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NO<sub>x</sub> SIP Call Rule — Impacts on  
Maryland and Surrounding States

January 2009

**MARYLAND POWER PLANT  
RESEARCH PROGRAM**



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Maryland Department of Natural Resources

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# NO<sub>x</sub> SIP Call Rule — Impacts on Maryland and Surrounding States

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## *FOREWORD*

This report was prepared under the direction of John Sherwell at the Maryland Department of Natural Resources, Power Plant Research Program (PPRP). Under contract to PPRP, the following individuals were responsible for conducting the work associated with this report:

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## *ABSTRACT*

In October 1998, EPA promulgated the “Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone,” which is commonly known as the “NO<sub>x</sub> SIP Call.” The NO<sub>x</sub> SIP Call applies to 20 states in the eastern United States and the District of Columbia and required NO<sub>x</sub> reductions of up to 28% from 1996 emissions levels by the year 2007. States established emissions caps on total NO<sub>x</sub> emissions allowable during the ozone season (May through September) for all sources affected by this rule, primarily electrical generation units (EGUs) and some non-EGUs.

In this project, the Maryland Power Plant Research Program (PPRP) evaluated the impacts of the NO<sub>x</sub> SIP Call Rule on sources in Maryland and surrounding states. It was observed that the number of installations of advanced post-combustion NO<sub>x</sub> controls such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR) systems increased during the period 1999-2006. Summertime NO<sub>x</sub> emissions were reduced significantly during this time period.

In 2006, EPA promulgated the Clean Air Interstate Rule (CAIR), which is considered the next generation of the NO<sub>x</sub> SIP Call rule and covers power plants and large sources in 28 eastern states. In addition, some states, including Maryland, have developed their own multi-pollutant regulations targeted at reducing emissions from power plants. Maryland’s program, the Healthy Air Act of 2006 (HAA), is designed to achieve more emissions reductions and on a faster schedule than federal regulations.

## *EXECUTIVE SUMMARY*

The Clean Air Act (CAA) requires that state regulatory agencies develop State Implementation Plans (SIP) specifying actions to reduce ozone pollution; each state reduction and control regulations are included in the SIPs. In October 1998, EPA promulgated the “Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone,” which is commonly known as the “NO<sub>x</sub> SIP Call.”

The NO<sub>x</sub> SIP Call applies to the following 20 states and the District of Columbia: Alabama, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, and West Virginia. The rule required NO<sub>x</sub> reductions of up to 28% from 1996 emissions levels by the year 2007. States were provided the option of either developing their own SIPs with NO<sub>x</sub> emissions control programs, or adopting EPA’s program in a Federal Implementation Plan (FIP).

The NO<sub>x</sub> SIP Call was based on air quality analyses conducted for the Ozone Transport Assessment Group (OTAG) on assessment of long range transport of ozone and its precursors. As part of the NO<sub>x</sub> SIP Call, states established statewide caps on total NO<sub>x</sub> emissions allowable during the “ozone season” (May to September) from all affected sources. Each state then established an allowance trading system in which “budget sources” (individual emissions units in affected states) were allocated NO<sub>x</sub> emission “allowances” for use during the ozone season. Sources could reduce NO<sub>x</sub> emissions (for example, by fuel switching or adding pollution control systems) or acquire NO<sub>x</sub> allowances (where an allowance represents a ton of NO<sub>x</sub>) to comply. This program is known as the “NO<sub>x</sub> Budget Trading Program.”

The NO<sub>x</sub> rules have resulted in significant reductions in summertime emissions of NO<sub>x</sub> from sources in Maryland and surrounding states. Between 1999 and 2006, Maryland and surrounding states showed an increase in the number of installations of more advanced NO<sub>x</sub> controls, such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR), and an overall increase in the number of NO<sub>x</sub> control systems. It should be noted that the cap-and-trade mechanism available with the NO<sub>x</sub> SIP Call allowed sources to acquire allowances rather than

actually reducing NO<sub>x</sub> emissions, which meant that some states, including Maryland and Pennsylvania, exceeded their statewide NO<sub>x</sub> allocations during the entire period. The exceedance in Pennsylvania may have been influenced by the fact that Pennsylvania is a net exporter of power generation. However, the NO<sub>x</sub> exceedance in Maryland is likely attributable to the fact that few large power plants sources installed state-of-the-art controls such as SCR systems over the period.

In 2006, EPA promulgated the Clean Air Interstate Rule (CAIR), which will result in further reductions in emissions of SO<sub>2</sub> and NO<sub>x</sub>. CAIR was vacated by the D.C. Circuit in July 2008; however, the rule was subsequently remanded in December 2008. EPA will be required to develop new CAIR regulations; however, the current regulations will be in effect until the new regulations are finalized. In addition to these federal initiatives, Maryland and some surrounding states have developed their own multi-pollutant regulations that will reduce emissions of NO<sub>x</sub> (and SO<sub>2</sub> and mercury in some cases). In Maryland, the State's multi-pollutant program, the Healthy Air Act (HAA) of 2006, will result in significant decreases in ozone season (May-September) and annual NO<sub>x</sub> emissions, as well as reductions in SO<sub>2</sub> and mercury. Delaware and Virginia have promulgated similar multi-pollutant regulations; Pennsylvania and West Virginia have not yet developed new state-level programs to reduce NO<sub>x</sub> and SO<sub>2</sub> emissions beyond CAIR.

