DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DIVISION OF AIR QUALITY

Statutory Authority: 7 Delaware Code, Chapter 60 (7 **Del.C.** Ch. 60)

GENERAL NOTICE

REGISTER NOTICE

1. TITLE OF THE REGULATIONS:

State Implementation Plan (SIP) Revision to address the Clean Air Act Section 110 Infrastructure Elements for the 2008 Ozone National Ambient Air Quality Standard (NAAQS)

2. BRIEF SYNOPSIS OF THE SUBJECT, SUBSTANCE AND ISSUES:

The Department of Natural Resources and Environmental Control (DNREC), Division of Air Quality (DAQ) is proposing to revise the SIP to address the implementation, maintenance, and enforcement of the 2008 8-hour Ozone NAAQS.

On March 27, 2008, the Environmental Protection Agency (EPA) promulgated a new NAAQS for the pollutant ozone. The level of the NAAQS was lowered from 0.08 parts per million (ppm) to 0.075 ppm, based on 8-hour average concentrations. Pursuant to sections 110(a)(1) and 110(a)(2) of the Clean Air Act (CAA), each State is required to submit to EPA a SIP to provide for the implementation, maintenance, and enforcement of a newly promulgated or revised NAAQS. This SIP fulfills this requirement relative to the 2008 ozone NAAQS.

The SIP document consists of a determination and certification that Delaware has reviewed its SIP and determined that all elements required in CAA § 110(a)(2) for the 0.075 ppm ozone NAAQS have been met through earlier SIP submissions in connection with previous ozone standards, dated December 13, 2007, and September 16, 2009. In addition, a more detailed demonstration detailing how Delaware complies with the requirements of 110(a)(2)(D)(i)(I) of the CAA is included.

3. POSSIBLE TERMS OF THE AGENCY ACTION:

None

4. STATUTORY BASIS OR LEGAL AUTHORITY TO ACT:

7 Delaware Code, Chapter 60

5. OTHER REGULATIONS THAT MAY BE AFFECTED BY THE PROPOSAL:

None

6. NOTICE OF PUBLIC COMMENT:

Statements and testimony may be presented either orally or in writing at a public hearing to be held on Thursday, August 2, 2012 beginning at 6:00 PM in the DNREC's Richardson & Robbins Building Auditorium, 89 Kings Hwy, Dover, DE 19901. Interested parties may submit comments in writing to: Ron Amirikian, DNREC Division of Air Quality, 655 S. Bay RD, Suite 5N, Dover, DE 19901.

7. PREPARED BY:

Ronald A. Amirikian (302) 739-9402 ronald.amirikian@state.de.us June 15, 2012

Implementation, Maintenance, And Enforcement of National Ambient Air Quality Standards
Revision to State Implementation Plan for Ozone
June 12, 2012

1.0 Introduction and Background

A State Implementation Plan ("SIP") is a state plan that identifies how that state will attain and maintain air quality that conforms to each primary and secondary National Ambient Air Quality Standard ("NAAQS"). The SIP is a complex, fluid document containing regulations, source-specific requirements, and non-regulatory items such as plans and emission inventories.

Delaware's initial SIP was approved by the US Environmental Protection Agency (EPA) on May 31, 1972. Since this initial approval the Delaware SIP has been revised numerous times to address air quality non-attainment and maintenance issues. The revisions consisted of updated plans and inventories, and new and revised regulatory control requirements. Delaware's SIP is compiled at 40 C.F.R. Part 52 Subpart I.

Clean Air Act (CAA) § 110(a)(1) and (2) requires states to submit to the EPA SIP revisions that provide for the implementation, maintenance, and enforcement of any new or revised NAAQS within three years following the

promulgation of such NAAQS. On March 27, 2008, EPA promulgated a new NAAQS for the pollutant ozone. The level of the NAAQS was lowered from 0.08 parts per million (ppm) to 0.075 ppm, based on 8-hour average concentrations.[1]

> *"Delaware has reviewed its SIP and determined that all elements required in CAA § 110(a)(2) for the 0.075 ppm ozone NAAQS have been met through earlier SIP submissions in connection with previous ozone standards. Discussion of each CAA § 110(a)(2) element was specifically addressed in formal submittals to the EPA dated December 13, 2007, and September 16, 2009. These prior submittals addressed the § 110(a)(2) requirements for the 1997 8-hour ozone NAAQS, and Delaware believes that no changes are needed for Delaware to implement and enforce the revised 2008 ozone NAAQS. This letter confirms and certifies that Delaware's current SIP is adequate to address all applicable CAA§ 110(a)(2) requirements for the 0.075 ppm ozone NAAQS."*

This January 17, 2012 letter was based on an October 2, 2007 EPA document, "*Guidance on SIP Elements Required Under Sections 110(a)(1) and (2) for the 1997 8-hour Ozone and PM2.5 National Ambient Air Quality Standards.*" On March 29, 2012 the EPA returned Delaware's January 17, 2012 letter as incomplete for two reasons. First, EPA noted that Delaware's submittal did not include documentation to show that it had gone through the notice and hearing requirements of 40 CFR Part 51, Appendix V.[2] Second, EPA indicated that the submittal was incomplete regarding a "negative declaration"[3] related to 110(a)(2)(D)(i)(I) because "*EPA would expect a demonstration that contains information supporting a claim that a state does not significantly contribute or interfere with maintenance of the 2008 ozone NAAQS in other states*." This letter is incorporated here as Attachment B.

This document is a revision to Delaware's SIP. The purpose of this SIP revision is to address the two EPA comments identified above: 1) that Delaware must provide for public notice pursuant to 40 CFR Part 51, Appendix V, and 2) that EPA would expect a demonstration that contains information supporting a claim that a state does not significantly contribute or interfere with maintenance of the 2008 ozone NAAQS in other states.

Delaware is making this submission in absence of any published EPA guidance and is therefore relying on existing guidance and past practices as well as what Delaware believes to be a rational approach. Delaware encourages EPA to use this document as a template when formulating its guidance and require other states to submit similar analysis.

2.0 Certification that all CAA § 110(a)(2) Elements Have Been Met

Delaware has reviewed its SIP and determined that all elements required in CAA § 110(a)(2) for the 0.075 ppm ozone NAAQS have been met through earlier SIP submissions in connection with previous ozone standards. Discussion of each CAA § 110(a)(2) element was specifically addressed in formal submittals to the EPA dated December 13, 2007, and September 16, 2009. These prior submittals addressed the § 110(a)(2) requirements for the 1997 8-hour ozone NAAQS, and Delaware believes that no changes are needed for Delaware to implement and enforce the revised 2008 ozone NAAQS. Those documents are incorporated here again and submitted as attachments C and D. This SIP revision confirms and certifies that Delaware's current SIP is adequate to address all applicable CAA§ 110(a)(2) requirements for the 0.075 ppm ozone NAAQS.

3.0 Demonstration of Adequate Provisions in SIP (CAA § 110(a)(2)(D)(i)(I))

Delaware has been non-attainment for the pollutant ozone since a standard was first established in 1971. Over the past 40 years Delaware has learned that transport is very significant relative to ozone, and that the only way to reduce ozone concentrations is to reduce the volatile organic compound (VOC) and nitrogen oxides (NOx) emissions that are causing them. Over the last twenty years Delaware has adopted and implemented SIP provisions that cover all VOC and NOx emitting sources and source categories, and all such emissions in Delaware are now well controlled. These SIP provisions have eliminated Delaware's significant contribution to both its own unhealthy air quality, and the air quality of all downwind areas.[4]

---

1. 73 FR 16436, March 27, 2008. National Ambient Air Quality Standards for Ozone, Final Rule
2. EPA has apparently abandoned their 2007 guidance, and is now requiring all submissions, including those where the current SIP is reviewed and certified as being adequate without change, be subject to the SIP revision requirements of 40 CFR Part 51, Appendix V.
3. The term "negative declaration" is a term the EPA used in their March 29, 2012 letter. Delaware agrees that under no circumstances is a negative declaration appropriate relative to 110(a)(2)(D)(i)(I). For clarity, Delaware has, and is, basing its confirmation and certification that it has complied with 110(a)(2)(D)(i)(I) on the adequate provisions in its SIP.
4. Delaware's air quality remains unhealthy because other upwind States have not done the same.

CAA § 110(a)(2)(D) requires Delaware's SIP to *"Contain adequate provisions – (i) prohibiting, consistent with the provisions of this title, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will - (I) contribute significantly to non-attainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard, or (II) interfere with measures required to be included in the applicable implementation plan for any other State under part C to prevent significant deterioration of air quality or to protect visibility, (ii) insuring compliance with the applicable requirements of sections 126 and 115 (relating to interstate and international pollution abatement)."*

Based on EPA's Cross State Air Pollution Rule (CSAPR) modeling,[5] the provisions in Delaware's SIP were demonstrated by the EPA to be adequate provisions that satisfy CAA § 110(a)(2)(D)(i)(I) relative to the 0.08ppm ozone NAAQS. This SIP revision demonstrates that these same provisions in Delaware's SIP also satisfy CAA § 110(a)(2)(D)(i)(I) for the 0.075 ppm ozone NAAQS. This demonstration was specifically requested by the EPA in its March 29, 2012 letter.

