone national ambient air quality standard (NAAQS). Starting in May 2017, this final rule puts in place NOx emissions caps that will provide additional reductions of ozone season NOx emissions from power plants in 22 states in the eastern United States.

These State and regional NOx reduction efforts have resulted in significant NOx emissions reductions from EGUs located in the state of Delaware. These reductions have occurred both in terms of ozone season NOx mass emissions (tons) and also in average ozone season NOx emissions rates (lb/MMBTU). The following table was assembled with data extracted from the United States Environmental Protection Agency's Air Markets Program Data (EPA's AMPD). *(15)* The table shows the ozone season NOx mass emissions (tons) and average NOx emissions rate (lb/MMBTU) for the EGU fleet located in the state of Delaware:

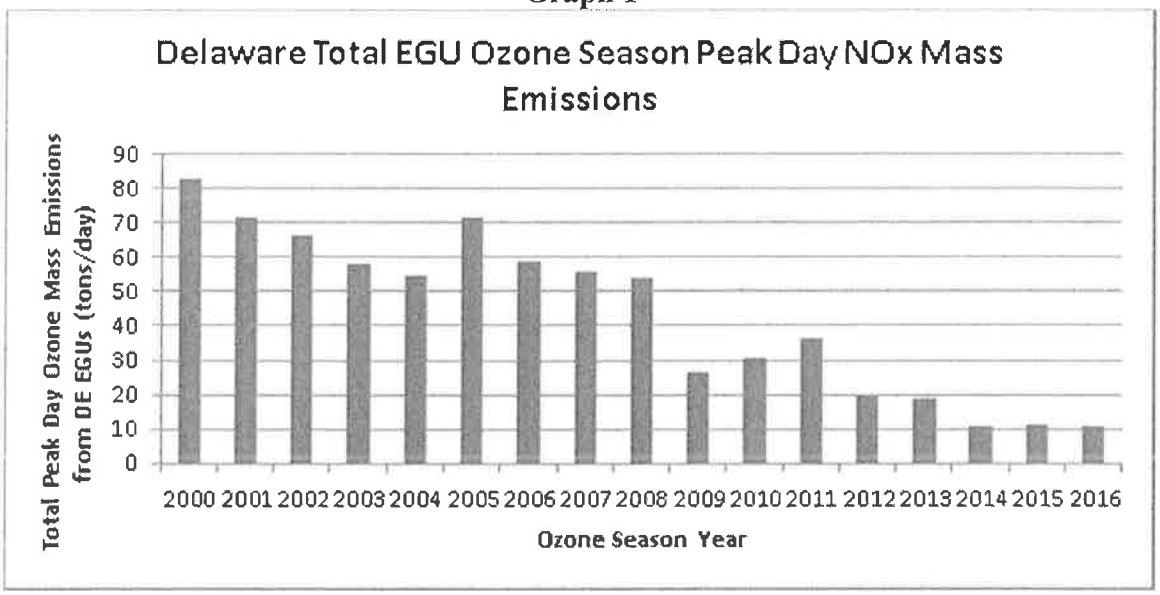
Table 3
2000 – 2016 Ozone Seasons
State of Delaware
Total EGU NOx Mass Emissions and Average NOx Emission Rate

Ozone Season Year	Total EGU OS NOx (tons)	Change in NOx Mass Emissions from 2000 (%)	Avereage NOx Emissions Rate (lb/MMBTU)	Change in Average NOx Emission Rate (%)
2000	4137	0.0	0.2784	0.0
2001	4777	15.5	0.2806	0.8
2002	4609	11.4	0.2415	-13.3
2003	3850	-6.9	0.2374	-14.7
2004	3659	-11.6	0.2449	-12.0
2005	5175	25.1	0.2818	1.2
2006	3567	-13.8	0.2582	-7.3
2007	4179	1.0	0.2398	-13.9
2008	3190	-22.9	0.2277	-18.2
2009	1280	-69.1	0.1695	-39.1
2010	2265	-45.3	0.1484	-46.7
2011	1879	-54.6	0.1250	-55.1
2012	1054	-74.5	0.0585	-79.0
2013	879	-78.7	0.0589	-78.9
2014	668	-83.9	0.0483	-82.7
2015	635	-84.6	0.0480	-82.8
2016*	613	-85.2	0.0396	-85.8

* Preliminary AMPD Data

However, relatively long term NOx mass emission caps (such as annual or seasonal caps) have limited impact on the short term NOx emissions (such a 24-hour period) from EGUs that have a more direct impact on compliance with short term air quality standards, such as the 8-hour ozone NAAQS. To address this issue, Delaware's air quality regulations have included short term NOx emission rate limits (with 24-hour averaging periods) that are protective of the short term ozone NAAQS. These short term NOx emission rate limits have helped Delaware achieve significant reductions in ozone season peak daily NOx mass emissions from Delaware's EGUs.

Graph 1



It can be seen in the above Graph 1 that between the 2000 and 2016 ozone seasons, the Delaware's EGUs have achieved a NOx mass emissions reduction (for ozone season peak NOx mass emissions days) in excess of 80% reduction. This reduction in peak ozone season day NOx mass emissions provides benefit in attaining compliance with the 8-hour ozone NAAQS for both Delaware's citizens and downwind populations.

Even though Delaware has significantly reduced the NOx emissions from EGUs located in Delaware, as discussed above, Delaware continues to experience exceedances of the 8-hour ozone NAAQS. Pollutants transported from facilities in upwind states are significant contributors to Delaware's continuing issues in meeting the 8-hour ozone NAAQS.

Modeling Identifies Impact of Upwind NOx Emissions Impacting Delaware's 8-hour Ozone NAAQS Compliance

The US EPA performed modeling as part of the development of its Cross-State Air Pollution Rule in order to help determine the impact of transported pollutants on downwind states and those states' ability to attain and maintain the then current 2008 ozone NAAQS of 75ppb. Some results of the modeling that identify state contributions to ozone at individual monitoring locations can be found on the spreadsheet titled "Contributions of 8-hour ozone, annual PM2.5, and 24-hour PM2.5 from each state to each monitoring site" located in the "Technical Information and Support Documents" section of the US EPA's Cross-State Air Pollution Rule (CSAPR) website. *(16)*

The US EPA's modeling identified 13 individual states (in addition to Delaware itself) whose NOx emissions significantly impact the ability of Delaware to attain and maintain the then current 8-hr ozone standard of 75 ppb. *(17)* (A state significantly impacts another state if it impacts that state's air quality by 1% or more of the applicable air quality standard. For the then current 8-hr ozone standard of 75 ppb, a significant contribution was 0.75 ppb or greater.) The states identified by the US EPA as significantly impacting Delaware's air quality, and the modeling results quantifying each state's impact, are shown in the following table:

Table 4
States Significantly Impacting Compliance with the 8-hour Ozone Standard in Delaware and the Magnitude of that Impact

State	Maximum Contribution (ppb)
CT	1.008
DE	6.256
IL	1.445
IN	1.737
KY	3.208
MD	23.951
MI	2.207
NJ	13.034
NY	9.092
OH	3.987
PA	13.344
TN	1.932
VA	6.039
WV	3.142

The EPA's modeling results, summarized in the above table, indicate that four states (Maryland, New Jersey, New York, and Pennsylvania) have greater impact on compliance of the 8-hour ozone standard in Delaware than the impact of Delaware itself. The EPA's modeling results summarized in the above table also indicate that three states (Kentucky, Ohio, and West Virginia) individually have an impact on compliance of the 8-hour ozone standard in Delaware of 50% of the impact that Delaware impacts itself. These modeling results tend to confirm that pollutant transport is a significant issue for the state of Delaware, and they also help explain Delaware's ongoing difficulties with the 8-hour ozone standard despite the significant actions Delaware has implemented to reduce NOx and VOC emissions in Delaware.

