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DEPARTMENT OF NATURAL RESOURCES
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July 7, 2016

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 Brunner Island facility's electric generating units (EGUs), located near York, 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."

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

Joyce E. Epps, Air Director
Pennsylvania Department of Environmental Protection

Attachment 1

Delaware CAA 126 Petition

The state of Delaware submits this petition for a finding under §126(b) of the Clean Air Act that the Brunner Island facility's electric generating units (EGUs), located near York, 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 Brunner Island 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 o 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 2015:

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
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
2003 Ozone Season**	5	3	5	7
2002 Ozone Season**	18	10	16	26
2001 Ozone Season**	18	8	10	21
2000 Ozone Season**	8	5	7	11

*= 0.075 ppm Standard **= 0.08 ppm Standard

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

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.

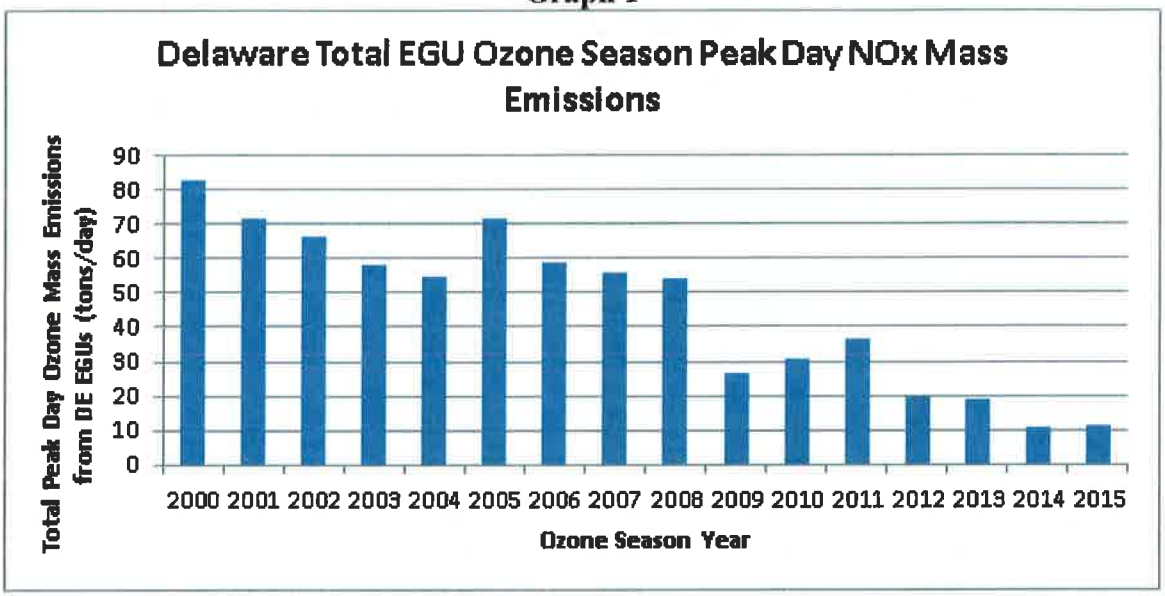
These state and regional NOx reduction efforts have resulted in significant NOx emissions reductions from EGUs located in the state of Delaware. These reductions have occurred both in terms of ozone season NOx mass emissions (tons) and also in average ozone season NOx emissions rates (lb/MMBTU). The following table was assembled with data extracted from the United States Environmental Protection Agency's Air Markets Program Data (EPA's AMPD). *(14)* 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 – 2015 Ozone Seasons
State of Delaware
Total EGU NOx Mass Emissions and Average NOx Emission Rate

Year	Total EGU OS Nox Mass (tons)	Change in NOx Mass Emissions from 2000 (%)	Average 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	628	-84.8	0.0494	-82.3

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 2015 ozone seasons, the Delaware's EGUs have achieved a NOx mass emissions reduction (for ozone season peak NOs 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 EPS's Cross-State Air Pollution Rule (CSAPR) website. *(15)*

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. *(16)* (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. 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 Brunner Island EGU Facility'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) *(17)*. 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. The identified EGU facilities significantly impacting Delaware's ambient air quality included Pennsylvania's Brunner Island facility.