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## ACRONYMS

CAA	Clean Air Act
CEMS	Continuous Emissions Monitoring System
COMAR	Code of Maryland Air Regulations
CO	Carbon Monoxide
DNREC	Delaware Department of Natural Resources and Environmental Control
eGRID	Emissions and Generation Resource Integrated Database
EGU	Electrical Generation Units
EIA	Energy Information Administration
ETS	Emissions Tracking System
FERC	Federal Energy Regulatory Commission
FIP	Federal Implementation Plan
IC	Internal Combustion
ICE	Information Collection Effort
IMDB	Integrated Modeling Database
MDE	Maryland Department of Environment
MOU	Memorandum of Understanding
MW	Megawatt
NAAQS	National Ambient Air Quality Standard
NET	National Emissions Trends

NSR	New Source Review
OTAG	Ozone Transport Assessment Group
OTC	Ozone Transport Commission
PADEP	Pennsylvania Department of Environmental Protection PADEP
RACT	Reasonably Achievable Control Technology
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SIP	State Implementation Plan
VADEQ	Virginia Department of Environmental Quality
WVDEP	West Virginia Department of Environmental Protection

## 1.0 INTRODUCTION

### 1.1 BACKGROUND

Ground level ozone causes a wide range of health problems and is considered to be a “regional” pollutant, as it forms in the atmosphere and is transported long distances by wind. Emissions of nitrogen oxides (NO<sub>x</sub>) and other precursor compounds contribute to the formation of ozone through photochemical reactions. The Clean Air Act (CAA) requires states to develop State Implementation Plans (SIPs) containing regulatory programs designed to reduce emissions of NO<sub>x</sub> to address ozone pollution.

Because state pollution control programs through the early 1990s were not achieving sufficient improvements in ambient ground-level ozone, particularly in the northeastern U.S., EPA promulgated the “Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone,” in October 1998, (commonly known as the “NO<sub>x</sub> SIP Call”). Further, in 2005, Ozone Transport Assessment Group (OTAG) states voted to implement a program to regulate NO<sub>x</sub> emissions from electric generating units (EGUs) and other major sources.

The NO<sub>x</sub> SIP Call was targeted at reducing NO<sub>x</sub> emissions by up to 28% from 1996 emissions levels by the year 2007. Affected states were provided the option of either developing their own SIPs to reduce NO<sub>x</sub> (and other precursors) or adopting EPA’s model program in the form of a Federal Implementation Plans (FIPs).

The NO<sub>x</sub> SIP Call was based on the analyses conducted for the OTAG on assessment of long range transport of ozone and its precursors. As part of the NO<sub>x</sub> SIP Call, states established statewide caps on total NO<sub>x</sub> emissions from all affected sources, limiting allowable NO<sub>x</sub> emissions during the “ozone season” (May to September). Each state then established an allowance trading system in which “budget sources” (individual emissions units in affected states) were allocated NO<sub>x</sub> emission “allowances” for use during the ozone season. Sources could reduce NO<sub>x</sub> emissions (for example, by fuel switching or adding pollution control systems) or acquire NO<sub>x</sub> allowances (where an allowance represents a ton

of NO<sub>x</sub>) to comply. This program is known as the “NO<sub>x</sub> Budget Trading Program.”

## 1.2 *PROJECT GOALS*

Maryland and other states in the Mid-Atlantic region were subject to the NO<sub>x</sub> SIP Call. Revisions to SIPs were made and sources began complying with new regulations by adding pollution control equipment, purchasing allowances, or a combination of those actions.

The Maryland Department of Environment (MDE) was interested in evaluating the benefits achieved from the NO<sub>x</sub> SIP Call. MDE was also interested in comparing the numbers and types of control equipment installed in Maryland to those in surrounding states. The overall goals of this project were to evaluate the impacts of the NO<sub>x</sub> SIP Call on NO<sub>x</sub> emissions in Maryland and surrounding states, and to identify NO<sub>x</sub> control systems that have been installed at power plants in the region since promulgation of the NO<sub>x</sub> SIP Call. As part of this project, a review of the NO<sub>x</sub> SIP Call and its implications for emission sources was conducted. An overview of the legal issues surrounding the regulation is presented. Finally, the study evaluated the emissions reductions that will be achieved as a result of new and more stringent NO<sub>x</sub> regulations that have been promulgated in Maryland and surrounding states.

A detailed description of the NO<sub>x</sub> control regulations leading to the NO<sub>x</sub> SIP Call rule is provided in Section 2. An overview of the impact of the NO<sub>x</sub> SIP Call on emissions and control equipment is presented in Section 3. Section 4 provides an overview of upcoming regulations that will impact Maryland and surrounding states in the future.