Pennsylvania's Conemaugh Generating Station's Impact on Delaware's 8-hour Ozone NAAQS Compliance

As noted in Table 4 above, the EPA's modeling indicated that the state of Pennsylvania significantly impacts Delaware's compliance with the 8-hour ozone NAAQS. Because of the magnitude of Pennsylvania's impact on Delaware's compliance with the 8-hour ozone standard, and the potential contribution to this impact by EGUs located in Pennsylvania, further modeling was performed to determine if individual Pennsylvania EGU facilities individually have a significant impact on Delaware's compliance with the 8-hour ozone standard.

In order to help Delaware assess the impact of upwind EGU facility NOx emissions on Delaware's 8-hour average ozone exceedances in 2011, Sonoma Technologies Inc. (STI) conducted air quality modeling using the Comprehensive Air Quality Model with extensions (CAMx) Ozone Source Apportionment Technology (OSAT) *(18)*. The 2011 ozone season modeling was performed to determine 8-hour average ozone apportionments from individual upwind EGU facilities and upwind groups of EGU facilities. The modeling identified that a number of EGU facilities located in the state of Pennsylvania individually had significantly impacted Delaware's compliance with the 8-hour ozone NAAQS during the 2011 ozone season. The identified EGU facilities significantly impacting Delaware's ambient air quality included Pennsylvania's Conemaugh Generating Station.

Because of the magnitude of its impact on Delaware's ambient ozone, the Conemaugh Generating Station is being individually addressed in this petition for a finding under §126(b) of the Clean Air Act.

The STI modeling results indicated that the Conemaugh Generating Station, located in Indiana County, Pennsylvania, emitted NOx on a number of days during the 2011 ozone season such that the magnitude of the emissions had a significant impact on Delaware's ambient air quality. The following table shows the 2011 ozone season days that the STI modeling determined that the Conemaugh Generating Station's NOx emissions had a significant impact on Delaware's ambient ozone:

Table 5
Conemaugh Generating Station
STI Modeling Calculated Impact on Delaware Air Monitors
2011 Ozone Season

Date	Conemaugh Facility Daily NOx Mass Emissions - AMPD (tons)	STI Modeling Estimated Daily Highest Impact On DE Ozone Monitors (ppb)	Actual 2008 8-Hour Ozone NAAQS Exceedance Day In Delaware
June 8, 2011	62.78	1.91	Yes
June 9, 2011	59.788	1.28	Yes
June 18, 2011	54.516	0.86	
July 6, 2011	66.353	0.80	
July 7, 2011	67.173	1.03	Yes
July 12, 2011	64.875	0.94	Yes
July 18, 2011	62.926	2.02	Yes
July 22, 2011	56.973	0.77	Yes
July 23, 2011	61.212	2.10	Yes
July 29, 2011	63.235	1.02	Yes

As shown in the above Table 5, the STI modeling calculated that during the 2011 ozone season the Conemaugh Generating Station's NOx emissions had a significant impact on Delaware's ambient ozone on 10 separate days relative to both the 2008 8-hour ozone NAAQS of 0.075 ppm and 2015 8-hour ozone NAAQS of 0.070 ppm.

The above Table 5 also shows that of the 10 days of the 2011 ozone season that the STI modeling showed that the Conemaugh Generating Station significantly impacted Delaware's ambient ozone, 8 of the 10 days coincided with actual ozone exceedances as measured by Delaware's ambient ozone monitors.

However, emissions and meteorological data related to the dates shown in Table 5, where Conemaugh Generating Station NOx emissions were shown by STI modeling to significantly impact Delaware's 8-hour average ambient ozone, indicates that NOx emissions over periods shorter than 24-hours are directly related to the significant downwind ozone impact.

As an example, for June 8 and 9, 2011, the STI modeling showed that the Conemaugh Generating Station's NOx emissions had a significant impact on Delaware's ambient ozone. As indicated in the following table, the Conemaugh emissions contributed 1.91 ppb ozone for a peak 8-hour concentration beginning at 1100 hours on June 8, 2011, and contributed 1.28 ppb ozone for a peak 8-hour concentration beginning at 1100 hours on June 9, 2011.

Table 6
Conemaugh Generating Station
STI Modeling Calculated Impact on Delaware Air Monitors
June 8 and 9, 2011

Monitoring Station					Date				Source					Modeled Apportionment
AQS Site ID	State	County	Local Site Name	Designated Nonattainment Area or CBSA	Year	Month	Day	Starting Hour of Peak 8-hour Total Concentration EDT (hhmmss)	Tag Name	FIPS	State	Plant Name	Notes	8-hour Ave O3 (ppb)
1E+08	DE	New Castl	LUMS_POI	Philadelphia-Car	2011	6	8	110000	I5	42063	PA	Conemaugh		1.91
1E+08	DE	New Castl	BRANDYW	Philadelphia-Car	2011	6	9	110000	I5	42063	PA	Conemaugh		1.28

In order to estimate the timing relationship between the Conemaugh Generating Station's NOx emissions and the STI modeled significant impact on Delaware's ambient ozone on June 8 and 9, 2011, NOAA Hysplit Models were run utilizing the meteorological data for those dates. Figure 1 below shows the graphical Hysplit model output for June 8, 2011 and Figure 2 below shows the graphical Hysplit model output for June 9, 2011.