Because of the magnitude of its impact on Delaware's ambient ozone, the Brunner Island EGU facility 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 Brunner Island power plant, located in York, Pennsylvania, emitted NOx during the 2011 ozone season at levels to individually have a significant impact on Delaware's air quality as measured by Delaware's ambient ozone monitors. The following table shows the days of the 2011 ozone season that the STI modeling estimated that the Brunner Island facility's NOx emissions impacted Delaware's ambient ozone at significant levels:

Table 5
Brunner Island NOx Emissions
STI Modeling Estimated Impact on Delaware Air Monitors
2011 Ozone Season

Month	Day	Year	8-hour Ave O3 (ppb)
5	8	2011	0.93
5	30	2011	2.17
6	2	2011	0.75
6	4	2011	1.53
6	8	2011	4.83
6	9	2011	4.37
6	12	2011	1.5
6	18	2011	2.73
6	23	2011	1.01
6	25	2011	2.22
6	26	2011	2.41
6	29	2011	2.07
6	30	2011	1.17
7	2	2011	1.59
7	4	2011	1.26
7	5	2011	0.7
7	6	2011	0.85
7	7	2011	1.56
7	10	2011	0.77
7	12	2011	2.88
7	13	2011	1.1
7	15	2011	2.11
7	18	2011	1.03
7	22	2011	3.81
7	23	2011	3.58
7	24	2011	1.71
7	26	2011	0.72
7	27	2011	1.14
7	28	2011	0.93
7	29	2011	1.78
7	30	2011	1.53
7	31	2011	0.79
8	1	2011	3.47
8	2	2011	1.65
8	7	2011	0.88
8	8	2011	1.61
8	10	2011	2.55
8	20	2011	4.39
8	22	2011	0.81
8	31	2011	1.51
9	12	2011	1.53
9	13	2011	1.41
9	24	2011	1.43

As shown in the above Table 5, the STI modeling estimated that during the 2011 ozone season the Brunner Island facility's NOx emissions had a significant impact on Delaware's ambient ozone on 43 separate days relative to the 2015 8-hour ozone NAAQS of 0.070 ppm, and 41 days of significant impact relative to the 2008 8-hour ozone NAAQS of 0.075 ppm. As shown in the table, the highest estimated impact occurred June 8, 2011 with a modeled impact value of 4.83 ppb. The data in the above table also indicates that Brunner Island facility NOx emissions contributed at significant levels to Delaware's 2011 ozone NAAQS exceedances on 9 of the 15 days of exceedance.

Brunner Island Electric Generating Station

The Brunner Island electric generation facility is located in York county Pennsylvania. The Energy Information Administration (EIA) database indicates that the Brunner Island facility includes three coal fired steam electric generating. *(18)* The following table provides some technical information regarding the Brunner Island coal-fired electric generating units:

Table 6
Brunner Island Electric Generating Units

Unit ID	Generator Prime Mover	EIA Nameplate Rating (MW)	EIA Summer Capacity (MW)	EIA Primary Fuel	EIA Commercial Operation Year	AMPD Max Heat Input Capacity (MMBTU/hr)	AMPD Reported NOx Controls
1	Steam Turbine	363	306	Coal	1961	3220	LNB w/CCOFA & SOFA
2	Steam Turbine	405	363	Coal	1965	3655	LNB w/CCOFA & SOFA
3	Steam Turbine	848	742	Coal	1969	7430	LNB w/CCOFA & SOFA

The Brunner Island facility is currently owned and operated by Talen Energy. The facility is located within the PJM RTO and the facility and its electric generating units operate as independent power producers. These units would be expected to typically operate as dispatched by PJM for reliability and economic purposes to support the electric grid. EIA data indicates that the three Brunner Island coal-fired EGUs currently fire bituminous coal from Appalachian states as their primary fuel. Talen Energy has publicly announced that that permitting and planning to install natural gas firing capability for all three steam EGUs has been initiated, with spring 2017 being the time of expected gas firing capability. Talen Energy has also indicated that coal-firing capability will be retained for the three Brunner Island steam EGUs. Lacking additional permitting or regulatory requirements, it would be anticipated that the Brunner Island steam EGUs would fire coal whenever it would be economically beneficial to do so.