## 2.0 OVERVIEW OF NO<sub>x</sub> REDUCTION REGULATIONS

### 2.1 A PRELUDE TO THE NO<sub>x</sub> SIP CALL—OTC NO<sub>x</sub> RULE

Before 1990, EPA emphasized local solutions and planning at the state level to help solve the ozone problem in the northeastern United States. However, despite these measures, most urban areas in the northeast and elsewhere did not show sufficient improvement toward attainment of the National Ambient Air Quality Standard (NAAQS) for ozone. Therefore, in 1990, Congress established the Ozone Transport Commission (OTC) through an amendment to the Clean Air Act. The OTC is comprised of the states of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Delaware, the northern counties of Virginia, and the District of Columbia<sup>i</sup>. In September 1994, the states that form the OTC agreed on a memorandum of understanding (MOU) to reduce NO<sub>x</sub> emissions beyond the level of reductions previously achieved by implementation of state-level Reasonably Achievable Control Technology (RACT) programs for NO<sub>x</sub>. The program was divided into two phases — Phase I, extending from 1999 through 2002 and Phase II, starting in 2003. Phase II of the OTC program was subsequently superseded by EPA's NO<sub>x</sub> SIP Call rule, which will be discussed later in this report. The NO<sub>x</sub> budget goal for OTC states during the Phase I and Phase II of the OTC rule were 219,000 tons and 143,000 tons, respectively. The sources affected by this rule included electric generating units (EGUs) generating more than 15 megawatts (MW) of electricity and fossil fuel-fired boilers with a rated capacity of 250 MMBtu/hr or more. The primary responsibility for enforcement of the OTC rule rested with the states, with EPA playing a support role. EPA's responsibility for this rule included approving SIPs, developing and managing NO<sub>x</sub> allowance tracking systems, and enforcement, if required.

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<sup>i</sup> <http://www.epa.gov/airmarkt/progsregs/nox/otc-overview.html>.

*SECTION 126 PETITIONS*

In August 1997, eight states in the northeastern U.S. filed a petition under Section 126 of the Clean Air Act (CAA) requesting that EPA develop regulations to reduce emissions of NO<sub>x</sub> from upwind states. Section 126 is a legal mechanism through which the states can petition EPA to set emission limits for sources in other states that cause or contribute to air quality in their state. The eight states included Connecticut, Maine, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont. The petition requested EPA to make “findings of significant contribution” from EGUs and other major NO<sub>x</sub> emitting sources in upwind states causing ozone “nonattainment” or interfering with “attainment” of NAAQS for ozone in the eastern United States. Some of the petitions requested findings related to the 8-hour ozone standard and all the petitions requested findings related to the 1-hour ozone standard.

In October 1998, EPA finalized its findings and concluded that large sources in 22 states significantly contribute to nonattainment of ozone in northeastern states. Thus, the NO<sub>x</sub> SIP Call rule, formally called the “Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone,” was the result of the Section 126 petition filed by several northeastern states. The details of the NO<sub>x</sub> SIP Call are discussed in the next section. Figure 2-1 presents a timeline of the different federal regulations that were promulgated for control of NO<sub>x</sub> emissions leading to the NO<sub>x</sub> SIP Call rule.

*Figure 2-1 Timeline of Different NO<sub>x</sub> Regulations in Maryland and Surrounding States*

Sep 94	OTC states sign a Memorandum of Understanding (MOU) for NO <sub>x</sub> control
Aug 97	Section 126 Petition requesting EPA to develop NO <sub>x</sub> regulations
Sep 98	Final rule on regional NO <sub>x</sub> reductions
May 99	D.C. Circuit issues two rulings remanding 8-hour ozone and staying SIP submissions
Jun 99	EPA delays 8-hour ozone standard implementation and separates Section 126 rule from NO <sub>x</sub> SIP Call rule
Sep 99	States submit implementation plans to EPA
May 00	EPA extends deadline for SIP submissions to September 2000
May 03	States implement controls to achieve budgets
May 07	States demonstrate compliance

### 2.3 DESCRIPTION OF NO<sub>x</sub> SIP CALL

In October 1998, EPA published the NO<sub>x</sub> SIP Call rule, which was targeted at reducing NO<sub>x</sub> emissions from large sources in the eastern United States. The NO<sub>x</sub> SIP Call is applicable to the following 21 states and the District of Columbia (D.C.): Alabama, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, and West Virginia.

As part of the rule, affected states were allocated an ozone season NO<sub>x</sub> budget for the entire state; each state distributed its statewide allocation among affected sources in the state. States were required to revise SIPs to incorporate emissions reductions from target sources to meet statewide emissions budgets. States that failed to revise their SIPs adequately within the schedule would become subject to EPA's Federal NO<sub>x</sub> SIP program under a Federal Implementation Plan (FIP).

As part of the NO<sub>x</sub> SIP Call, EPA developed a model "NO<sub>x</sub> Budget Trading Program," which most states adopted to track and trade NO<sub>x</sub> allowances.

### 2.3.1 *Sources Regulated by NO<sub>x</sub> SIP Call Rule*

Under the NO<sub>x</sub> SIP Call, EPA identified specific target source categories for NO<sub>x</sub> emissions reductions. These categories included EGUs, non-EGUs, area sources, non-road mobile sources, and highway sources. EGUs in this case are defined as any unit with a nameplate capacity of 25 MW or greater and that generate electricity for sale. States had the choice to select which sources to regulate to achieve the NO<sub>x</sub> reductions required to meet the budgets established by EPA.