Figure 1

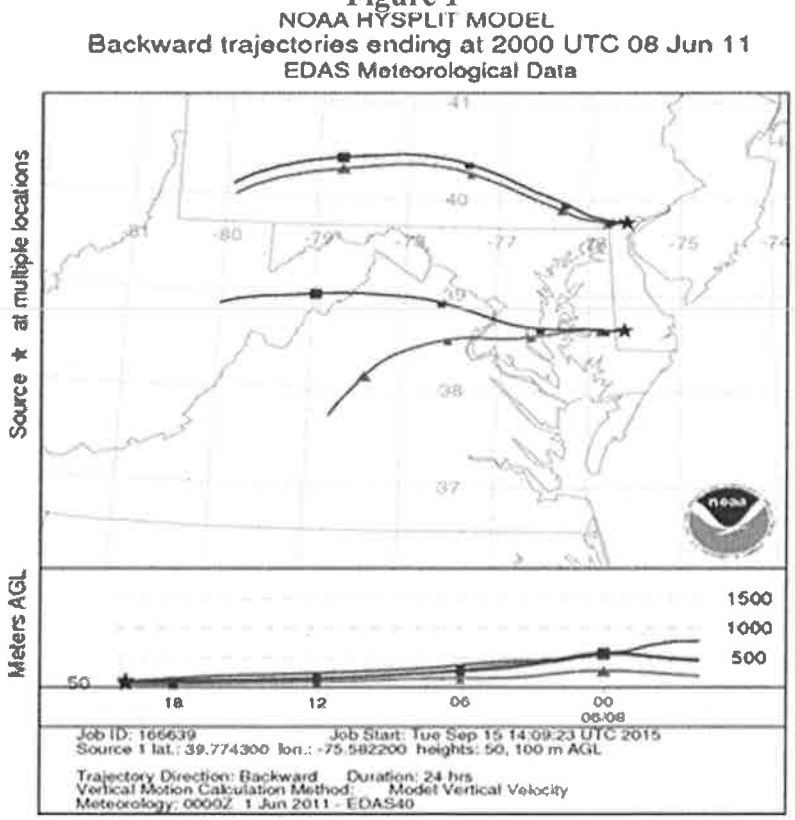
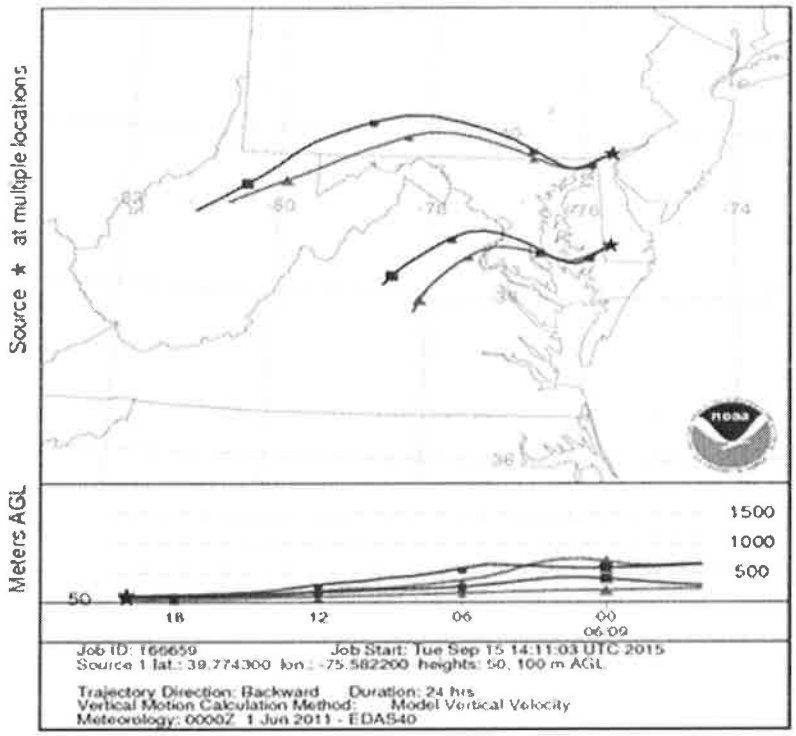


Figure 2

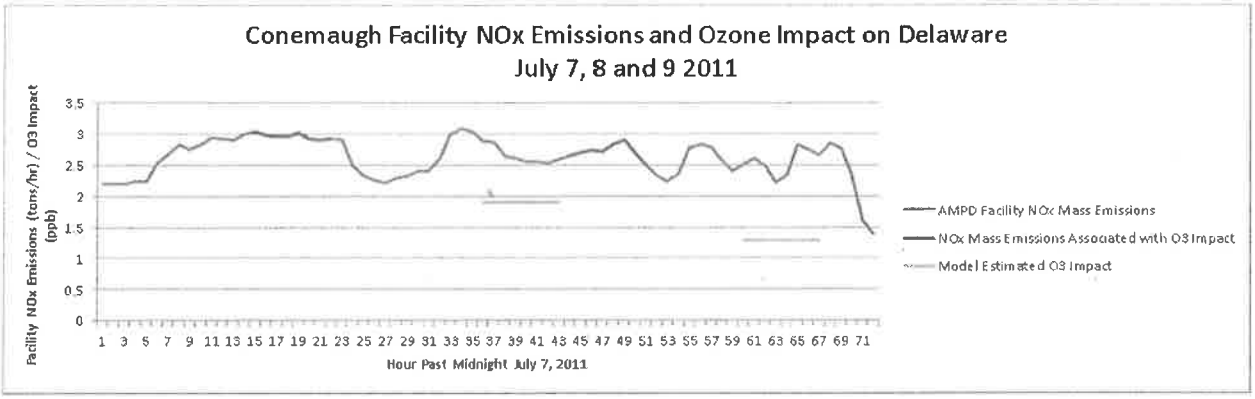
NOAA HYSPLIT MODEL
Backward trajectories ending at 2000 UTC 09 Jun 11
EDAS Meteorological Data



It can be seen in Figure 1 above that on June 8, 2011 there was an approximate 21-hour path from the Conemaugh Generating Station location (Long 79.0611) to the STI model's impacted Delaware ozone monitor. It can be seen in Figure 2 that on June 9, 2011 there was an approximate 16-hour path from the Conemaugh Generating Station location (Long 79.0611) to the STI model's impacted Delaware ozone monitor. Using these time delays and the STI model output's estimated start of the individual 8-hour ozone impact events, AMPD data was collected to show the Conemaugh Generating Station's facility NOx emissions that coincided with the STI model's calculated ozone impact events.

The following graph shows the Conemaugh facility's NOx mass emissions during the time period leading up to the STI model's estimated ozone impact events on June 8 and June 9, 2011. The blue line on the chart is the hourly Conemaugh Electric Generating Station's total facility NOx mass emissions as recorded in the AMPD. The red portions of the same line represent the hourly NOx mass emissions estimated to coincide with the travel path duration of the NOx emissions related to the 8-hour ozone impacts that are shown in the green line segments.

Figure 3



It can be seen in above Figure 3 that even on consecutive days there is a variation in the relationship in the timing of the Conemaugh Generating Station's NOx emissions and their model estimated variable impact on downwind ambient ozone in Delaware.

Other 2011 ozone season Conemaugh Generating Station NOx emissions data and meteorological information further demonstrates the variability of the Conemaugh Generating Station NOx emissions on Delaware's ambient ozone. On July 12, 2011, the STI modeling showed that the Conemaugh Generating Station's NOx emissions had a significant impact on Delaware's ambient ozone. As indicated in the following table, the Conemaugh emissions contributed 0.81 ppb ozone for a peak 8-hour concentration beginning at 1200 hours on July 12, 2011, and contributed 0.94 ppb ozone for a peak 8-hour concentration beginning at 1300 hours on July 12, 2011.