3.1 Delaware's SIP includes measures that cover its entire emissions inventory

A periodic emissions inventory (PEI) is a comprehensive emissions inventory that quantifies the VOC and NOx emission from every source or other type emitting activity within a State. PEIs are developed every three years, and 2008 is the year of Delaware's most current (PEI). Delaware's PEI encompasses all emissions that could violate CAA § 110(a)(2)(D)(i)(I) with respect to the ozone NAAQS.

Year 2008 NOx emissions and VOC emissions were sorted from highest to lowest, and are summarized in Chart 1 and Chart 2. Many of Delaware's VOC and NOx control measures were not fully in effect in 2008. In order to demonstrate the effectiveness of Delaware's control measures Chart 1 and Chart 2 also include corresponding 2014 projected NOx and VOC emissions from EPAs Cross State Air Pollution Rule (CSAPR) 2014 base case modeling inventory.[6]

Table 3-1 below details VOC and NOx emissions from Delaware's 2008 PEI and EPA's 2014 base case CSAPR inventory. Included in Table 3-1 is every Delaware stationary source/source category that emitted equal to or greater than 25 tons per year (TPY) of either VOC or NOx, and that made up the top 99% of Delaware's VOC and NOx inventory. Table 3-1 is generally sorted from the largest Delaware source/source category, to the smallest, based on the 2008 PEI. For each source or source category in Table 3-1 the current applicable Delaware control measures are discussed, along with any identified additional measures that could be adopted into Delaware's SIP.

Chart 3-1: Delaware 2008 PEI vs CSAPR 2014 NOx Emissions

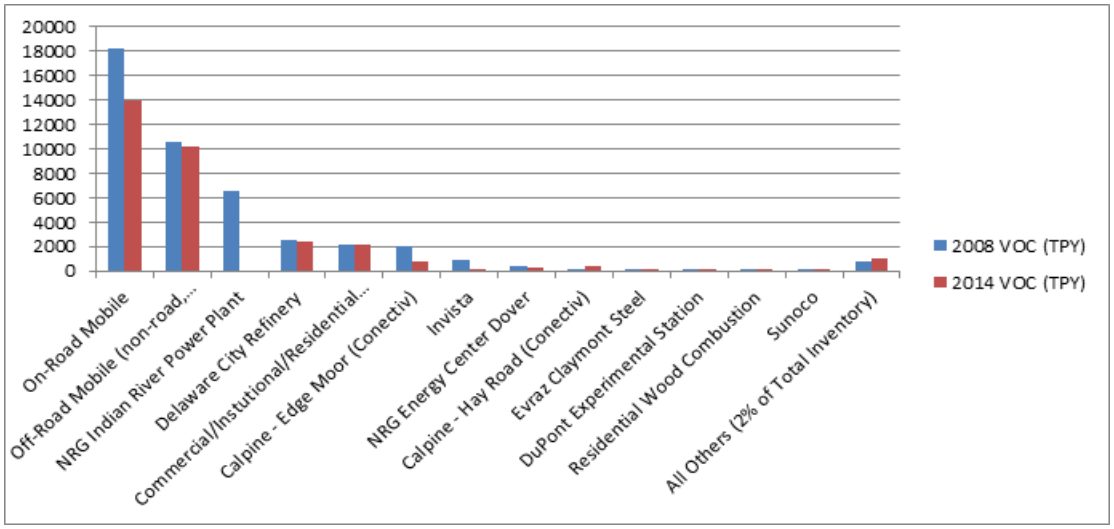


Chart 3-2: Delaware 2008 PEI vs CSAPR 2014 VOC Emissions

5. 76 FR 48208, August 8, 2011. The Cross-State Air Pollution Rule, Final Rule
6. ftp://ftp.epa.gov/EmisInventory/2005v4_2/2014emis/

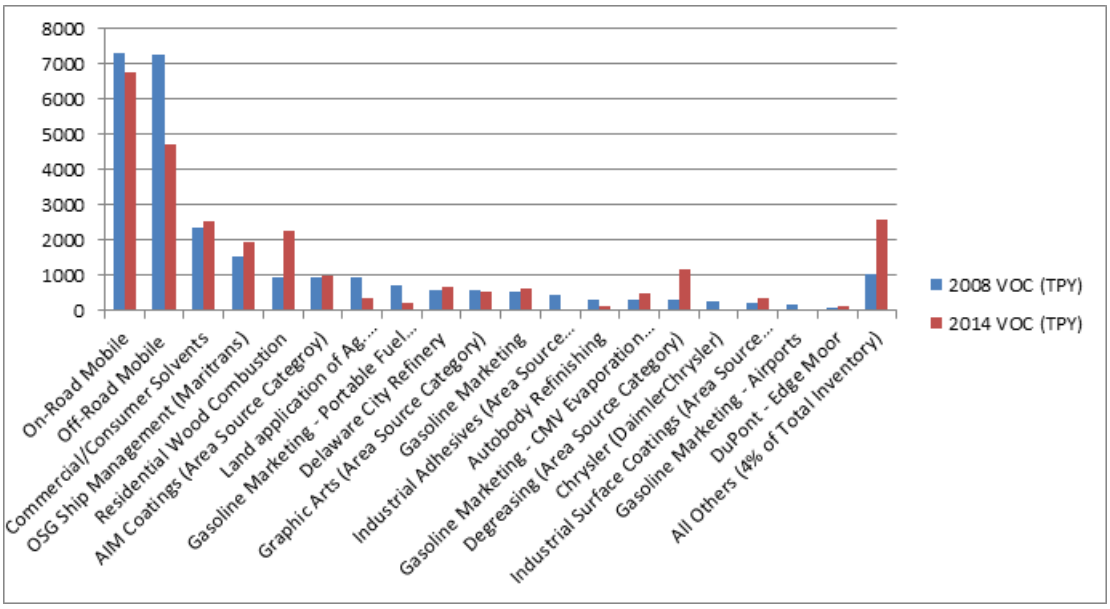


Table 3-1

FACILITY NAME / Source Category	2008 DE Periodic Emission Inventory		2014 CSAPR Base Case Inventory		Description of Control Measures in Delaware's SIP	Potential Additional Control Measures
	NOx (TPY)	VOC (TPY)	NOx (TPY)	VOC (TPY)		
On-Road Mobile *41% of 2008 NOx Inventory* *27% of 2008 VOC Inventory*	18206	7322	13959	6744	New vehicles must meet California vehicle emission standards (CA LEV 2) under 7 DE Admin. Code 1140. New and existing vehicles must be maintained under Delaware's vehicle Inspection and Maintenance program, 7 DE Admin. Code 1126 and 1131. Extended idling of heavy duty vehicles is prohibited under 7 DE Admin Code 1145. Overall on-road mobile emissions are capped in each of Delaware's three counties by ozone SIP budgets, which are managed under 7 DE Admin. Code 1132, transportation conformity.	Delaware has no authority under the CAA to further regulate tailpipe emissions. The next level of control would be to upgrade Sussex County's Basic I/M program to the Low Enhanced I/M program that is implemented in Kent and New Castle County. Delaware estimates this could reduce NOx emission by up to 292 TPY and VOC by up to 255 TPY, at a cost of 5,317 $/ton. Aside from I/M program upgrades, all other identified measures are in the form of transportation control measures (TCMs), which generally gain small incremental reductions (i.e., on the order of tons per year, not hundreds of tons per year), and that have a $/ton cost of $50,000 to over $1 million.

Off-Road Mobile (non-road, commercial marine, aircraft, locomotive) *23% of 2008 NOx Inventory* *27% of 2008 VOC Inventory*	10518	7268	10177	4738	These categories are subject to applicable federal measures only.	Delaware has limited authority under the CAA to regulate off-road mobile sources. Delaware, as part of the Ozone Transport Commission (OTC), is currently evaluating the feasibility of an off-road anti-idling regulation. Other potential measures include programs such as lawn-mower trade-in programs which generally gain small incremental reductions (i.e., on the order of tenths of a ton to several tons per year), and that have a $/ton cost of $50,000 to over $1 million.