EPA determined NO<sub>x</sub> SIP Call emissions limits for different source categories based on technical and cost-effectiveness evaluations conducted by the Agency. EPA considered average cost effectiveness to determine the allowable emission rate of 0.15 lb/MMBtu during the ozone season for EGUs and an emission reduction requirement of 60% from baseline for non-EGUs.

As discussed in Section 3.1, many states in the region, including Maryland, chose to regulate EGUs and industrial boilers (greater than 250 MMBtu/hr) only; other sources, including cement kilns and internal combustion (IC) engines, were not included as a part of the targeted sources in the Phase I of the rule.

### 2.3.2 *Revisions to State Implementation Plan (SIP)*

Under the NO<sub>x</sub> SIP Call as originally published in 1998, states were required to submit revisions to their SIPs incorporating programs to achieve NO<sub>x</sub> emissions reductions to meet their NO<sub>x</sub> caps. In response to the D.C. Circuit Court's decision in 2000 to uphold the 1-hour basis for the NO<sub>x</sub> SIP Call, EPA divided the SIP revision requirements into two phases: Phase I SIP revisions (which addressed the NO<sub>x</sub> SIP Call upheld by the D. C. Circuit for the 19 states and D.C.) were due by October 30, 2000 and Phase II SIP revisions (addressing any additional reductions required by states covered in Phase I to meet the standards and the NO<sub>x</sub> budgets for states not included in Phase I of the rule) were due by April 2005. Some of the key requirements of the SIP revisions included<sup>ii</sup>:

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<sup>ii</sup> USEPA, 1999. Q&A for NO<sub>x</sub> SIP Call Rule.

- An inventory of sources for 2007, which included projected growth in the state and existing control requirements on sources in the state;
- Demonstration that the state would achieve the NO<sub>x</sub> budget for the year 2007; and
- List of control measures to be adopted, requiring each state's compliance by May 2003.

For states that failed to submit a complete SIP revision application by the due date, EPA was required to issue a finding under Section 179(a) of the CAA. If the states fail to submit the SIP revisions, two types of sanctions were to be imposed:

- New and modified sources would be subject to the Section 173 New Source Review (NSR) program and would be required to obtain reductions in existing emissions at a ratio of 2:1 for any emissions increases; and
- Federal highway funds would be withheld.

The first sanctions would start 18 months after the deadline for submission of SIP revisions and the second sanction would begin 24 months after the submission date.

### 2.3.3 *Federal Implementation Plan (FIP)*

If a state failed to submit adequate and timely revisions to the SIP, a Federal Implementation Plan (FIP) would be implemented. The NO<sub>x</sub> SIP Call FIP included caps for large EGUs and non-EGUs including boilers, turbines, IC engines, and cement kilns. If the state subsequently submitted a SIP and it was approved, the FIP would be replaced with the SIP. Maryland and the surrounding states submitted SIPs in a timely manner, with the exception of D.C. and West Virginia. Both of these agencies' SIP submissions were delayed; however, FIPs were not implemented because the SIPs were eventually submitted to EPA before the sanction period started.

### 2.3.4 *NO<sub>x</sub> Budget Trading Program*

EPA encouraged states to adopt a market-based cap-and-trade program as a cost effective means for reducing emissions as a part of the NO<sub>x</sub> SIP Call. To assist states in developing acceptable programs, EPA developed a

model NO<sub>x</sub> allowance trading regulation, entitled “NO<sub>x</sub> Budget Trading Program for State Implementation Plans” (40 CFR 96), for use by individual states in development of their own programs. States had the choice of adopting EPA’s model rule, which allowed EPA to streamline the approval for that portion of the SIP, or develop their own program. EPA provided technical assistance and helped states administer the system.

## 2.4

### *LEGAL ISSUES SURROUNDING NO<sub>x</sub> SIP CALL*

In April 1999, EPA finalized the NO<sub>x</sub> trading program, including the decision to implement a cap-and-trade mechanism to remedy the ozone nonattainment problems. In May 1999, the U.S. Court of Appeals for the D.C. Circuit issued two rulings. In the first ruling, the D.C. Circuit remanded the 8-hour NAAQS, which formed the basis of EPA’s findings for the NO<sub>x</sub> SIP Call rule. In the second ruling, the D.C. Circuit stayed the dates for submission of the SIP revisions. In a June 1999 response, EPA proposed changes to two parts of the rule – delaying indefinitely the determination on 8-hour NAAQS exceedance and separate the findings under Section 126 from the NO<sub>x</sub> SIP Call rule. In March 2000, the D.C. Circuit upheld the 1-hour basis of the NO<sub>x</sub> SIP Call and vacated the rule for three states which were subject to the SIP Call on the basis of the 1-hour impacts – Wisconsin, Georgia, and Missouri. In addition, the Court remanded two other parts of the rule – the definition of EGU as it applies to cogeneration units and the NO<sub>x</sub> control level assumed for IC engines. Subsequently, EPA requested the Court to lift the stay on submission of the SIPs and extend the deadline to September 2000, which was granted by the Court. The extended deadline did not apply to sources in the three states for which the rule was vacated. The next sections describe the impact of the NO<sub>x</sub> SIP Call rule on sources in Maryland and surrounding states.