Brunner Island NOx Emissions Limitations and Performance

As noted in Table 6 above, the Brunner Island Units 1, 2, and 3 are currently equipped with low NOx burners (LNBs) and combustion air controls which were installed in the mid-1990s to satisfy the requirements of Pennsylvania's NOx RACT regulation. 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. (19)*

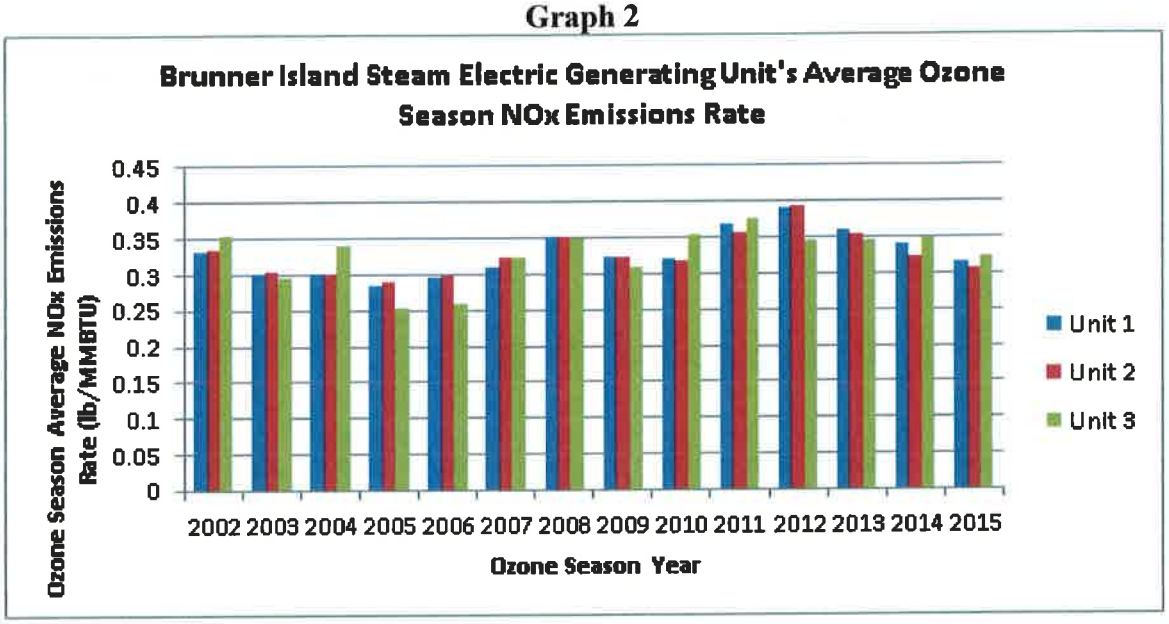
The revision to Pennsylvania's NOx RACT regulation also revises the NOx RACT provisions that are applicable to the Brunner Island Units 1, 2, and 3. The steam generators associated with Brunner Island Units 1, 2, and 3 are all coal-fueled tangentially fired combustion units with heat input ratings of greater than 250 MMBTU/hr. In accordance with the requirements of the revised Pennsylvania NOx RACT regulation, each of the three Brunner Island steam generating units are subject to a NOx RACT emissions rate limit of 0.35 lb/MMBTU based on a 30-day averaging period. Additionally, the revised Pennsylvania NOx RACT regulation permits the averaging of NOx emission rates among units at a single facility or multiple facilities under the control of a common owner for NOx RACT compliance purposes.