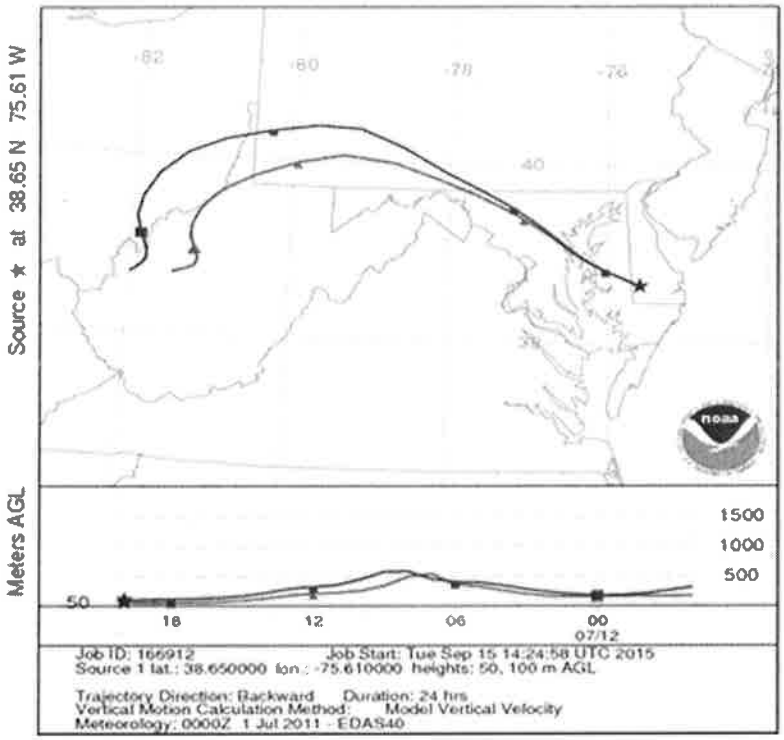
Table 7
Conemaugh Generating Station
STI Modeling Calculated Impact on Delaware Air Monitors
July 12, 2011

Monitoring Station					Date				Source					Modeled Apportionment
AQS Site ID	State	County	Local Site Name	Designated Nonattainment Area or CBSA	Year	Month	Day	Starting Hour of Peak 8-hour Total Concentration EDT (hhmmss)	Tag Name	FIPS	State	Plant Name	Notes	8-hour Ave O3 (ppb)
1E+08	DE	Kent	STATE_RO	Dover, DE	2011	7	12	120000	IS	42063	PA	Conemaugh		0.81
1E+08	DE	Sussex	350_VIRGI	Seaford, DE	2011	7	12	130000	IS	42063	PA	Conemaugh		0.94

In order to estimate the timing relationship between the Conemaugh Generating Station's NOx emissions and the STI modeled significant impact on Delaware's ambient ozone on July 12, 2011, NOAA Hysplit Models were run utilizing the meteorological data for that date. Figure 4 below shows the graphical Hysplit model output for July 12, 2011.

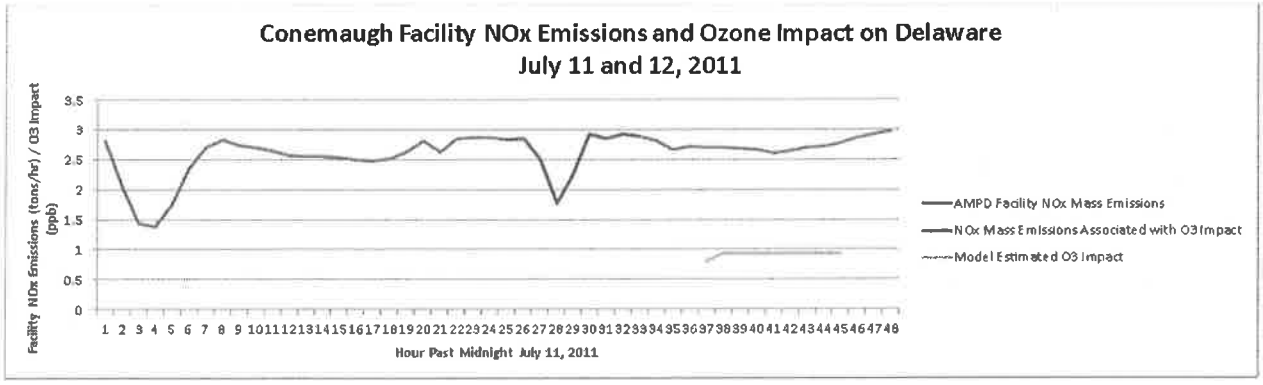
Figure 4

NOAA HYSPLIT MODEL
Backward trajectories ending at 2000 UTC 12 Jul 11
EDAS Meteorological Data



It can be seen in Figure 4 above that on July 12, 2011 there was an approximate 12-hour path from the Conemaugh Generating Station location (Long 79.0611) to the STI model's impacted Delaware ozone monitor. Using this time delay and the STI model output's estimated start of the individual 8-hour ozone impact events, AMPD data was collected to show the Conemaugh Generating Station's facility NOx emissions that coincided with the STI model's estimated ozone impact events. This information is shown below in Figure 5.

Figure 5



In comparing the information in Figures 3 and 5, it can be seen that there is a varying relationship between the timing and magnitude of the Conemaugh Generating Station's NOx emissions and its estimated impact on Delaware's ambient ozone. Many variables impact this relationship, including wind speed, ambient temperature, humidity, intensity of sunlight, availability of other pollutants that contribute to ozone formation, etc. These factors are generally outside the control of the upwind emitting facility, and to a certain extent outside the ability to accurately predict the emissions' potential impact ahead of time. Because of this, the emissions from the Conemaugh Generating Station may significantly impact Delaware's ambient ozone on any particular ozone season day and only control of those emissions below significant impact threshold levels can ensure that Delaware's ambient ozone is not significantly impacted on any given ozone season day.

Conemaugh Generating Station

The Conemaugh Generating Station is located near New Florence, in Indiana County, Pennsylvania. The Energy Information Administration (EIA) database indicates that the Conemaugh Generating Station includes two coal fired steam electric generating units. *(19)* The following table provides some technical information regarding the Conemaugh Generating Station's coal-fired electric generating units:

Table 8
Conemaugh Generating Station's Electric Generating Units

	EIA Nameplate Rating (MW)	AMPD Heat Input Rating (MMBTU/hr)	Commercial Operation Year	AMPD NOx Controls
Unit 1	936	9100	1970	LNB, CC/SOFA, SCR (SCR added 11/2014)
Unit 2	936	8985	1971	LNB, CC/SOFA, SCR (SCR added 11/2014)

The Conemaugh Generating Station Units 1 and 2 incorporate supercritical Combustion Engineering tangential steam generators. Both of the Conemaugh Generating Station steam generators fire bituminous coal as their primary fuel, with EIA information indicating that the bituminous coal fuel is sourced primarily from Pennsylvania mines. As noted in the above table, SCR NOx controls were added to the two Conemaugh coal-fired steam generators in late 2014.

EIA information indicates that the Conemaugh Generating Station is operated by GenOn Northeast Management Company, which merged with NRG in 2012. The Conemaugh Generating Station operates as an independent power producer and provides capacity, energy, and energy related services to the PJM regional transmission organization (RTO).