### 3.0 **IMPACTS OF NO<sub>x</sub> SIP CALL ON MARYLAND AND SURROUNDING STATES**

#### 3.1 **HOW THE STATES COMPLIED WITH NO<sub>x</sub> SIP CALL REQUIREMENTS**

The NO<sub>x</sub> SIP Call required states to submit SIP revisions by May 2003. Maryland and surrounding states submitted revisions to their SIPs based on guidance provided in the NO<sub>x</sub> SIP Call rule. Some of the details of the states' programs and timelines are discussed in the following sections. The NO<sub>x</sub> SIP Call budgets for each state and the status of the SIPs are summarized in Table 3-1.

**Table 3-1 State-wide NO<sub>x</sub> Budgets and SIP Status**

<b>State</b>	<b>NO<sub>x</sub> SIP Call Budget (tons)</b>	<b>SIP Status as of 28 August 2008</b>
D.C.	233	Approved: Phase I (EGUs and non-EGUs) and Phase II (IC engines, cement kilns, and non-Acid Rain units)
Delaware	5,227	Approved: Phase I (EGUs and industrial boilers)
Maryland	14,740	Approved: Phase I (EGUs and non-EGUs) and Phase II (IC engines and cement kilns)
Pennsylvania	50,843	Approved: Phase I (EGUs and non-EGUs); cement kilns and IC engines were included in a 2004 revision
Virginia	21,195	Conditional Approval: Phase II (EGUs and non-EGUs)
West Virginia	26,859	Approved: Phase I (EGUs and non-EGUs, including industrial boilers and cement kilns); IC engines were included in a 2006 revision

Sources: USEPA, NO<sub>x</sub> SIP Call for Mid Atlantic States.  
<http://www.epa.gov/reg3artd/specprog/NOx/nox-sip-status.htm>.

### 3.1.1 *Maryland*

Maryland submitted revisions to the SIP to comply with this rule on 27 April 2000. The revisions were approved by EPA and included in the Federal Register on 10 January 2001. The revisions to the SIP required adoption of two new chapters in the Code of Maryland Air Regulations (COMAR) – 26.11.29 and 26.11.30 – relating to the NO<sub>x</sub> Budget and Trading Program for stationary sources and for the State regulators. Maryland’s budget program was based on EPA’s model NO<sub>x</sub> Budget program, codified at 40 CFR Part 96. The Maryland NO<sub>x</sub> Budget program establishes requirements for EGUs and non-EGU combustion sources (i.e., industrial boilers greater than 250 MMBtu/hr rated capacity). The initial Maryland program specified ozone season emission limits for the years 2003 through 2007 for EGUs; Maryland subsequently revised the SIP to include allocations for 2008 and 2009. EPA approved Maryland’s SIP to comply with Phase I of the NO<sub>x</sub> SIP Call and published it in the Federal Register on January 10, 2001. Subsequently, in November 2006, EPA approved a revision to the Maryland SIP to include allocations for the year 2008. Allocations for the years 2009 through 2014 were made as a part of the State’s plan to comply with the federal CAIR.

### 3.1.2 *Virginia*

The Virginia Department of Environmental Quality (VADEQ) submitted SIP revisions to include NO<sub>x</sub> reduction requirements in October 2000; the SIP revision was approved by EPA and included in the Federal Register in June 2002. The requirements of the rule are included in Virginia regulations in 9 VAC Chapter 140. EPA approved all provisions of the SIP revision except the NO<sub>x</sub> allowance banking provisions, because Virginia had proposed to start the NO<sub>x</sub> banking period in 2006, instead of 2005. EPA considered this provision inconsistent with the EPA model rule and therefore did not approve this portion of the Virginia program. Virginia’s program includes requirements for EGUs and industrial boilers with heat input greater than 250 MMBtu/hr only. In March 2007, CAIR allocations for ozone season NO<sub>x</sub> budgets were incorporated into state regulations under 9 VAC 5-140, Part III.

### 3.1.3 *West Virginia*

In December 2000, EPA published a finding that West Virginia had not submitted revisions to the SIP to comply with the NO<sub>x</sub> SIP Call rule. This finding would have triggered sanctions beginning in June 2001, and would have required implementation of a FIP beginning in December

2002. However, the West Virginia Department of Environmental Protection (WVDEP) subsequently submitted a revision to the SIP on 1 May 2002, which was approved by EPA on 10 May 2002. The regulations for reducing NO<sub>x</sub> emissions to comply with the SIP Call rule are codified in West Virginia regulations for EGUs in Section 45CSR26, for large non-EGUs (boilers greater than 250 MMBtu/hr) and for cement kilns in Section 45CSR1. IC engines were included in the NO<sub>x</sub> SIP revision, which was approved by EPA on 26 September 2006.

#### **3.1.4** *Pennsylvania*

The Pennsylvania Department of Environmental Protection (PADEP) submitted revisions to the SIP in October 2000 and April 2001, which were approved by EPA and published in the Federal Register in August 2001. The requirements of the NO<sub>x</sub> SIP Call rule were included in regulations in 25 PA Code Chapters 145 (Interstate Pollution Transport Reduction) and 123 (Standards for Contaminants). The Pennsylvania regulations specified NO<sub>x</sub> allowances for EGUs, and for industrial (i.e., non-EGU) boilers with a design capacity equal to or greater than 250 MMBtu/hr. Cement kilns and IC engines were not included; therefore, the regulations for these sources were included in the SIP as part of a separate rule making in December 2004 and are codified under 25 PA Code Chapter 145, Subchapters B and C.