NRG Indian River Power Plant 15% of 2008 NOx Inventory	6579	40	0[a]	0.3	Emissions are from four coal fired electric generating units (EGUs). Each of the four units installed low NOx burners under 7 DE Admin Code 1112 (NOx RACT). Units 1-3 are required to shutdown by consent order. Unit 2 was shutdown 5/2010 Unit 1 was shutdown 5/2011 Unit 3 is required to be shutdown in 12/2013, and in the interim has been controlled by installation of an SNCR system to supplement the existing low-NOx burners. Unit 4 has installed SCR technology and is subject to a NOx limitation of 0.1 lb/mmBTU, 24-hour average, under 7 DE Admin Code 1146, and an associated consent order. Unit 4 will be the only remaining coal fired unit in Delaware upon full implementation of the control measures currently being implemented.	Pipeline natural gas is not available as a generation fuel at this facility, and none of the units have natural gas firing capability in their current configuration. • As Units 1 and 2 have already been shut down, there are no actions that could be taken to further reduce the NOx emissions from these two units. • With regards to Indian River Unit 3, SCR is the only commercially available technology capable of attaining additional NOx emission rate reductions beyond the capabilities of the currently installed NOx reduction technologies (low-NOx burners and SNCR). However, the amount of time involved in the engineering, procurement, installation, and startup of an SCR system for Unit 3 would exceed the time available before the scheduled shutdown of the unit (18 month through December 2013). Therefore there are no additional NOx emission rate controls available to reduce the NOx emissions rate from this unit between the current date and the unit's scheduled shutdown. • An SCR system has already been installed on Unit 4 that, in conjunction with its existing low-NOx burners and turbo-furnace design, has allowed Unit to demonstrate compliance with the unit's 0.1 lb/MMBTU, 24-hour average NOx emissions rate limit. No commercially available NOx emission controls have been demonstrated to achieve NOx emission rate reductions beyond those achievable utilizing SCR. Therefore there are no additional NOx emissions rate reduction capabilities available for this unit. Delaware concludes that there are no additional economically and technologically feasible means of reducing the NOx emissions rate from these units.

Delaware City Refinery *6% of 2008 NOx Inventory* *2% of 2008 VOC Inventory*	2525	597	2367 [b]	665	The Delaware City Refinery is a petroleum refinery. NOx emissions are controlled under 7 DE Admin Code 1112 (NOx RACT), and also under a NOx cap/ PAL established pursuant to Section 2.0 of 7 DE Admin Code 1142 and 1125. The NOx cap began in 2011 at 2,525 TPY (i.e., actual 2008 emission levels), and decreases to 1,650 TPY beginning 2015. VOC emissions are subject to 7 DE Admin Code 1124 (VOC RACT). In addition, numerous sources at the facility are subject to emission limits established under 7 DE Admin. Code 1125 (LAER plus offsets). .	Delaware's March 15, 2011 SIP revision, "*Demonstration that Amendments to Section 2.0 of 7 DE Admin Code 1142, Control of NO_x Emissions from Industrial Boilers and Process Heaters at Petroleum Refineries Do not Interfere with Any Applicable Requirement of the Clean Air Act*" provides a detailed discussion of the facility-wide NOx cap. The following information demonstrates the stringency of the facility-wide NOx cap: Thirteen of the refineries industrial boilers were subject to the EPA NOx SIP Call, which was implemented in Delaware under 7 DE Admin Code 1139. The initial 2,525 NOx cap is significantly less than annualized NOx SIP Call cap[c], 3,333, which indicates that implementation of RACT and NSR at the refinery have resulted in the implementation of NOx controls at the refinery. The 1,650 TPY NOx cap represents a 35% reduction beyond RACT limits (i.e., actual 2008 levels), and more than an additional 50% reduction below NOx SIP Call levels. In addition, all future growth at the refinery must occur under this NOx cap. Delaware concludes that it is not feasible to lower the NOx cap at this time, and that NOx emission cannot be significantly reduced from the refinery in the context of this SIP. In addition, no additional VOC reduction measures have been identified.

Commercial/ Consumer Products *9% of 2008 VOC Inventory*	0	2345	0	2531	Commercial and consumer products are defined as non-industrial products used around the home, office, institution, or similar settings. Included are hundreds of individual products, including personal care products (SCC 2460100000), household products (SCC 2460200000), automotive aftermarket products (SCC 2460400000), coatings and related products (SCC 2460500000), adhesives and sealants (SCC 2460600000), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) related products (SCC 2460800000), and other miscellaneous products (SCC 2460900000). The VOCs in these products may act either as the carriers for the active product ingredients or as the active ingredients themselves. This category has undergone three rounds of regulation in Delaware. First under a 1998 National Rule (*63 FR 48819)*, then under a more stringent 2002 Delaware regulation (Section 2.0 of 7 DE Admin. Code 1141) which was based on a OTC model rule, and finally, under an update to Section 2.0 of 7 DE Admin. Code 1141 which was based on a 2006 revised OTC model rule, and which had a 2009 compliance date.	Delaware's SIP currently contains the most stringent provisions feasible at this point (i.e., those of the most recent OTC model rule adopted by any state). [d] Delaware does not have the authority to directly regulate manufacturers outside of the boundaries of the State of Delaware. Because of this, the only means available to Delaware to regulate emission in this category is to regulate the allowable VOC content of products sold in Delaware. Delaware represents a very small market share to these manufacturers and any attempt by Delaware to further reduce allowable VOC content on our own would result in the manufacturers not selling in Delaware, rather than having the desired effect of reformulation to lower VOC emitting products. In other words, Delaware's market share alone is not large enough for manufacturers to justify the expense of reformulating their products. Separate from a national or regional rule, it is not feasible for Delaware to regulate this category further. [e]

Commercial/ Institutional/ Residential Fuel Combustion (Area Source Category) *5% of 2008 NOx Inventory*	2113	95	2109	105	The commercial/institutional fuel combustion category includes small boilers, furnaces, heaters, and other heating units too small to be considered point sources. The commercial/institutional sector includes wholesale and retail businesses; health institutions; social and educational institutions; and federal, state, and local governments (i.e., prisons, office buildings) and are defined by SIC codes 50-99. The fuel types included in this source category are coal (SCC 2103002000), distillate oil (SCC 2103004000), residual oil (SCC 2103005000), natural gas (SCC 2103006000), and liquefied petroleum gas (LPG) (SCC 2103007000). Uses of natural gas and LPG in this sector include space heating, water heating, and cooking. Uses of distillate oil and kerosene include space and water heating. Emissions in this category are from many small units throughout the State, where facility-wide VOC and NOx emissions are generally less 5 TPY and 25 TPY, respectively (i.e., those not covered in the point source inventory). 7 DE Admin Code 1112 requires the control of NOx emissions from fuel burning equipment. Under 1112, units with maximum rated heat input capacities equal to or larger than 50 MMBtu/hr must be controlled by installation of either low excess air and low NO_x burner technology or flue gas recirculation technology. Units between 15 and 50 MMBtu/hr must receive an annual tune up performed by qualified personnel to minimize NOx emissions. Most commercial/institutional combustion units are subject to the annual tune-up requirements, or are less than 15MMBtu/hr and are exempt from the requirements of 1112.	Additional control measures for this category are possible. 7 DE Admin. Code 1112 could be revised to achieve some additional NOx reductions: • 1112 could be revised such that it is applicable to combustion units at facilities with the potential to emit less than major thresholds; and the low-end exemption of 1112 could be revised from 15MMBTU/hr to 5MMBTU/hr. Covered units would be predominately small units subject to annual tune-ups, and a NOx reduction of about 5% from each subject unit. Conservatively assuming that all emissions in this category would be impacted by the new requirement, this measure is estimated to have the potential to reduce 2012 NOx emissions by up to 60 TPY, at a cost of over $36,701/ ton. • 1112 could be revised to require boilers in the 25 MMBTU/hr – 50 MMBTU/hr size range to install either low excess air and low NO_x burner technology or flue gas recirculation technology. This would reduce NOx by up to 50% for each subject unit. Conservatively assuming that all emissions in this category would be impacted, this measure has the potential to reduce 2012 NOx emissions by up to 600 TPY, at a cost of more than $30,577/ ton. Other measures could likely be identified at similar reductions and cost effectiveness. Given the high control costs, and the large number of very small sources in this category, this category is best regulated through turnover of equipment.[f]