The revised Pennsylvania NOx RACT regulation's NOx emissions rate limit of 0.35 lb/MMBTU is representative of a presumptive NOx emission rate limit for a coal-fueled tangentially fired steam generator equipped with the equivalent of low-NOx burner technology. As the Brunner Island Units 1, 2, and 3 already incorporate this low-NOx burner technology, they are already operating at or near this presumptive limit of 0.35 lb/MMBTU. However, the use of a 30-day averaging period may facilitate the operation of one or more of the Brunner Island units at a daily average NOx emission rate in excess of 0.35 lb/MMBTU while still being able to attain the 0.35 lb/MMBTU average on a 30-day averaging period basis. Together the 30-day averaging

period and emissions averaging provisions of the applicable Pennsylvania NOx RACT do not ensure that the NOx emissions from the facility do not exceed an average rate of 0.35 lb/MMBTU over any given short time period, such as a 24 hour period. Because of these provisions in the revised Pennsylvania NOx RACT regulation, it does not appear likely that these revised regulatory provisions will result in any significant reduction in Brunner Island facility NOx emissions beyond historic and current levels. Therefore, the Pennsylvania NOx RACT provisions applicable to Brunner Island do not serve to limit this facility's ability to negatively impact downwind areas' compliance with the 8-hour ozone NAAQS.

Brunner Island Units 1, 2, and 3 have also all been subject to various NOx emissions cap and trade programs. Beginning with the 2001 ozone season through the 2002 ozone season, Brunner Island Units 1, 2, and 3 participated in the Ozone Transport Commission's NOx Budget Trading Program. Beginning with the 2003 ozone season through the 2008 ozone season, Brunner Island Units 1, 2, and 3 participated in the EPA's NOx Budget Program. Beginning with the 2009 ozone season through the 2014 ozone season, Brunner Island Units 1, 2, and 3 participated in the EPA's Clear Air Interstate Rule ozone season trading program. And beginning with the 2015 ozone season, Brunner Island Units 1, 2, and 3 participated in the Transport Rule ozone season NOx trading program. While these various trading programs effectively put a seasonal NOx emissions mass cap on the fleet of subject units, it did not require the subject units to limit their NOx emissions over any particular portion of the ozone season as long as the EGU was able to obtain sufficient NOx allowances to balance that unit's actual ozone season NOx mass emissions. The following graph shows the ozone season average NOx emission rate values for Brunner Island Units 1, 2, and 3 for the ozone season of 2002 through 2015.