Conemaugh Generating Station NOx Emissions Limitations and Performance

As noted in Table 8 above, the Conemaugh Generating Station Units 1 and 2 are currently equipped with low NOx burners (LNBs), close-coupled and separated overfire air (CC/SOFA), and selective catalytic reduction systems (SCR) for control of NOx emissions. The LNBs and CC/SOFA NOx combustion controls were installed on the Conemugh Generating Station EGUs in the mid-1990s for compliance with the state of Pennsylvania's NOx RACT requirements. In accordance with Pennsylvania's previous NOx RACT requirements (see discussion of Pennsylvania's 2016 revision to its NOx RACT regulation requirement below), the Conemaugh Generating Station EGU's were subject to NOx emission rate limits of 0.45 lb/MMBTU, on a 30-day rolling average. AMPD data indicates that the Conemaugh Generating Station coal-fired EGUs have consistently been in compliance with these NOx RACT limits.

Also as indicated in Table 8 above, the Conemaugh Generating Station Units 1 and 2 are both equipped with SCR for control of NOx emissions. AMPD data indicates that the SCRs for both Conemaugh Generating Station coal-fired EGUs were installed in November, 2014. The following table consists of AMPD data that shows the ozone season average NOx emissions rate for the Conemaugh Generating Station before and after the installation of the SCRs on the Conemaugh electric generating units after the 2014 ozone season.

Table 9
Conemaugh Generating Station NOx Emissions
2011 – 2016 Ozone Seasons

Ozone Season Year	Ozone Season Average NOx Rate (lb/MMBTU)	Highest Daily NOx Mass Emissions (tons/day)	Highest Hourly NOx Mass Emissions (lb/hr)
2011	0.3313	67.908	8061.8
2012	0.3113	62.211	5835.6
2013	0.3228	63.056	5963.3
2014	0.3211	72.946	6906.1
2015	0.1935	41.354	6313.4
2016*	0.1402	32.837	5171.7

*Preliminary Data for 2016

It can be seen in the above Table 9, that while subsequent to the late 2014 installation of the Conemaugh generating unit SCRs there has been a significant reduction in ozone season average NOx emissions rate, the highest ozone season hourly NOx mass emissions remain relatively high after installation of the generating unit SCRs. In fact, the Conemaugh Generating Station's

ozone season peak hourly NOx mass emissions after SCR installation (5171.7 lb/hr in 2016) falls within the range of NOx mass emissions shown by STI modeling to have significant impact on Delaware's ambient ozone, as shown in the following table:

Table 10
Conemaugh Generating Station NOx Emissions and STI Modeled Impact Associated with Delaware 2011 8-hr Ozone NAAQS Exceedance

Date of Delaware 8-hour Ozone NAAQS Exceedance	STI Model Peak Ozone Impact (ppb)	Range of Hourly NOx Mass Emissions Estimated to be Associated with Ozone Exceedance (tons/hr)
June 8, 2011	1.91	5818.7 - 6083.5
June 9, 2011	1.28	5008.4 - 5792.3
July 12, 2011	0.94	3540.9 - 5839.8
July 22, 2011	0.77	4847.0 - 5451.2

Pennsylvania has recently finalized a revision to its NOx RACT regulation, *Title 25. Environmental Protection/ Part I. Department of Environmental Protection/ Subpart C. Protection of Natural Resources, Article III Air Resources/ Chapter 129. Standards for Sources, Additional RACT Requirements for Major Sources of NOx and VOCs. (20)* The revisions to Pennsylvania's NOx RACT regulation become effective in 2017. The revision to Pennsylvania's NOx RACT regulation revises the NOx RACT provisions that are applicable to the Conemaugh Generating Station Units 1 and 2.

The steam generators associated with the Conemaugh Generating Station Units 1 and 2 are both coal-fueled, tangential-furnace configuration combustion units with heat input ratings of greater than 250 MMBTU/hr and are both equipped with SCR NOx emission controls. In accordance with the requirements of §129.97 of the revised Pennsylvania NOx RACT regulation, the presumptive NOx RACT emission rate limitation for the Conemaugh Generating Station's coal-fired EGUs, with a SCR system flue gas inlet temperature equal to or greater than 600°F, is 0.12 lb/MMBTU, and compliance with this limit is also required in the event of SCR system by-pass, as follows:

> *§129.97(g)(viii) For a coal-fired combustion unit with a selective catalytic reduction system operating with an inlet temperature equal to or greater than 600°F, 0.12 lb NO_x/million Btu heat input. Compliance with this emission limit is also required when by-passing the selective catalytic reduction system.*

In accordance with §129.100 of the revised Pennsylvania NOx RACT regulation, compliance with the revised regulation's emission rate limit provisions of §129.97(g)(viii) are on a rolling 30-day average.

Additionally, under §129.98 of the revised Pennsylvania NOx RACT regulation, the owner or operator of a major NOx emitting facility subject to the regulation with at least one air contamination source subject to a NOx RACT emission limitation in §129.97 of the regulation that can not meet the applicable limitation may elect to meet the limitation by averaging NOx emissions on either a facility-wide or system wide basis using a 30-day rolling average. The regulation requires that system-wide averaging must be among sources under the common control of the same owner or operator within the same ozone non-attainment area of Pennsylvania.

> *§129.98(a) The owner or operator of a major NO_x emitting facility subject to § 129.96 (relating to applicability) that includes at least one air contamination source subject to a NO_x RACT emission limitation in § 129.97 (relating to presumptive RACT requirements, RACT emission limitations and petition for alternative compliance schedule) that cannot meet the applicable NO_x RACT emission limitation may elect to meet the applicable NO_x RACT emission limitation in § 129.97 by averaging NO_x emissions on either a facility-wide or system-wide basis using a 30-day rolling average. System-wide emissions averaging must be among sources under common control of the same owner or operator within the same ozone nonattainment area in this Commonwealth.*

Compliance with the averaging provisions of the revised Pennsylvania NOx RACT regulation is determined as follows:

> *§129.98(e) The owner or operator shall calculate the alternative facility-wide or system-wide NO_x RACT emissions limitation using a 30-day rolling average for the air contamination sources included in the application for the operating permit modification or plan approval, if otherwise required, submitted under subsection (b) by using the following equation to sum the emissions for all of the sources included in the NO_x emissions averaging plan:*

$$\left[\sum_{i=1}^{n} Ei_{actual}\right] \leq \left[\sum_{i=1}^{n} Ei_{allowable}\right]$$

Where:

Ei_{actual} = The actual NO_x mass emissions, including emissions during start-ups, shutdowns and malfunctions, for air contamination source i on a 30-day rolling basis.

$Ei_{allowable}$ = The allowable NO_x mass emissions computed using the allowable emission rate limitations for air contamination source i on a 30-day rolling basis specified in § 129.97. If an air contamination source included in an averaging plan is subject to a numerical emission rate limit that is more stringent than the applicable allowable emission rate limitation in §

129.97, then the numerical emission rate limit shall be used for the calculation of the allowable NO_x mass emissions.

n = The number of air contamination sources included in the NO_x emissions averaging plan.