Calpine - Edge Moor (Conectiv) *4% of 2008 NOx Inventory*	1980	31	752	16	This facility is a power plant that consists of three gas/oil fired EGUs. (i.e., 86 MW, 174 MW, and 450 MW). NOx emissions are regulated under 7 DE Admin Code 1112 (NOx RACT), and 7 DE Admin Code 1146 (NOx, SO2 and Hg BACT). 1146 requirements are phased in between 2009 and 2012. 1146 includes both a unit specific annual NOx cap, and a 0.125 lb/MMBTU emission limitation, demonstrated on a rolling 24-hour average basis. All units complied with 1112 through the installation of low NOx burners. As a result of Delaware's 7 DE Admin Code 1146 and a related Consent Decree, Calpine's (formerly Conectiv) Edge Moor Electric Generating Station was required to take actions that have significantly reduced the NOx emissions rate from the electric generating units at that site. Units 3 and 4 have both been modified with additional NOx emissions controls: low-NOx burners, overfire air, and SNCR. Unit 5's primary fuel is residual fuel oil, and incorporates low-NOx burners, overfire air, and SNCR for NOx emissions rate reduction. As of January 1, 2012, each unit has a NOx emissions rate limit of 0.125 lb/MMBTU, calculated on a rolling 24-hr basis. Each of these units in 2011 had an average annual NOx emissions rate of less than 0.1 lb/MMBTU. Note that implementation of regulation 1146 is not reflected in the 2008 inventory, but appears to be reflected in the EPA CSAPR 2014 inventory.	SCR is the most effective commercially available NOx emissions control technology available for a gas/oil fired steam generating units such as these at the Calpine-Edge Moor facility. Additional control is possible by replacing the existing SNCR technology with SCR technology on each of the three EGUs • Unit 3: .The estimated incremental cost of reducing the NOx emission rate lower than the unit's 2011 annual average value (assuming a 10 year life, using the 2011 annual heat input, and using a 0.04 lb/MMBTU attainable NOx emissions rate basement) is $26,348 per incremental ton of NOx reduced. This would reduce mass emissions by 32% (37 TPY based on actual 2011 data). Unit 4: The estimated incremental cost of reducing the NOx emission rate lower than the unit's 2011 annual average value (assuming a 10 year life, using the 2011 annual heat input, and using a 0.04 lb/MMBTU attainable NOx emissions rate basement) is $10,145 per incremental ton of NOx reduced. This would reduce mass emissions by 57% (80 TPY based on actual 2011 data). • Unit 5: The estimated incremental cost of reducing the NOx emission rate lower than the unit's 2011 annual average value (assuming a 10 year life, using the 2011 annual heat input, and using a 0.04 lb/MMBTU attainable NOx emissions rate basement) is $37,277 per incremental ton of NOx reduced. This would reduce mass emissions by 57% (50 TPY based on actual 2011 data).

OSG Ship Management *6% of 2008 VOC Inventory*	0	1522	0	1939	Lightering emissions are controlled by vapor balancing under Section 46 of 7 DE Admin. Code 1124. Emission limitations are phased in between 2008 and 2012. In 2012 and beyond, lightering emissions are capped (i.e., all crude oil lightering emissions plus growth) at 43% of actual 2005 levels. Lightering restricted on ozone action days. Vapor balance required on all transfers capable of vapor balancing.	Feasible control technology was determined to be limited to vapor balance due to operation in the marine environment. Additional controls beyond vapor balancing are not feasible.
Residential Wood Combustion *4% of 2008 VOC Inventory*	88	948	73	2243 [g]	Delaware does not regulate this category in its SIP.	Given Delaware's climate this activity generally occurs outside the ozone season, so additional control beyond the federal NSPS is not warranted.
Invista *2% of 2008 NOx Inventory*	941	26	18	26	The Invista-Seaford facility includes two steam boilers. The first is a 94 MMBTU/hr package boiler firing pipeline natural gas or #2 fuel oil, utilizes flue gas recirculation for NOx control in compliance with 7 DE Admin Code 1112 and operates in compliance with its permitted NOx mass emissions limit of 39 tons/ year and a permitted NOx emissions rate of 0.10 lb/MMBTU when firing natural gas and 0.11 lb/ MMBTU when firing #2 fuel oil. The second is a 220 MMBTU/hr boiler firing pipeline natural gas or #2 fuel oil, utilizes layered NOx reduction technologies to meet the requirements of 7 DE Admin Code 1112 and 40 CFR Part 60 Subpart Db. The NOx reduction technologies utilized on this boiler are low NOx burners, flue gas recirculation, and SCR….. with a permitted NOx mass emissions limit of 118 tons per year firing #2 fuel oil and 12 tons per year firing natural gas, and a permitted NOx emissions rate of 0.20 lb/MMBTU calculated on a 30 day rolling average	For the 94 MMBTU/hr package boiler, SCR is the most effective commercially available NOx reduction technology applicable to oil/gas fired boilers. The estimated incremental cost of reducing NOx emissions rate below the permitted NOx emissions rate of 0.10 lb/MMBTU (assuming 10 year life, permitted NOx annual mass emissions limit of 39 tons/ year, permitted NOx emissions rate of 0.10 lb/MMBTU, and using a 0.04 lb/MMBTU attainable NOx emissions rate basement) is $10,900 per ton of NOx reduced. For the 220 MMBTU/hr boiler SCR is the most effective NOx reduction technology applicable to oil/gas fired boilers. As this unit already incorporates SCR technology, there are no more effective NOx reduction technologies commercially available to further reduce the NOx emissions rate from this boiler

Architectural and Industrial Maintenance (AIM) Coatings (Area Source Category) *3% of 2008 VOC Inventory*	0	938	0	1006	Architectural surface coating operations consist of applying a thin layer of coating such as paint, paint primer, varnish, or lacquer to architectural surfaces, and the use of solvents as thinners and for cleanup. Surface coatings include either a water-based or solvent-based liquid carrier that generally evaporates in the curing process. Architectural surface coatings are applied to protect the substrate and/or to increase the aesthetic value of a structure. Industrial maintenance coatings include primers, sealers, undercoats, and intermediate and topcoats formulated for and applied to substrates in industrial, commercial, coastal, or institutional situations that are exposed to extreme environmental and physical conditions. These conditions include immersion in water, chemical solutions and corrosives, and exposures to high temperatures. AIM coatings are regulated under Section 1 of 7 DE Admin. Code 1141. This regulation is based on an Ozone Transport Commission (OTC) model rule (which was based on California regulations), and which is much more stringent than the current federal rule. The compliance date of this regulation was 1/1/2005.	Delaware's SIP currently contains the most stringent provisions feasible at this point (i.e., those of the most recent OTC model rule adopted by any state)[h]. Delaware does not have the authority to directly regulate manufacturers outside of the boundaries of the State of Delaware. Because of this, the only means available to Delaware to regulate emission in this category is to regulate the allowable VOC content of products sold in Delaware. Delaware represents a very small market share to these manufacturers and any attempt by Delaware to further reduce allowable VOC content on our own would result in the manufacturers not selling in Delaware, rather than having the desired effect of reformulation to lower VOC emitting products. In other words, Delaware's market share alone is not large enough for manufacturers to justify the expense of reformulating their products. Separate from a national or regional rule, it is not feasible for Delaware to regulate this category further.
Land application of Ag. Herbicides/ pesticides *3% of 2008 VOC Inventory*	0	853	0	343[i]	None.	Regulation of this category is not feasible by the State of Delaware. The only identified potential control measure for this source category is to reduce the VOC content of the herbicide/pesticide. Delaware does not command sufficient market share for this to be feasible. This category is best regulated by the EPA under a national rule.
Gasoline Marketing - Portable Fuel Containers *3% of 2008 VOC Inventory*	0	712	0	224	Portable fuel containers are regulated nationally by the EPA under 40 CFR Part 59, Subpart F.	No control measures to further reduce emission from this category have been identified.

Graphic Arts (Area Source Category) *2% of 2008 VOC Inventory*	0	575	0	559	Printing operations are a source of VOC emissions due to the volatile organic content of inks and thinners used in the industry. It is estimated that, on average, half of the graphic arts establishments are in-house printing services in non-printing industries. The remaining establishments are located at businesses whose main function is printing or graphic arts. Large printing operations with VOC emissions of 10 TPY or more are included in the point source inventory. All sources with maximum theoretical emissions equal to or greater than 7.7 TPY are subject to the CTG based requirements in Section 37 of 7 DE Admin Code 1124 (VOC RACT). Offset lithographic and letterpress emission sources with maximum theoretical emissions equal to or greater than 15 pounds per day are subject to the CTG based requirements in Section 47 of 7 DE Admin Code 1124 (VOC RACT).	Delaware's SIP currently contains the most stringent identified provisions feasible at this point (i.e., those of the most recent EPA CTGs).
Retail Gasoline Marketing – • Stage I Vapor Recovery • Stage II Vapor Recovery • Tank Breathing • Trucks in Transit	0	525	0	633	Stage I emissions (i.e., tank truck refilling of storage tanks) are controlled by vapor balancing under Section 26 of 7 DE Admin. Code 1124 (VOC RACT). Stage II emissions (i.e., refueling of vehicles) are controlled by vapor balancing under Section 36 of 7 DE Admin. Code 1124 (VOC RACT). Gasoline tank breathing emissions are subject to annual leak testing and permitting requirements under Section 36 of 7 DE Admin. Code 1124 (VOC RACT) Gasoline tank truck emissions are subject to annual leak testing and permitting requirements under Section 27 of 7 DE Admin. Code 1124 (VOC RACT).	No control measures to further reduce emission from Tank Breathing, and trucks in transit have been identified. Additional reductions could be achieved by revising Stage I and Stage II requirements to California EVR requirements. This could reduce Delaware VOC emissions by up to 400 TPY, at a cost of $7,640/ ton.
Industrial Adhesives (Area Source Category) *2% of 2008 VOC Inventory*	0	461	0	0 [j]	Regulated under Section 4.0 of 7 DE Admin. Code 1141. 1141 is much more stringent than the most recent EPA CTG, and has broader coverage than the CTG (i.e., it covers field applied roofing adhesives and sealants not covered by the CTG). These requirements took effect on 5/1/2009.	Delaware's SIP represents the current level of technology for this source category. Additional regulation of this category is not feasible at this time.