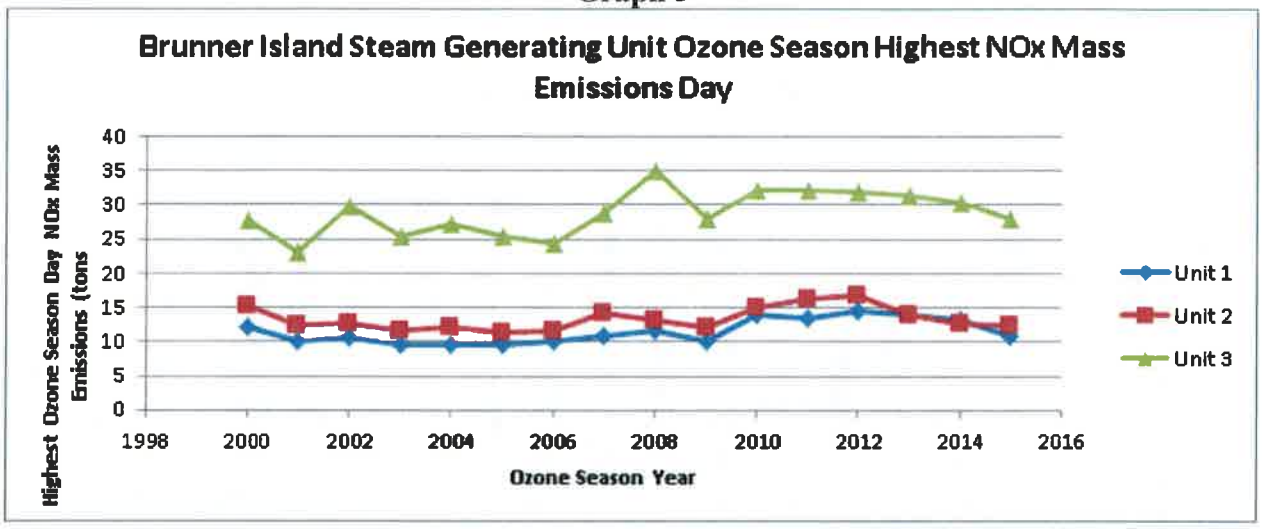
Graph 2



It can be seen in Graph 2 that, overall, there has been little change in the ozone season average NOx emissions rate for each of the three EGUs. While these EGUs have complied with the applicable requirements of the various NOx mass cap and trade programs, it appears that each of the three EGUs have been able to attain compliance without having to make any significant reductions in the respective EGU's ozone season average NOx emission rate.

Each of the three Brunner Island steam EGUs has also demonstrated a relatively consistent peak daily ozone season NOx mass emissions for the year 2000 through 2015 ozone seasons. The following graph shows each of the three units' ozone season peak daily NOx mass emissions for the year 2000 through 2015 ozone seasons:

Graph 3



Even with the regulatory and economic changes that have been occurring in the electric generation industry and the resulting impact on individual facilities and units, during some period in an ozone season it can be expected that an individual EGU or group of individual EGUs will operate at high capacity levels. The above graph is an indication that those discrete high capacity periods, however short, at the Brunner Island facility can be expected to produce high levels of daily NOx mass emissions at levels that can significantly impact Delaware's compliance with the 8-hour ozone NAAQS unless additional NOx emission controls or other appropriate regulatory restrictions are implemented.

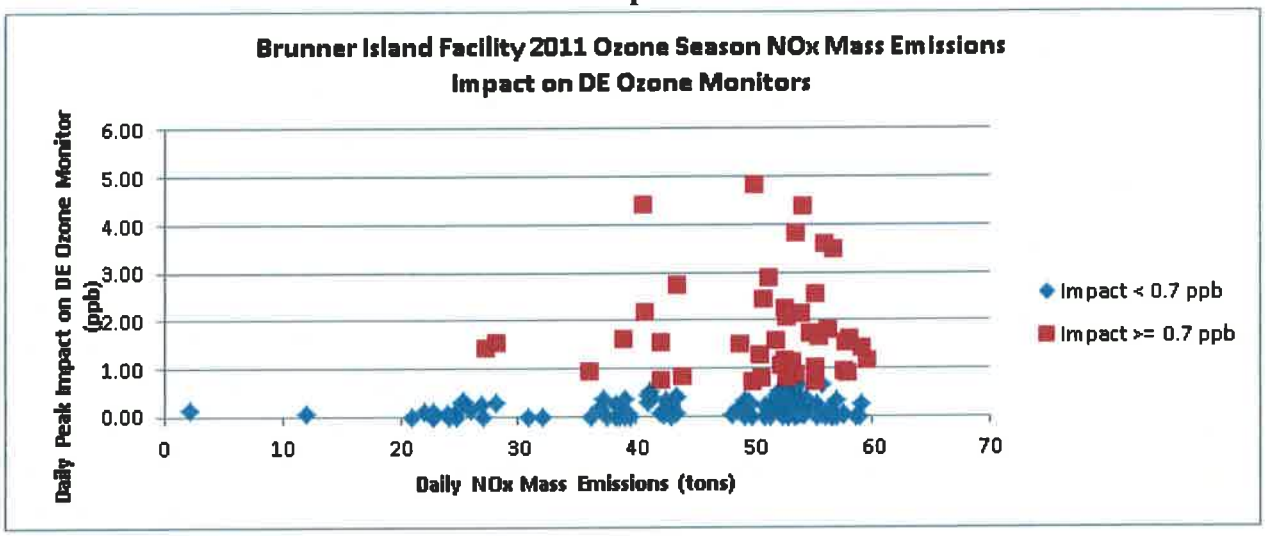
Peak NOx Mass Emissions Are Not Always Required to Significantly Impact Downwind NAAQS