#### **3.1.5** *Delaware*

The Delaware Department of Natural Resources and Environmental Control (DNREC) submitted revisions to the SIP to include the NO<sub>x</sub> SIP Call in November 2000. The revisions were approved by EPA in May 2001. Provisions of Delaware's NO<sub>x</sub> SIP Call requirements were included in Delaware Regulations Nos. 37 and 39, the NO<sub>x</sub> Budget and NO<sub>x</sub> Budget Trading Program, respectively. The Delaware regulations affect EGUs greater than 15 MW and certain non-EGUs with design capacities greater than or equal to 250 MMBtu/hr. IC engines and cement kilns were not covered by the Phase-I NO<sub>x</sub> SIP Call regulations in Delaware.

#### **3.1.6** *Washington, D.C.*

Similar to the case for West Virginia, EPA published a finding that D.C. had not submitted revisions to the SIP adequate to comply with the NO<sub>x</sub> SIP Call rule, which would have triggered sanctions beginning in June 2001 and a FIP starting in December 2002. However, the Washington D.C. Department of Health submitted a revision to the SIP on 21 May 2001,

which was approved by EPA and became effective in December 2001. The requirements of the NO<sub>x</sub> SIP rule were addressed in Chapter 10 of the regulations, which establishes requirements for EGUs and industrial units, including cement kilns and IC engines.

## 3.2 *IMPLICATIONS OF THE NO<sub>x</sub> SIP CALL*

The benefits of the NO<sub>x</sub> SIP Call are evaluated by reviewing two factors — changes in statewide NO<sub>x</sub> emissions and changes in the number and types of emission controls installed before and after the rule became effective. The primary focus of this study was EGUs; some available information on non-EGU sources was also reviewed. The measures taken by states to reduce emissions from mobile and area sources through the SIP Call were not evaluated in this project, as Maryland and surrounding states did not regulate mobile and area sources as a part of the NO<sub>x</sub> SIP Call.

### 3.2.1 *NO<sub>x</sub> Emissions Trends*

The information on NO<sub>x</sub> emissions and controls was obtained from the EPA's Clean Air Market's Acid Rain Program database, the Department of Energy's Energy Information Administration (EIA) database, and eGRID.

The Clean Air Markets database provides information on SO<sub>2</sub>, NO<sub>x</sub>, and carbon dioxide (CO<sub>2</sub>) emissions for annual and ozone season periods (May through September) for EGUs and select non-EGUs that are regulated under EPA's Acid Rain Program. Summary emissions information from this database is available from 1995 through 2007. Raw hourly data information in binary format is available for the years 1980, 1985, and 1990 through 2007.

The EIA database includes information on NO<sub>x</sub>, SO<sub>2</sub>, and carbon monoxide (CO) emissions from EGUs for the years 1980 through 2006. EIA includes information on fuel usage and fuel characteristics for EGUs as well.

The Emissions and Generation Resource Integrated Database (eGRID) is a comprehensive database with information on electrical power plants in the U.S., available under EPA's Clean Energy program. eGRID integrates information from 24 federal databases and three federal agencies including EPA, EIA, and the Federal Energy Regulatory Commission

(FERC)<sup>iii</sup>. The emissions data in eGRID are obtained from EPA, while the generation data are obtained from EIA. A range of EPA databases are used as sources of emissions information for this database, including the National Emissions Trends (NET), Emissions Tracking System/Continuous Emissions Monitoring (ETS/CEM), the Mercury Information Collection Effort (Hg ICE), and the Integrated Modeling Database (IMDB); however, the primary sources of information in eGRID are the ETS/CEMS and EIA databases. eGRID includes data for the years 1996 through 2000, 2004, and 2005.

Figure 3-1 presents state-wide, ozone season average NO<sub>x</sub> emission rates (in lb/MMBtu) for sources in Maryland and surrounding states for the years 1999 through 2006. Except for West Virginia and Virginia, all states reviewed here were covered by the OTC NO<sub>x</sub> rule (1999-2002) and the NO<sub>x</sub> SIP Call rule (2003-2006). As illustrated in Figure 3-1, NO<sub>x</sub> emissions decreased between 1999 and 2006 in Maryland and the region, with the exception of D.C., where there was no appreciable reduction in emissions over the period; only two facilities in D.C. are covered by the NO<sub>x</sub> SIP Call rule. Sources in Maryland, Pennsylvania, and Delaware, which were also subject to OTC rule, were able to reduce emissions before the NO<sub>x</sub> SIP Call became effective in 2003. A review of emission controls installed in these states is presented later. Sources in VA and WV reported emissions starting in 2004, when the NO<sub>x</sub> SIP Call rule became effective.