NRG Energy Center Dover	358	2	293	2	Emissions are from one cogeneration unit, and two combustion turbines. All units are subject to RACT under 7 DE Admin Code 1112 (NOx RACT), and PTE limits under 7 DE Admin. Code 1125. The combustion turbines are subject to NSPS under 7 DE Admin Code 1120 and 40 CFR Part 60 Subpart GG.	The owner operator has applied for a permit to repower the existing coal fired cogeneration boiler with a heat recovery boiler and convert one combustion turbine to combined cycle operation. When the first combustion turbine is converted to combined cycle, the unit will be subject to NSPS under 7 DE Admin Code 1120 and 40 CFR Part 60 Subpart Db. The owner operator has requested a permit NOx emissions limit of 2.5 ppmvd for the repowered, combined cycle unit. Additional controls are not feasible.
Auto body Refinishing 1% of 2008 VOC Inventory	0	320	0	141	Auto refinishing is the repairing of worn or damaged automobiles, light trucks, and other vehicles, and refers to any coating applications that occur subsequent to those at original equipment manufacturer (OEM) assembly plants (i.e., coating of new cars is not included in this category). The majority of these operations occur at small body shops that repair and refinish automobiles. This category covers solvent emissions from the refinishing of automobiles, including paint solvents, thinning solvents, and solvents used for surface preparation and cleanup. Autobody refinishing is regulated under Section 11 of 7 DE Admin Code 1124. This source category has undergone three rounds of regulation in Delaware since 1990 (i.e., 1st CTG RACT, then OTC Model Rule 1 in 2002, and now OTC Model Rule 2 which had a compliance date of 1/1/2012). Note that implementation of Delaware's 1/1/2012 regulation is not reflected in the 2008 inventory, but appears to be reflected in the EPA CSAPR 2014 inventory.	Delaware's SIP represents the current level of technology for this source category.
Gasoline Marketing - CMV Evaporation Losses	0	309	0	496	Not regulated beyond any applicable federal measures.	No control measures to reduce emission from this category have been identified.

Degreasing (Area Source Category)_ 1% of 2008 VOC Inventory	0	308	0	1174[k]	Solvent cleaning is the process of using organic solvents to remove grease, fats, oils, wax or soil from various metal, glass, or plastic items. Non-aqueous solvents such as petroleum distillates, chlorinated hydrocarbons, ketones, and alcohols have been used historically; however, the use of aqueous cleaning systems for some applications has recently gained acceptance. The types of equipment used in this method are categorized as cold cleaners, open top vapor degreasers, or conveyorized degreasers. Degreasing is regulated under Section 33 of 7 DE Admin. Code 1124. This category has undergone two rounds of regulation in Delaware (i.e., 1st CTG RACT, then OTC Model Rule 1 in 2002). This category is regulated much more stringently than required by the CTG.	A new OTC model rule was approved at the May 2012 OTC spring meeting. No state has yet adopted this rule. Delaware is evaluating for adoption as it may have the potential to further reduce VOC emissions from this category in the future.
Chrysler (DaimlerChrysler)_ *1% of 2008 VOC Inventory*	34	260	0	0	This facility was an automobile assembly plant. NOx and VOC emissions were subject to 7 DE Admin Code 1112 (NOx RACT) and 1124 (VOC RACT), and the facility was covered under a VOC/NOx PAL issued pursuant to 7 DE Admin Code 1125. This facility is now shutdown.	This facility is now shut-down.
Evraz Claymont Steel	190	67	133	74	This facility is a 500,000 TPY steel plate manufacture, with the main emission source being an electric arc furnace. NOx emissions from the EAF are limited by proper operation of the EAF (SIP approved alternate NOx RACT). VOC emissions are exempted from RACT. NOx emissions from the reheat furnace limited to 0.25 lb/mmbtu under 7 DE Admin Code 1112 (alternate NOx RACT).	No control measures to further reduce NOx or VOC emissions from an EAF have been identified.

Calpine - Hay Road (Conectiv) 1% of 2008 NOx Inventory	202	11	467	18	This facility is a power plant that consists of six combined cycle gas fired (oil backup) EGUs. Units 1-3 are subject to 7 DE Admin Code 1112 (NOx RACT) limits of 25 to 88 ppm, 1-hour average, depending on fuel and firing mode. Units 5-7 are subject to 7 DE Admin. Code 1112, plus they are controlled by SCR as required by 7 DE Admin. Code 1125 (NOx LAER plus offsets).	SCR is the most effective commercially available NOx emission control technology commercially available for combustion turbine and combined cycle electric generating units such as those installed at Hay Road. Hay Road units 5, 6 and 7 already incorporate SCR. It is technically feasible to retrofit SCR on the Hay Road units 1, 2, and 3 that do not presently incorporate SCR. Assuming a 10-year life and using the 2011 annual heat input, it is estimated that the incremental cost of reducing NOx for Hay Road units 1, 2, and 3 collectively is approximately $8,800 per incremental ton of NOx reduced. This would reduce NOx mass emissions by approximately 72% .(354 TPY based on actual 2011 data).
Industrial Surface Coatings (Area Source Category) (1% of 2008 VOC Inventory	0	201	0	375[l]	This source category is covered under Section 1 of 7 DE Admin. Code 1141 and several section of CTG based 7 DE Admin. Code 1124.	Delaware's SIP represents the current level of technology for this source category. Additional regulation of this category is not feasible at this time.
Sunoco	83	94	108	49	This facility was subject to 7 DE Admin. Code 1112 (NOx RACT) and 1124 (VOC RACT). It was subject to beyond-RACT NOx control under Section 1 of 7 DE Admin. Code 1142.	The facility is now shutdown.
Gasoline Marketing – Airports and Marinas	0	175	0	61	Stage I emissions are controlled by vapor balancing under Section 26 of 7 DE Admin. Code 1124 (VOC RACT).	No control measures to further reduce emission from this category have been identified.

DuPont Experimental Station	156	6	184	11	NOx emissions are substantially from four oil fired 96 mmBTU/hr boilers. Each boiler is equipped with low NOx burner and low excess air technology under 7 DE Admin Code 1112 (NOx RACT).	SNCR and SCR are technically feasible post-combustion NOx reduction technologies applicable to oil fired boilers. • The estimated cost effectiveness for retrofit of SNCR on these boilers ranges from $2,070 per incremental ton of NOx reduction to $7,270 per incremental ton of NOx reduction to achieve an overall reduction of 40% in NOx emissions. • The estimated cost effectiveness for retrofit of SCR on these boilers ranges from $5,290 per incremental ton of NOx reduction to $6,925 per incremental ton of NOx reduction to achieve an overall reduction of 70% in NOx emissions.
DuPont - Edge Moor	32	100	35	116	NOx emissions are from small (<50 mmBTU/hr) combustion units, which are subject to annual tune-up requirements to minimize NOx under 7 DE Admin Code 1112 (NOx RACT). VOC emissions are subject to an 81% reduction under Section 50 of 7 DE Admin Code 1124 (VOC RACT).	No control measures to further reduce emission from this facility have been identified.
General Motors	25	83	56	64	This facility was an automobile assembly plant. This facility was subject to 7 DE Admin. Code 1112 (NOx RACT) and 1124 (VOC RACT).	The facility is now shut down.
Dover Air Force Base	39	31	48	67	This facility is a U.S. Air Force Base. VOC emissions from the facility have been reduce by more than 81% since 1990 under 7 DE Admin Code 1124 (VOC RACT). NOx emissions are primarily from four gas fired central heat plant boilers, which are controlled by low NOx burners installed pursuant to 7 DE Admin. Code 1112 (NOx RACT).	No feasible control measures to further reduce emission from this facility have been identified.