Additionally, the Conemaugh Generating Station is subject to the EPA's CSAPR Update requirements as part of a federal CSAPR Update Federal Implementation Plan (FIP). Under the CSAPR Update, the Conemaugh Generating Station Unit 1 will have an ozone season NOx mass emissions allocation of 859 tons/allowances, and Unit 2 will have an ozone season NOx mass emissions allocation of 878 tons/allowances. However, these values are not hard caps; the values only represent the unit allocations. The units/facility may exceed these ozone season allocations by obtaining and surrendering allowances equal to their actual ozone season NOx emissions. Additional penalties are applied only in the event that the state consumption of allowances exceeds the state allocation. Under the CSAPR Update FIP, in the event that a state exceeds its allocation and variability limit, the units responsible for the exceedance are to be identified and penalized by application of a higher allowance surrender ratio for those exceedances. The ozone season provisions of the CSAPR Update have no provisions regarding control of short term (hourly, daily, 30-day, etc) NOx emission rates or mass emissions, and therefore offer little protection from the impact of short term events of high NOx mass emissions.

There are a number of conditions that could occur during the operation of a large EGU facility where a facility owner/operator may find it advantageous to operate (or continue operation) for a limited period of time with the SCR NOx emission controls out of service or operating at low efficiency levels. This assumes that the owner/operator has the ability to comply with NOx emissions caps by acquiring the sufficient allowances and can meet long term NOx emission rate limits through utilization of averaging provisions. Problems with the SCR (including damage, pluggage, etc), SCR ancillary support systems and controls, and boiler draft systems could impact the EGU operation to the point that the SCR must be taken out of service in order to continue EGU operation at load. There may also be some economic incentive to continue operation in this manner, as the economic impact of taking a forced outage (and associated fees) and/or replacement power costs could make the purchase of additional NOx compliance allowances a relative bargain.

Additionally, there are times in the eastern United States during the summer months where the grid energy costs are in the multi-hundred dollar per megawatt-hour range for a number of consecutive hours. Under certain conditions, these periods of very high grid energy costs (when combined with relatively low cost NOx compliance allowance costs) may provide economic incentive to operate with the SCR controls out of service. (Again, this assumes that the owner/operator has the ability to comply with NOx emissions caps by acquiring sufficient allowances and can meet long term NOx emission rate limits through utilization of averaging

provisions.) The economic incentive could potentially be realized by eliminating SCR reagent and atomizing media usage and costs with the SCR out of service, along with realizing an incremental reduction in EGU auxiliary loads (resulting in a net increase in EGU output for sale due to a reduction in unit draft fan loading for EGUs equipped with SCR bypass, reduction in reagent pump loading, etc). During periods of high energy costs on the grid, the combined reduction in reagent and atomizing media consumption and incremental increase in energy sales may more than offset the need to surrender additional NOx compliance allowances.

Potential Impact of the Absence of Short Term NOx Emission Rate Averaging Times

Unlike the EPA's CSAPR Update rules, Pennsylvania's revised NOx RACT regulation established a presumptive NOx RACT rate of 0.12 lb/MMBTU for SCR-equipped coal-fired EGUs beginning in 2017. However, Pennsylvania's new RACT regulation permits compliance with the 0.12 lb/MMBTU NOx rate limit by averaging NOx emissions among units at a common facility (or other facilities if under control of a common owner or operator, and the subject facilities are located in the same nonattainment zone) on a 30-day rolling average compliance basis.

If both of the Conemaugh Generating Station coal-fired EGUs (or the Conemaugh facility's NOx emission rate average) met a 0.12 lb/MMBTU limit on an hourly basis, and each operated at its maximum rated heat input, the hourly NOx mass emissions from the Conemaugh Generating Station would be approximately 2,170 lb/hr. As shown in Table 10, this 2,170 lb/hr rate of NOx mass emissions from Conemaugh is lower than the range of hourly NOx emissions values associated with the events shown by STI modeling to have a significant impact on Delaware's ambient ozone. However, as noted above, the revised Pennsylvania NOx RACT regulation provides for a 0.12 lb/MMBTU limit on a 30-day averaging period, not an hourly averaging period.

When taken in conjunction with Pennsylvania's NOx RACT regulations provisions under §129.98 which allows averaging of unit emissions at a common facility, it is possible that the Conemaugh Generating Station could emit NOx at rates well above 2,170 lb/hr for one or more days and still maintain compliance with the 0.12 lb/MMBTU, 30-day rolling average. This means the Conemaugh Generating Station can emit NOx mass emissions in the upper range of values of hourly NOx mass emissions associated with the events shown by STI modeling to have a significant impact on Delaware's ambient ozone, while still maintaining compliance with the 0.12 lb/MMBTU, 30-day rolling average, NOx emission rate limit.

The following is an example addressing a worst case situation, where the total 30-day heat input was low in conjunction with a single 24-hour day where the NOx mass emissions were at their

potential highest values. For the example, it is assumed that the Conemaugh Generating Station would emit NOx at rates representative of no SCR control operation for a 24-hour period during an ozone season while still remaining in compliance with Pennsylvania's revised RACT regulation. The AMPD preliminary 2016 ozone season operating heat input data was selected to form the basis for this example, as it is anticipated that it would be most representative of the Conemaugh Generating Station facility and unit operations in the near future. For the purposes of this example, it is assumed that the Conemaugh Generating Station owner/operator choses to comply with the Pennsylvania NOx RACT limits using the facility averaging the provisions of the RACT regulation.

- To estimate a high daily NOx mass emission for Conemaugh, the 2011 ozone season average NOx emission rate (0.3313 lb/MMBTU) was selected as representative of facility operation without SCR NOx controls. Operation of both coal-fired EGUs at maximum hourly heat input capacity (18,085 MMBTU/hr) for 24 hours (for a total of 434,040 MMBTU) was also assumed. This gives an estimated high daily NOx mass emissions of 71.9 tons/day.
- For the 2016 ozone season, the AMPD data for the Conemaugh Generating Station indicated that the lowest 30-day total heat input was 5,085,049 MMBTU. (It should be noted that the heat input value of 5,085,049 MMBTU for 30 days represents a heat input capacity factor of 39%). The estimated NOx emissions that would have been emitted combusting 5,085,049 MMBTU at an average NOx emission rate of 0.12 lb/MMBTU is 305.1 tons. (This is the allowable NOx mass emissions for the 30-day average in accordance with the provisions of the Pennsylvania NOx RACT for compliance purposes.)
- The required Conemaugh Generating Station facility average NOx emission rate required to comply with the 0.12 lb/MMBTU 30-day average and accounting for the high daily NOx mass emissions value of 71.9 tons/day for one day is estimated to be:

  *((305.1 tons – 71.9 tons) * 2000 lb/ton) / (5,085,049 MMBTU – 434,040 MMBTU)*
  = 0.1003 lb/MMBTU
- The estimated required average NOx emission rate of 0.1003 lb/MMBTU, 30-day average, appears to be within the capabilities of most coal-fired EGUs equipped with SCR NOx controls when those controls are consistently operated in accordance with good pollution control practices.