The OTC rule became effective in 1999 and did not include West Virginia and portions of Virginia outside northern Virginia, which were subject to the NO<sub>x</sub> SIP Call rule starting 2003. The OTC sources included all EGUs  $\geq$  15 MW and fossil fuel-fired combustion units  $>250$  MMBtu/hr. The number of sources in Maryland included in the NO<sub>x</sub> SIP Call was similar to those included in the OTC rule. A complete list of sources covered by the OTC and NO<sub>x</sub> SIP Call rules for all six states is included in Appendix A.

A comparison of state-wide NO<sub>x</sub> allowances and corresponding emissions is presented in Figure 3-2. Because the NO<sub>x</sub> SIP Call was based on a cap-and-trade approach, NO<sub>x</sub> budget sources did not necessarily have to install NO<sub>x</sub> controls or achieve real NO<sub>x</sub> emissions reductions; instead, sources could comply by purchasing or acquiring allowances. The

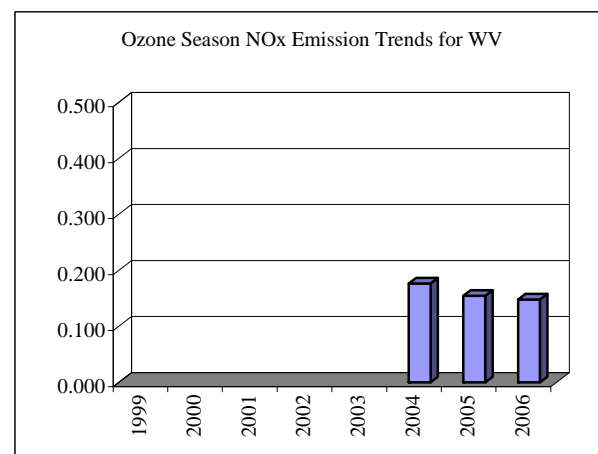
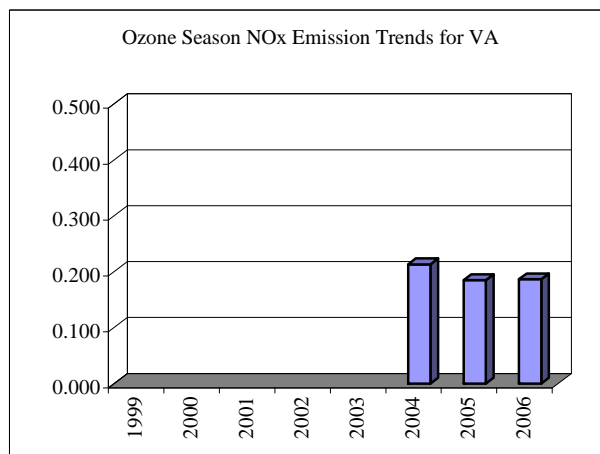
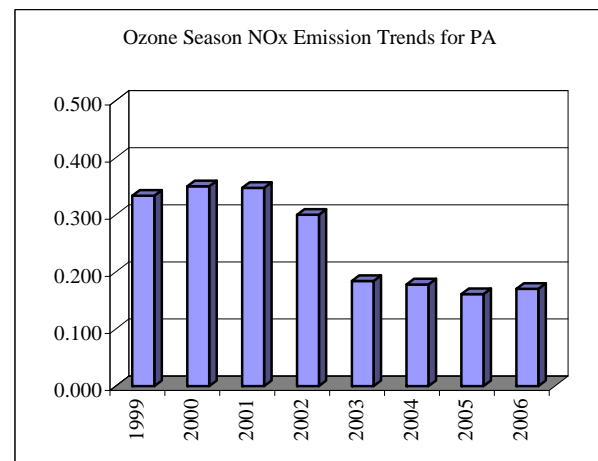
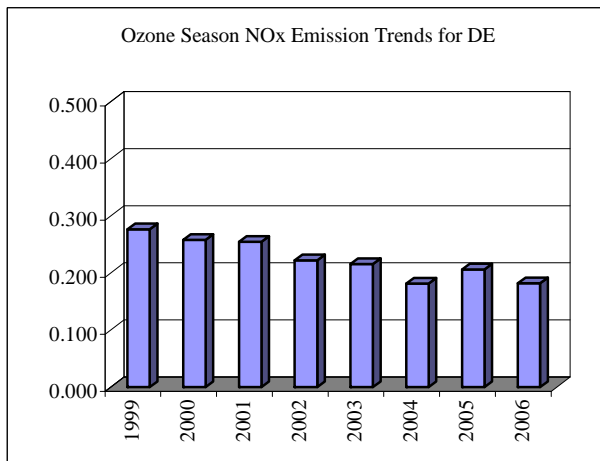
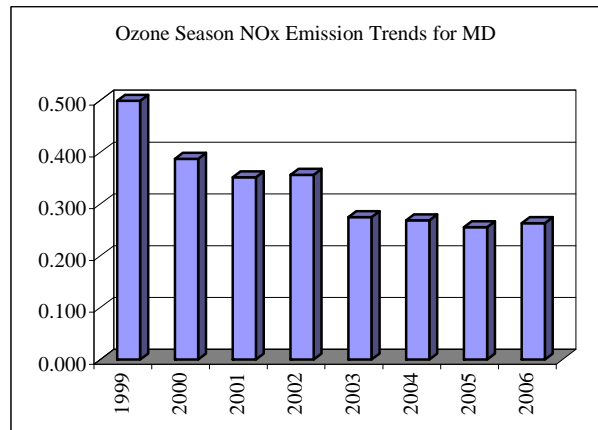
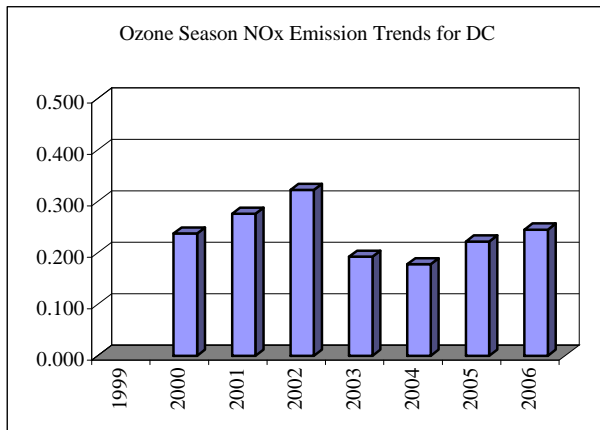
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<sup>iii</sup> USEPA, 2008. <http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html>.