Formosa Plastics	25	42	34	58	This is a plastics material and resin manufacturing facility. NOx emissions are from a 30 and a 40 mmBTU/hr boiler, subject to annual tune-up requirements to minimize NOx emissions under 7 DE Admin Code 1112 (NOx RACT). VOC emissions are from various storage tanks and reactors that are controlled by primary and secondary thermal oxidizers, with scrubbers under 7 DE Admin Code 1124 (VOC RACT) and federal NESHAP requirements.	SNCR and SCR are technically feasible post-combustion NOx reduction technologies applicable to oil and gas fired boilers. • The estimated cost effectiveness for retrofit of SNCR on these boilers ranges from $5,540 per incremental ton of NOx reduction to $19,450 per incremental ton of NOx reduction to achieve an overall reduction of 40% in NOx emissions. • The estimated cost effectiveness for retrofit of SCR on these boilers ranges from $12,100 per incremental ton of NOx reduction to $15,900 per incremental ton of NOx reduction to achieve an overall reduction of 80% in NOx emissions. No control measures to further reduce VOC emissions from this facility have been identified
DSWA Southern Landfill	38	28	8	13	Landfill emissions are controlled by a gas collection system and flare pursuant to 40 CFR Part 62, Subpart I and Part 63, Subpart AAA.	No control measures to further reduce emission from this facility have been identified.
Croda	49	10	2	12	NOx emissions are from a 75mmbtu/hr and a 115mmbtu/hr boiler, both equipped with low NOx burners/low excess air technology pursuant to 7 DE Admin. Code 1112 (NOx RACT). In addition, NOx from this facility are covered under a NSR PAL.	SNCR and SCR are technically feasible post-combustion NOx reduction technologies applicable to gas and oil fired boilers. • The estimated cost effectiveness for retrofit of SNCR on these boilers ranges from $69,200 per incremental ton of NOx reduction to $104,000 per incremental ton of NOx reduction to achieve an overall reduction of 40% in NOx emissions. • The estimated cost effectiveness for retrofit of SCR on these boilers ranges from $374,300 per incremental ton of NOx reduction to $557,000 per incremental ton of NOx reduction to achieve an overall reduction of 70% in NOx emissions. Given that these units are already controlled, and that emissions are projected to be low in the future, additional control beyond RACT is not warranted in the context of CAA 110(a)(2)(D)(i)(I).

Prescribed Fires	16	35	5	51	Open burning is restricted under 7 DE Admin. Code 1113.	The limited burning allowed under 1113 is substantially limited to outside the ozone season. Additional controls are not feasible.
Traffic Markings (Area Source Category)		48	0	100 m	Section 1 of 7 DE Admin. Code 1141	This category is currently regulated at the level of demonstrated technology.
DuPont - Chestnut Run	45	2	51	3	48 mmbtu/hr boiler subject to annual tune-up to minimize NOx emission under 7 DE Admin Code 1112 (NOx RACT). 96 mmbtu/hr boiler equipped with low NOx burner and low excess air technology under 7 DE Admin Code 1112 (NOx RACT). Vapor degreaser and other VOC emission points subject to 7 DE Admin Code 1124 (VOC RACT).	SNCR and SCR are technically feasible post-combustion NOx reduction technologies applicable to oil fired boilers. • The estimated cost effectiveness for retrofit of SNCR on these boilers ranges from $3220 per incremental ton of NOx reduction to $7330 per incremental ton of NOx reduction to achieve an overall reduction of 40% in NOx emissions. • The estimated cost effectiveness for retrofit of SCR on these boilers ranges from $10,550 per incremental ton of NOx reduction to $15,580 per incremental ton of NOx reduction to achieve an overall reduction of 70% in NOx emissions. Given that these units are already controlled, and that emissions are projected to be low in the future, additional control beyond RACT is not warranted in the context of CAA 110(a)(2)(D)(i)(I).
Printpack	2	42	6	104	The emissions from the facility are from seven flexographic printing presses, a photopolymer plate making system, and automatic parts washer, and a waste solvent tank. Emissions are controlled by a regenerative thermal oxidizer operated pursuant to 7 DE Admin. Code 1124 (VOC RACT).	No control measures to further reduce emission from this facility have been identified.

City of Dover - McKee Run	33	0	0 [n]	0	This facility is a power plant that consists of three gas/oil fired EGUs. These three units are controlled with low NOx burners installed pursuant to 7 DE Admin. Code 1112 (NOx RACT), with Unit 3 (the largest unit) also being controlled with overfire air. These units each have permit required short term NOx emission rate limits with a 24-hr averaging period, and collectively have a 24-hour mass emission limit. As a result of 7 DE Admin. Code 1146, all three McKee Run units were converted from residual oil primary fuel to natural gas primary fuel with No. 2 oil backup.	SCR is the most effective commercially available NOx reduction technology commercially available for oil and gas fired electric generating unit boilers such as the three units at McKee Run. For Unit 1 the estimated cost effectiveness is $126,600 per incremental ton of NOx reduction, for Unit 2 the estimated cost effectiveness is $150,100 per incremental ton of NOx reduction, and for Unit 3 the estimated cost effectiveness is $38,900 per incremental ton of NOx reduction. For each of these units, the retrofit of SCR would be expected to achieve an 80% reduction in NOx emissions (28 TPY based on actual 2011 data). SNCR is another commercially available, technically feasible retrofit NOx reduction technology for oil and gas fired boilers such as the three units at the McKee Run facility. For Unit 1 the estimated cost effectiveness is $76,500 per incremental ton of NOx reduction, for Unit 2 the estimated cost effectiveness is $92,800 per incremental ton of NOx reduction, and for Unit 3 the estimated cost effectiveness is $24,900 per incremental ton of NOx reduction. For each of the three units, the retrofit of SNCR would be expected to achieve a 40% reduction in NOx emissions (15 TPY based on actual 2011 data).
Delaware City Terminal	0	33	0	26	VOC emissions are regulated under 7 DE Admin Code 1124 (VOC RACT).	No feasible control measures to further reduce emission from this source have been identified.
Mountaire Farms - Millsboro	33	0	15	0.35	7 DE Admin. Code 1112 (NOx RACT)	No control measures to further reduce emission from this facility have been identified.
Commercial Cooking (Area Source Category)	0	32	0	30	Not regulated in Delaware's SIP.	The only identified VOC controls in place with regards to commercial cooking are those affecting chain-driven charbroilers. Delaware estimates emissions from chain-driven charbroilers to be less than 5% its total commercial cooking VOC, i.e. a maximum of 1 tpy of controllable VOCs. A report by the Bay Area Air Quality Management District (April, 2007) says that costs for controls would be $5,193/ton of VOC reduced.
FMC	30	1	0.003	0.042	NOx emissions from two 25 mmBTU/hr boilers and three small spray dryers. Annual tune-ups to minimize NOx emissions on all NOx emitting units is required by 7 DE Admin. Code 1112 (NOx RACT).	No control measures to further reduce emission from this facility have been identified.

Hirsh Industries	1	26	2	24	Subject to Section 19 of 7 DE Admin. Code 1124, which is based on the most recent EPA CTG.	No control measures to further reduce emission from this facility have been identified.
DSWA Cherry Island Landfill	1	24	4	57	Landfill emissions are controlled by a gas collection system and flare pursuant to 40 CFR Part 62, Subpart I and Part 63, Subpart AAA.	No control measures to further reduce emission from this facility have been identified.
Total - categories covering all 2008 PEI sources that emit more than 25 TPY of either VOC or NOx, and which total the top 99% of DE's overall 2008 Anthropogenic Emissions	**44342**	**26550**	**30906**	**24899**		
Total - all other 150+ 2008 PEI facilities and source categories not included above	418	347	823	1692	Many of these small sources are also controlled under the adequate measures in Delaware's SIP. This includes small sources covered by CTG and non-CTG RACT. This also includes many combustion turbines and diesel generators with very low TPY emissions, but with very high TPD emissions on days conducive to ozone formation. These units are regulated under 7 DE Admin. Code 1144 and 1148. Control of all units with significant emissions on days conducive to the formation of ozone is critical to compliance with CAA 110(a)(2)(D)(i)(I).	
Total Anthropogenic Emissions (TPY)	**44760**	**26897**	**31729**	**26591**		

a. Emissions from this facility are low, but are anticipated to generally be greater than zero.

b. Note that the 2014 CSAPR projection is inflated because it exceeds the allowable refinery NOx CAP.

c. The referenced SIP revision includes a demonstration that the refinery emissions are uniform across the year, and regulation on a TPY basis and not on an ozone season basis is acceptable. Based on this the 1139 budgets were annualized by multiplying by 12/5.

d. The OTC commissioners approved an updated consumer products model rule in May 2012. Delaware plans to propose an update to its regulations based on this model rule in the future

e. Note that the OTR states are currently considering an update to their model rule. This is based on CARB 2006 amendments, plus potential increased benefit by adding paint thinner and multi-purpose solvents, and has the potential to reduce Delaware VOC emissions by 365 TPY.

f. Note that section 4.0 of 7 DE Admin. Code 1125 requires BACT for any new source that emits greater than 5 TPY of NOx.

g. Delaware cannot explain why this emission is projected to be so high in CSAPR inventories. 2014 emissions should remain on-par with 2008 levels.

h. An update AIM model rule was approved by the OTC on June 3, 2010, which has not yet been adopted by any state. Delaware plans to propose an update to its regulations based on this model rule in the future.

i. Delaware cannot explain why this emission is projected to be so low in CSAPR inventories. 2014 emissions should remain on-par with 2008 levels.

j. Section 5 of 7 DE Admin. Code 1141 reduces VOC emission from this category by about 50%. It is not clear where the emissions from this category are reflected in the CSAPR inventory.

k. Delaware cannot explain why this emission is projected to be so high in CSAPR inventories. 2014 emissions should remain on-par with 2008 levels.

l. Because of 7 DE Admin Code 1141 and CTG based updates to 7 DE Admin Code 1124 that took effect post-2008, we would expect 2014 emissions to be lower than 2008 emissions for this category.

m. Delaware cannot explain why this emission is projected to increase in the CSAPR inventory. 2014 emissions should remain on-par with 2008 levels

n. Emissions from this facility are expected to be very low, but to generally be greater than zero.