While many evaluations for assessing downwind impact of upwind emissions are conducted for periods when the upwind emissions are at or near their peak, under some naturally occurring ambient conditions upwind NOx emissions much lower than peak levels can significantly impact downwind compliance with the 8-hour ozone NAAQS. This is a situation that can occur between the upwind Brunner Island EGU facility's NOx emissions and the monitored ozone levels in Delaware. The 2011 ozone season modeling performed by STI indicates that for the Brunner Island facility, it is not necessary for the facility to be operating near its maximum daily NOx mass emissions levels to significantly impact Delaware's compliance with the 8-hour ozone NAAQS.

The following graph is for the 2011 ozone season, and shows the Brunner Island EGU facility's daily NOx mass emissions versus the peak impact predicted by the STI modeling of those NOx mass emissions on ambient ozone at Delaware monitoring locations. The data for the Brunner

Island facility's NOx mass emissions was taken from the EPA's AMPD, and the modeling predicted ozone monitor impact was model's highest predicted impact of all of the Delaware monitor locations.

Graph 4



It can be seen in the above graph that the STI modeling predicted that the impact of NOx mass emissions from the Brunner Island facility on Delaware's monitoring locations varies greatly from day to day. The above graph also indicates that the 2011 ozone season modeling estimated that Brunner Island daily NOx mass emissions ranging from approximately 27.4 tons/day to approximately 59.7 tons/day had an impact of 0.7 ppb or greater at Delaware's ozone monitoring locations. At other times, the modeling indicated that the same range of the Brunner Island facility's NOx mass emissions had an impact of less than 0.7 ppb at Delaware's ozone monitoring locations. This is an indication that other variables/factors, such as ambient conditions and wind currents, may have a significant effect on the impact that Brunner Island facility NOx emissions have on Delaware's monitored ambient ozone.

The STI modeling indicated that on September 13, 2011, the Brunner Island EGU facility had a peak ozone impact of 1.41 ppb on Delaware ambient ozone monitors. On that day, Brunner Island coal-steam units 1&2 were on line the entire day and operated at elevated outputs most of the day, while the facility's coal-steam unit 3 was on line for less than half of the day and never reached 30% of its rated output during any of those hours. As documented in the EPA's AMPD, this resulted in a facility total daily NOx mass emission of approximately 27.4 tons (approximately 46% of the highest 2011 ozone season daily total NOx mass emissions from the facility). This information clearly shows that the Brunner Island facility has the capability of significantly impacting Delaware's compliance with the 8-hour ozone NAAQS even when the Brunner Island facility's NOx mass emissions are less than one half of the facility's current

potential to emit NOx on a short term (daily) basis.

It is of concern that the STI modeling information and AMPD emissions data indicate that for the September 13, 2011 date, the Brunner Island emissions of about half of the facility's recorded peak daily NOx emissions value had an estimated impact on the Delaware ozone of approximately twice the value identified as having significant impact (1.41 ppb estimated impact compared to 0.70 ppb identified as significant impact). This is an indication that even lower amounts of Brunner Island facility NOx mass emissions (compared to the 27.4 tons/day value) may still have significant impact on Delaware's measured ozone levels under certain atmospheric conditions.

It is a significant issue that the Brunner Island facility's NOx mass emissions alone can still have significant impact on Delaware's ambient ozone even when the EGUs at the Brunner Island facility are collectively operating at greatly reduced outputs, because this reduces the options available to ensure that the facility's NOx emissions do not significantly impact Delaware's compliance with the 8-hour ozone NAAQS. This is an indication that moderate reductions in Brunner Island NOx mass emissions rate (in terms of tons per hour), such as those that might occur as a result of application of more advanced combustion NOx controls or SNCR, do not appear to be sufficient to ensure that Brunner Island does not significantly impact Delaware's ambient ozone under all ambient conditions in the future. It appears that installation of SCR or a fuel switch to natural gas with advanced combustion controls appropriate regulatory requirements might be necessary to mitigate the Brunner Island facility's ability to negatively impact Delaware's compliance with the 8-hour ozone NAAQS.