Another example would be to base the highest daily NOx mass emissions on the highest actual daily heat input for the 2016 ozone season instead of using a maximum potential heat input. As with the previous example, the highest NOx daily NOx mass emissions would be estimated assuming no SCR operation for determining the NOx emission rate (in lb/MMBTU), but the maximum daily heat input would be based on actual AMPD 2016 ozone season operating heat input data. It is again assumed that the AMPD 2016 ozone season operating heat input data is most representative of future operation and the Conemaugh Generating Station owner/operator choses to comply with the Pennsylvania NOx RACT limits using the facility averaging provisions of the RACT regulation.

- To estimate a high daily NOx mass emission for Conemaugh, the 2011 ozone season average NOx emission rate (0.3313 lb/MMBTU) was selected as representative of facility operation without SCR NOx controls. Preliminary AMPD data for the 2016 ozone season indicated that the highest daily heat input for the Conemaugh Generating Station occurred on August 8, 2016 with a value of 403,169 MMBTU. A heat input of 403,169 MMBTU and a NOx emission rate of 0.3313 lb/MMBTU gives an estimated high daily NOx mass emissions of 66.8 tons/day.
- For the 2016 ozone season, the AMPD data for the Conemaugh Generating Station indicated that the lowest 30-day total heat input was 5,085,049 MMBTU. (It should be noted that the heat input value of 5,085,049 MMBTU for 30 days represents a heat input capacity factor of 39%). The estimated NOx emissions that would have been emitted combusting 5,085,049 MMBTU at an average NOx emission rate of 0.12 lb/MMBTU is 305.1 tons. (This is the allowable NOx mass emissions for the 30-day average in accordance with the provisions of the Pennsylvania NOx RACT for compliance purposes.)
- The required Conemaugh Generating Station facility average NOx emission rate required to comply with the 0.12 lb/MMBTU 30-day average and accounting for the high daily NOx mass emissions value of 66.8 tons/day for one day is estimated to be:

  *((305.1 tons – 66.8 tons) * 2000 lb/ton) / (5,085,049 MMBTU – 403,169 MMBTU)*
  = 0.1018 lb/MMBTU
- The estimated required average NOx emission rate of 0.1018 lb/MMBTU, 30-day average, also appears to be within the capabilities of most coal-fired EGUs equipped with SCR NOx controls when those controls are consistently operated in accordance with good pollution control practices.

Another example is to assume that the Conemaugh Generating Station emits NOx at rates representative of no post-combustion controls for an 8-hour duration, a period of time of high NOx emissions previous discussed to coincide with significant impact on downwind 8-hour ozone NAAQS compliance. For this example, the Conemaugh Generating Station was assumed to operate for an 8 hour period at the maximum heat input capacity and at a NOx emissions rate representative of no post-combustion control operation. As in the previous examples, it is again assumed that the AMPD 2016 ozone season operating heat input data is most representative of future operation and the Conemaugh Generating Station owner/operator choses to comply with the Pennsylvania NOx RACT limits using the facility averaging provisions of the RACT regulation.

- To estimate a high 8-hour potential NOx mass emission for Conemaugh, the 2011 ozone season average NOx emission rate (0.3313 lb/MMBTU) was selected as representative of facility operation without SCR NOx controls. The highest heat input for an 8-hour period was calculated by multiplying the facility's heat input capacity by 8, for a total heat input of 144,680 MMBTU. Multiplying heat input of 144,680 MMBTU and a NOx emission rate of 0.3313 lb/MMBTU gives an estimated 8 hour NOx mass emissions of 24.0 tons.

- For the 2016 ozone season, the AMPD data for the Conemaugh Generating Station indicated that the lowest 30-day total heat input was 5,085,049 MMBTU. (It should be noted that the heat input value of 5,085,049 MMBTU for 30 days represents a heat input capacity factor of 39%). The estimated NOx emissions that would have been emitted combusting 5,085,049 MMBTU at an average NOx emission rate of 0.12 lb/MMBTU is 305.1 tons. (This is the allowable NOx mass emissions for the 30-day average in accordance with the provisions of the Pennsylvania NOx RACT for compliance purposes.)
- The required Conemaugh Generating Station facility average NOx emission rate required to comply with the 0.12 lb/MMBTU 30-day average and accounting for the high daily NOx mass emissions value of 66.8 tons/day for one day is estimated to be:

  *((305.1 tons – 24.0 tons) * 2000 lb/ton) / (5,085,049 MMBTU – 144,680 MMBTU)*
  = 0.1138 lb/MMBTU
- The estimated required average NOx emission rate of 0.1138 lb/MMBTU, 30-day average, also appears to be within the capabilities of most coal-fired EGUs equipped with SCR NOx controls when those controls are consistently operated in accordance with good pollution control practices. The preliminary AMPD data for the 2016 ozone season indicated that the Conemaugh Generating Station had 27 occasions with a facility 30-day average NOx emission rate less than 0.1138 lb/MMBTU. It should be recalled that the 0.12 lb/MMBTU NOx emission rate limit provisions of the revised Pennsylvania RACT regulation do not take effect until 2017 and that the Conemaugh facility was not required to meet such stringent NOx emission rate requirements.

These examples for the Conemaugh Generating Station demonstrate that it is likely that the facility has the ability to exhibit periods of relatively high NOx emissions (NOx emission levels shown by the STI modeling as significantly contributing to Delaware's ambient ozone) while still being able to remain in compliance with the NOx emission rate and facility averaging provisions of Pennsylvania' new NOx RACT regulation, *Title 25. Environmental Protection/ Part I. Department of Environmental Protection/ Subpart C. Protection of Natural Resources, Article III Air Resources/ Chapter 129. Standards for Sources, Additional RACT Requirements for Major Sources of NOx and VOCs.*

Delaware does not agree that a 30-day averaging period, as provided for in Pennsylvania's revised NOx RACT regulation, is appropriate in conjunction with the 0.12 lb/MMBTU NOx rate limit to protect downwind areas with regards to the 2015 8-hour ozone NAAQS. It is Delaware's opinion that the use of a 30-day rolling average for an emissions limitation is not sufficient to be protective of short term NAAQS such as the 2008 and 2015 8-hour ozone NAAQS, and can potentially have a negative impact on Delaware's ability to be in compliance with the short term air quality standards of the 2008 and 2015 8-hour ozone NAAQS.

Short Term NOx Emission Limits Are Required To Assist in Reducing the Downwind Impact of Conemaugh Generating Station NOx Emissions

The information discussed above indicates that currently applicable NOx emission rate limits and applicable EGU cap-and-trade NOx control programs, that were designed to limit annual and seasonal NOx emissions, have not served to limit the Conemaugh Generating Station's NOx emissions to levels such that those emissions do not significantly contribute to downwind exceedances of short term air quality standards, thereby imperiling the public health and welfare in downwind states. The modeling performed by STI tends to support this conclusion by quantifying the impact of the Conemaugh Generating Station's NOx emissions on ozone levels measured at Delaware's monitoring locations.