The information in the Table 3-1 above demonstrates that Delaware's SIP includes measures that cover all non-trivial NOx and VOC sources in the State.

3.2 Implementation of the measures in Delaware's SIP have been effective, and have resulted in significant emissions reductions.

Delaware's adjusted[7] 1990 base year SIP inventory emissions totaled 82,718 TPY, and 95,203 TPY for VOC and NOx, respectively. Delaware's 2005 PEI demonstrates that emissions were reduced to 30,626 TPY, and 45,250 TPY for VOC and NOx, respectively[8]. This reduction (i.e., a 63% reduction in VOC and 52% reduction in NOx) was largely attributable to Delaware's implementation of 7 DE Admin. Code 1125 (NSR), 7 DE Admin. Code 1112 (NOx RACT), and 7 DE Admin. Code 1124 (VOC RACT), 7 DE Admin. Code 1126 and 1136 (vehicle I/M) control measures.

Table 3-2

	1990 PEI	**2005 PEI**
NO_x	95203	45250
VOC	82718	30626

While Delaware attained compliance with the 1-hour ozone NAAQS in 2005, it remained non-attainment for the 1997 8-hour ozone NAAQS. Between 2005 and 2009 Delaware adopted stringent control requirements applicable to its largest sources (e.g., EGUs, large ICI boilers, lightering). These control requirements generally incorporated phased-in compliance dates: a 2009 date to aid in attainment of the 1997 8-hour ozone NAAQS by the statutory deadline, and a later date, generally 2012/13, which was 1) looking forward to EPA finalization of a new 8-hour ozone NAAQS that was protective of public health[9], and 2) that resulted in each source/source category being well controlled. During this time period Delaware also updated its VOC RACT requirements and adopted regional measures to reduce emission from large area source categories (e.g., AIM, Consumer Products, etc.).

EPA's CSAPR projections give an indication of the effectiveness of Delaware's current SIP measures once fully implemented (i.e., after 2013). EPA developed base case projection inventories for 2012 and 2014 as part of the CSAPR. The 2014 CSAPR inventory is detailed in Table 3-1,and both 2012 and 2014 [10] CSAPR inventories are summarized in Table 3-3 below.

7. Delaware's actual 1990 base year SIP inventory emissions totaled 52,493 TPY, and 77,281 TPY for VOC and NOx, respectively. To enable direct comparison to Delaware's 2005 PEI the on-road and non-road categories were adjusted using EPAs MOBILE6.2 and 2004 non-road models.
8. These reductions were made to reduce ozone concentrations under the 1-hour ozone standard. Delaware attained the 1-hour ozone NAAQS in 2005.
9. EPA abandoned this effort
10. ftp://ftp.epa.gov/EmisInventory/2005v4_2/2014emis/

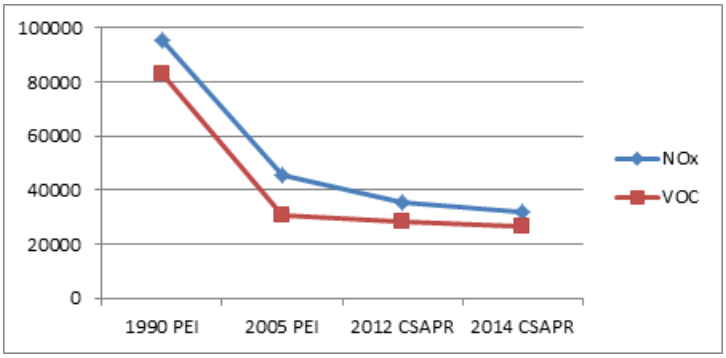
Table 3-3

	2012 CSAPR		2014 CSAPR	
	NOx	**VOC**	**NOx**	**VOC**
EGU	2639	75	1701	40
Non-EGU	3975	3858	3675	3861
Nonpoint	2255	11201	2194	11115
Nonroad	10365	5165	10177	4526
Onroad	16294	7599	13959	6744
Fires	23	305	23	305
Total	**35549**	**28204**	**31729**	**26591**

For 2014 EPA projects Delaware's overall emissions to be 26,591 TPY and 31,729 TPY for VOC and NOx, respectively. This represents a 13% reduction in state-wide VOC emissions, and a 30% reduction in state-wide NOx emissions since 2005; and a 68% reduction in VOC and a 67% reduction in NOx emission levels since 1990.

This inventory analysis is summarized in Chart 3-3 below.

Chart 3-3



This data clearly demonstrates that Delaware's current SIP measures are very effective at reducing emissions that contribute to ozone formation. By extension, Delaware's SIP measurers have reduced the impact of Delaware emissions on the attainment and maintenance of air quality standards in both Delaware and downwind states.

3.3 Cost Effectiveness of the measures in Delaware's SIP

The large emission reductions discussed in Section 3.2 above have required a correspondingly large economic investment by Delaware.[11] Table 3-4 below provides estimates of the cost to achieve the significant emission reductions discussed above:

11.

Table 3-4

Regulation (7 DE Admin. Code)	Pollutant	Estimated Cost Effectiveness
1112 (NOx RACT)	NOx	$400 - $12,300 per ton
1124 (VOC RACT)	VOC	$3,000 - $29,000 per ton
1126 (Vehicle I/M)	VOC, NOx	$1,000 - $5,000 per ton
1136 (Vehicle I/M)	VOC, NOx	$1,000 - $5,000 per ton
1125 (non-attainment NSR)	VOC, NOx	$39,700 to $150,000 per ton
1142, Section 2.0 (NOx emissions from Petroleum Refineries)	NOx	$10,000 - $150,000 per ton
1141, Section 1.0 (AIM)	VOC	$6,400 per ton
1141, Section 2.0 (Consumer Products)	VOC	$800 per ton
1144 (Stationary Generators)	NOx	$23,000 - $90,000 [1]
1146 (EGU Multi-Pollutant Regulation)	NOx	$1,200 - $5000 per ton[2]
1148 (Combustion Turbines)	NOx	$63,000 - $78,000 per ton [24]

1 The $/ton cost is very high because the subject units have low TPY emissions. These units were regulated not because they are high TPY emitters, but rather because they have high daily emissions. For example, a unit that emits 10 tons all on a day conducive to ozone formation, and a unit that emits 3,650 TPY, 10 tons each day, both contribute the same to ozone NAAQS attainment/maintenance problems.

2 7 DE Admin. Code 1146 is a multi-pollutant regulation that covers NOx, SO2 and Hg. This cost is for the NOx pollutant only.

Delaware evaluated EPA's final report "*Direct Cost Estimates for the Clean Air Act Second Section 812 Prospective Analysis*," dated February 2011. This report estimates costs of "local controls" by each U.S. State. Delaware adjusted this cost data to account for state size by dividing by population from the 2010 census. Table 3-5 below compares the 2010 per capita cost invested in local controls by Delaware to the CSAPR covered states.

Table 3-5

State	$ local controls/person
New Jersey	231.71
New York	169.77
Texas	136.90
Delaware	128.29
Maryland	87.73
West Virginia	63.90
Pennsylvania	63.15
Illinois	61.18
Indiana	40.12
Wisconsin	36.43
Michigan	22.82
Ohio	20.94
Alabama	14.62
Tennessee	10.87
Missouri	5.84
North Carolina	4.32
Kentucky	3.85
Georgia	3.69
Virginia	2.64
Arkansas	0
Iowa	0
Kansas	0
Minnesota	0
Florida	0
Louisiana	0
Mississippi	0
Nebraska	0
Oklahoma	0
South Carolina	0

This indicates that Delaware has incurred a local control cost beyond most of the CSAPR covered states to comply with the CAA.