Brunner Island's Modification to Incorporate Natural Gas Fuel

It has been publicly announced that the Brunner Island facility's current owner, Talen Energy, is continuing the process initiated by it predecessor to add natural gas firing capability to the EGUs at Brunner Island. Public statements by Talen Energy indicate the estimated the completion of adding natural gas firing capability is 2017. However, public statements by Talen Energy also indicated that the Brunner Island facility EGUs will retain coal-firing capacity on all of the EGUs, and will have the ability to operate on only natural gas fuel, only coal fuel, or a combination of both fuels based upon fuel economics. It is Delaware's understanding that there will be no permit restrictions regarding the selections of fuel to be combusted at any particular time other than annual mass caps. It is also Delaware's understanding that there will be a slight increase in the facility's annual VOC emissions associated with the operation of the natural gas firing capability. Because the Brunner Island EGUs will retain the capability to fire any amount of coal fuel at any time, the addition of natural gas fuel firing capability at the Brunner Island EGUs does not reduce the potential future NOx mass emissions on a short term basis that is critical to downwind 8-hour ozone NAAQS compliance.

Short Term NOx Emission Limits Are Required Assist in Reducing the Downwind Impact of Brunner Island NOx Emissions

The information discussed above indicates that current and past EGU cap-and-trade NOx control programs, applicable to the Brunner Island facility, that were designed to limit annual and seasonal NOx emissions, and current and past PA RACT, have not served to limit the Brunner Island facility's NOx emissions to levels such that those emissions do not significantly contribute to 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 Brunner Island NOx emissions on ozone levels measured at Delaware's monitoring locations.

Delaware is concerned that the NOx mass emission limits associated with CSAPR and, when effective, the proposed CSAPR Update will also 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 CSAPR and the proposed CSAPR Update provide for more restrictive annual and seasonal NOx mass emissions than previous rules, and that the CSAPR and proposed CSAPR update programs also provide significantly more restrictive allowance trading provisions than previous rules. However, the provisions of CSAPR and CSAPR Update do not provide any limitations on the Brunner Island facility's NOx mass emissions for any period shorter than seasonal (such as hourly or daily). The lack of short term NOx emission rates facilitates the continued operation of the Brunner Island EGUs with inadequate NOx emission controls and resulting high NOx emissions over short periods of time. The lack of short term emissions limitations will therefore help facilitate the Brunner Island facility'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 will be necessary to establish emissions limits with appropriate magnitudes and averaging periods at the Brunner Island facility that ensure that the 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 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 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 in upwind states 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 Brunner Island EGU facility, located in the upwind state of Pennsylvania, itself significantly impacts the level of ozone in Delaware's ambient air. The modeling has shown that not only can the Brunner Island facility significantly impact Delaware's 8-hour ozone NAAQS compliance when the facility is operating at high loads, but also that the Brunner Island facility significantly impact Delaware's 8-hour ozone NAAQS compliance when the facility is operating at 50% capacity or lower. The Brunner Island facility's impact on Delaware's 8-hour ozone NAAQS compliance has continued even though the Brunner Island facility has been in compliance with PA RACT and the applicable cap-and-trade NOx emissions control programs. These 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, and proposed CSAPR Update, will continue to attempt to control NOx mass emissions on and annual and seasonal basis, these programs are also expected to permit an EGU facility such as Brunner Island to emit NOx at high levels over any given short term basis and remain in compliance overall with the annual and seasonal programs.

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 Brunner Island EGU facility, located in Pennsylvania, is air pollutants in violation of the prohibition of section 110(a)(2)(D)(i) of the Clean Air Act, and to require the Brunner Island EGU facility 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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