Pennsylvania has recently revised its NOx RACT regulation. In accordance with the provisions of the revised NOx RACT regulation, beginning in 2017, the Conemaugh Generating Station coal-fired EGUs will be subject to a NOx emission rate limit of 0.12 lb/MMBTU, and in accordance with provisions of the revised NOx RACT regulation may elect to comply with the limit by averaging the emissions of the two coal-fired EGUs at the facility and on a 30-day rolling average basis. However, as discussed earlier, the 30-day averaging provisions of the revised NOx RACT regulation do not ensure that that the Conemaugh EGU facility will not emit NOx emissions at levels that have been shown by STI modeling to significantly impact Delaware's ambient ozone while still remaining in compliance with applicable NOx emission limitations. Sufficiently stringent NOx emission rate limits based on shorter term averaging periods (such as 24-hour or less) are needed to help ensure that the Conemaugh Generating Station does not significantly impact downwind jurisdictions' ability to comply with the 8-hour ozone NAAQS.

It is interesting to note that since the installation of the SCR NOx controls at the Conemaugh Generating Station in late-2014, AMPD data does not appear to indicate that the SCRs have consistently been operated reflective of good pollution control practices in the subsequent 2015 and 2016 ozone seasons. While it is uncertain why the Conemaugh Generating Station owners/operators have chosen to operate their SCR controls in this fashion, it is suspected that for some facilities in similar circumstances that changing conditions in the power generation industry have resulted in conditions where NOx cap-and-trade compliance allowances are available at prices that make it uneconomic to operate existing NOx controls for compliance with cap-and-trade NOx control programs. Additional regulatory incentive is required to ensure that the existing EGU NOx controls are consistently operated in accordance with good pollution control practices for all such facilities.

Delaware is concerned that the NOx mass emission limits associated with CSAPR Update will be ineffective in properly protecting the public health and welfare in downwind states at all times with regards to the 8-hour ozone NAAQS. It is recognized that the provisions of the CSAPR Update provide for more restrictive annual and seasonal NOx mass emissions than previous

rules, and that the CSAPR Update program also provides more restrictive allowance trading provisions than previous rules. However, the provisions of the CSAPR Update do not provide any limitations on the Conemaugh Generating Station's NOx mass emissions for any period shorter than seasonal (such as hourly or daily). The lack of sufficiently stringent short term NOx emission rates facilitates the continued operation of the Conemaugh Generating Station's coal-fired EGUs with inadequate NOx emission control and resulting high NOx emissions over short periods of time. The lack of sufficiently stringent short term emissions limitations will therefore help facilitate the Conemaugh Generating Station's NOx mass emissions at levels that will continue to support non-compliance with the 8-hour ozone NAAQS in Delaware, and thereby continue to impact the health and welfare of Delaware's citizens.

In order to be protective of short term air quality standards, such as the 8-hour ozone NAAQS, it is Delaware's opinion that it is necessary to establish emissions limits with appropriate magnitudes and averaging periods for the Conemaugh Generating Station that ensure that the NOx emissions are adequately controlled during any particular time period. It is Delaware's opinion that selection of a short term NOx emission rate limit averaging period of no greater than 24 hours is also appropriate to address the short term aspects of compliance with a short term NAAQS, such as the 8-hour ozone NAAQS.

Requested EPA Action

Even with extensive reduction of NOx emissions from EGU and other sources located in the state of Delaware, Delaware continues to experience exceedances of the 8-hour ozone NAAQS. Modeling conducted by the EPA indicates that emissions from EGUs located in upwind states, including the state of Pennsylvania, are major contributors to Delaware's ongoing 8-hour ozone NAAQS compliance issues. Modeling performed for Delaware by Sonoma Technologies Inc, (STI) indicates that the Conemaugh Generating Station, located in the upwind state of Pennsylvania, itself significantly impacts the level of ozone in Delaware's ambient air.

The Conemaugh Generating Station's impact on Delaware's 8-hour ozone NAAQS compliance has been estimated to occur even though the Conemaugh Generating Station's coal-fired EGUs have been in compliance with their permit NOx emissions rate limits and applicable cap-and-trade NOx emission control programs. These permit NOx emission rate limits and long term (annual, seasonal) cap-and-trade NOx control programs have not provided the level of short term NOx emission limits necessary to be supportive of the short term, 8-hour ozone NAAQS. Because the CSAPR Update will continue to attempt to control NOx mass emissions on an annual and seasonal basis, these programs are also expected to permit an EGU facility such as the Conemaugh Generating Station to emit NOx at high levels over any given short term period while the subject EGU facility remains in overall compliance with the annual and seasonal programs.

The historic compliance flexibility provided to the Conemaugh Generating Station by applicable NOx cap-and-trade programs and relatively high, long term NOx emission rate limitations have permitted the Conemaugh Generating Station owner/operator the flexibility to operate without the installation of post-combustion NOx controls similar to those that have been in place for a number of years at other coal-fired EGUs. In fact, even after the installation of SCR NOx controls on the Conemaugh Generating Station coal-fired EGUs in late 2014, the compliance flexibility appears to have allowed the owner/operator to remain in compliance with applicable NOx emission rate and cap-and-trade NOx mass emission limitations without the need to operate the SCR controls at their best NOx control capacity in subsequent ozone seasons.

Pennsylvania has recently revised its NOx RACT regulation, *Title 25. Environmental Protection/ Part I. Department of Environmental Protection/ Subpart C. Protection of Natural Resources, Article III Air Resources/ Chapter 129. Standards for Sources, Additional RACT Requirements for Major Sources of NOx and VOCs*. The revision to Pennsylvania's NOx RACT regulation will be effective beginning in 2017, and includes NOx emissions rate limits that will be applicable to the Conemaugh Generating Station coal-fired EGUs. This includes a NOx emission rate limit of 0.12 lb/MMBTU, provisions to allow averaging among all of the units at the facility, and provisions to have compliance based on a rolling 30-day average basis. As discussed earlier in this petition, the 30-day averaging provisions of the regulation give the Conemaugh Generating Station the ability to emit NOx at a level shown by STI modeling to significantly impact Delaware's ambient ozone while remaining in compliance with the provisions of the revised Pennsylvania NOx RACT regulation.

In order to be protective of short term air quality standards, such as the 8-hour ozone NAAQS, it is Delaware's opinion that it will be necessary to establish NOx emissions limits with appropriate magnitudes and averaging periods that ensure that the NOx emissions are adequately controlled during any particular time period. Therefore, Delaware is hereby petitioning the EPA under section 126(b) of the Clean Air Act to find that the Conemaugh Generating Station, located in Pennsylvania, emits air pollutants in violation of the prohibition of section 110(a)(2)(D)(i) of the Clean Air Act, and to require the Conemaugh Generating Station to limit short term NOx emissions to levels that are protective of the 8-hour ozone NAAQS in downwind areas such as Delaware.

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