3.4 Measures in Delaware's SIP that cover EGUs

The EPA has defined emissions that contribute significantly under CAA § 110(a)(2)(D)(i)(I) in various ways, all of which have substantially limited such emissions to EGUs. In the NOx SIP Call and CAIR EPA's methodology defined significant contribution as those emissions that could be removed with the use of ''highly cost effective'' EGU controls. Under CSAPR, EPA determined that the emissions contributing significantly to nonattainment or interfere with maintenance were those that could be removed with $500/ton cost on EGUs, based on an analysis that accounted for both cost and air quality improvement. Under any definition, EGU's in Delaware are well controlled, and looking solely at EGUs Delaware has satisfied 110(a)(2)(D)(i)(I).

Delaware has measures in its SIP that control each of its EGUs (i.e., 7 **DE Admin. Code** 1112, 1146, and 1148). Pertinent characteristics of these measures are that they apply on a stack-by-stack basis (i.e., trading is not allowed), they require compliance on a short-term basis (i.e., generally a 24-hour or shorter rolling average), and they require controls on all EGUs, including those with high daily emissions despite having small annual mass emissions (e.g., peaking units). In addition, Delaware has measures in its SIP to prevent smaller

stationary reciprocating engine driven generators from operating as EGUs without controls (i.e., 7 **DE Admin. Code** 1144). Additional detail on Delaware's current EGU control measures is presented in the SIP revisions associated with the adoption of 7 **DE Admin. Code** 1112, 1144, 1146 and 1148.

Table 3-1 and the inventory analysis in Section 3.2 above summarize the current level of control on Delaware EGUs. EPA's CSAPR base case inventories and CAIR budgets also demonstrate the effectiveness of the EGU measures in Delaware's SIP.

- Between 2012 and 2014 Delaware's EGU emissions are projected to decrease from 2,639 TPY (7.4% of Delaware's overall 2012 CSAPR NOx inventory) to 1,701 TPY (5.4% of Delaware's overall 2014 CSAPR NOx inventory). For comparison, prior to implementation of Delaware's EGU SIP measures (i.e., prior to 1990) Delaware's EGU emissions were 24,878 TPY (32% of Delaware's overall 1990 NOx inventory). This represents a 93% reduction in NOx emissions from this sector.
- Under CAIR Delaware's annual 2015 NOx EGU budget was 3,472 tons, and Delaware's ozone season EGU budget was 1,855 tons. EPA's 2014 projection indicates that Delaware's annual EGU emissions are about 50% of the corresponding 2015 CAIR budget – in fact, Delaware's annual EGU emissions (i.e., 12-months) are less than its 2015 CAIR ozone season budget (5-months).[12]

Table 3-1 indicates that Delaware could achieve, in the aggregate, an additional estimated 549 TPY reduction in NOx from installing additional EGU controls.

- At about $8,800 /ton DE could reduce NOx emissions by 354 TPY
- At $10,000/ton by an additional 80 TPY
- At over $25,000/ton, by an additional 115 TPY

This high cost of additional EGU control is consistent with the EPA CSAPR analysis. Under CSAPR EPA determined that no additional EGU reductions would be achieved in Delaware for cost up to $2,500/ton. In CSAPR the EPA evaluated ozone season and annual EGU NOx emissions at pollution control marginal costs per ton of reductions ranging from $0 to $2,500/ton, for 2012 and 2014 scenarios. In all cases Delaware NOx emissions increased with cost. This indicates that controls are being added to EGUs outside of Delaware as cost increases, which would increase the capacity factor of Delaware units by making them more competitive. Additional reductions will not be realized from Delaware EGU's until the control cost exceeds about $8,800/ton, at which time gas fired combined cycle units in Delaware would install SCR.

Delaware concludes that because the cost is very high, the potential air quality benefit is low (i.e., the potential to further reduce significant mass emissions from Delaware's EGUs is low), and because each of Delaware's EGUs are already well controlled, these additional reductions beyond Delaware's current SIP measures are not feasible in the context of this SIP, and are not required under 110(a)(2)(D)(i)(I).

3.5 Measures in Delaware's SIP that cover non-EGUs

CAA § 110(a)(2)(D)(i)(I) covers a scope broader than EGUs. CAA § 110(a)(2)(D)(i)(I) requires a SIP to "*Contain adequate provisions prohibiting…any source or other type of emissions activity…from emitting any air pollutant in amounts which will contribute significantly…"* Ozone and ozone precursors are transported and can contribute to ozone concentrations in downwind areas regardless of their source. To satisfy 110(a)(2)(D) a SIP must contain provisions that cover VOC and NOx emissions from any source or other type of activity within the state. A state has not satisfied 110(a)(2)(D) until 1) the total emissions from the state no longer impact any other nonattainment/maintenance area by more than 1% of the NAAQS, or 2) there are adequate provisions in the SIP that cover all sources or other type of activities in the State. If there are any sources not regulated, then 110(a)(2)(D) has not been satisfied.

Section 3.1 above demonstrates that Delaware has measures in its SIP that cover all non-trivial VOC and NOx emitting activities. Section 3.2 above demonstrates that these measures are effective. In Table 3-1 Delaware has identified non-EGU measures that could achieve, in the aggregate, an additional estimated 1,125 TPY reduction in NOx and a 655 TPY reduction in VOC. These establish the level of control currently in effect in Delaware.

- At about $5,000/ton DE could reduce NOx emissions by about 375 TPY and VOC by 255 TPY
- At $10,000/ton DE could reduce NOx by an additional 50 TPY and VOC by an additional 400 TPY
- At over $10,000/ton, DE could reduce NOx by an additional 700 TPY

The analysis in Section 3.2 above shows that DE has reduced emissions by 56,127 TPY VOC and 63,474 TPY NOx between 1990 and 2014. These potential additional reductions make up about 1% of the VOC reductions, and less than 2% of the NOx reductions already made by Delaware's SIP measures. Delaware concludes that because the cost is very high, the potential air quality benefit is low (i.e., the potential to reduce

12. This does not imply that CAIR budgets are an adequate measure of compliance with CAA 110(a)(2)(D)(i)(I); rather it is an indication that Delaware's EGU SIP measures effectively control emissions.

significant mass emission is low), and because each of these sources/source categories are already well-controlled, these additional reductions beyond Delaware's current SIP measures are not feasible in the context of this SIP, and are not required under 110(a)(20(D)(i)(I).

4.0 Conclusion

This SIP revision demonstrates 1) that the Delaware SIP contains measures that cover every non-trivial VOC and NOx emitting source and source category in the State, and 2) that implementation of these measures has resulted in significant emission reductions in Delaware. Delaware concludes that the Delaware emissions that would significantly contribute to nonattainment and maintenance in downwind areas are those VOC and NOx emissions that are reduced by the following adequate measures in Delaware's SIP:

- Centralized Vehicle Inspections and Maintenance (I/M) requirements to include testing of older, high emitting vehicles, to significantly reduce on-road mobile emissions (7 **DE Admin. Code** 1126 and 1136)
- Stringent Reasonable Available Control Technology (RACT) on all major nitrogen oxides (NOx) and volatile organic compound (VOC) stationary sources, which establishes a baseline level of control and achieves large, cost effective reductions (7 **DE Admin. Code** 1112 and 1125)
- Best Available Control Technology (BACT) has been required on all existing coal and residual oil fired EGUs, and large industrial boilers, which ensure the largest emitters are well controlled (7 **DE Admin. Code** 1142 and 1146)
- BACT on all sources with high daily emissions, despite low annual emissions, which ensure all emissions on ozone days are controlled (7 **DE Admin. Code** 1144 and 1148).
- Adoption of regional measures to reduce emission from large non-point source categories that have been recommended by the Ozone Transport Commission (7 **DE Admin. Code** 1141, Sections 1, 2 and 4)
- Major and minor new source review, with minor source thresholds set at 5 tpy for ozone precursor emission, which ensures new units are well-controlled (7 **DE Admin. Code** 1125)

Additional opportunities for controlling emissions are either outside of our regulatory authority, impractical as a Delaware only initiative or carry an additional incremental cost in excess of $5,000 per ton. We are recommending this cost threshold to the EPA as criteria for evaluating all transport SIPs. Additional control measures from Delaware are not required under CAA § 110(a)(2)(D)(i)(I).

In the unlikely event that nonattainment or maintenance problems remain in downwind states impacted by Delaware once all states comply with CAA § 110(a)(2)(D)(i)(I), then the EPA should respond at that time with a SIP call under CAA § 110(k).

This and prior SIP revisions demonstrate that Delaware's SIP adequately addresses the requirements of CAA § 110(a)(2) for the 2008 ozone NAAQS.