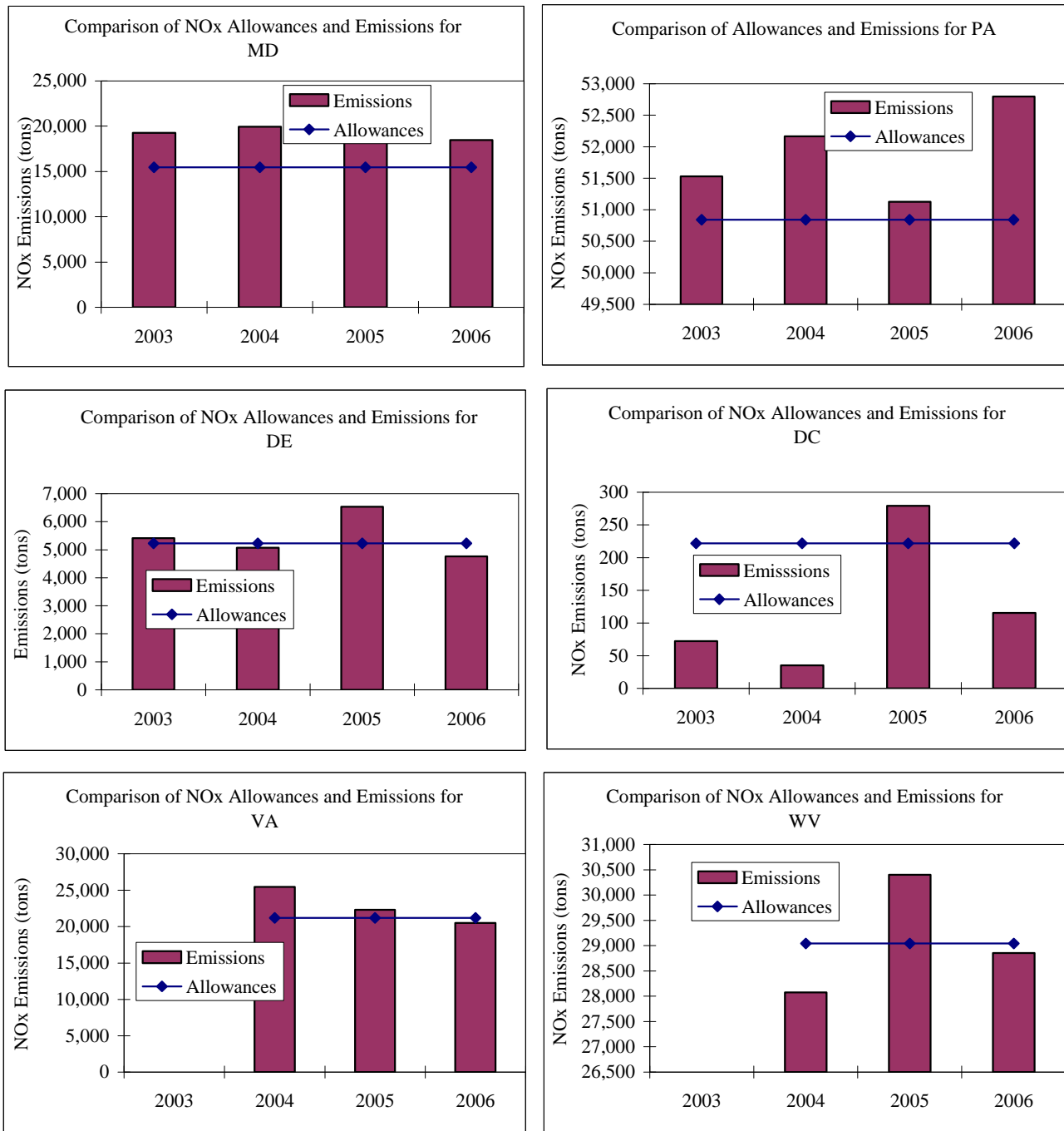
statewide NO<sub>x</sub> emissions of NO<sub>x</sub> are above the NO<sub>x</sub> budget for all years in Maryland and Pennsylvania, suggesting that these states were net importers of NO<sub>x</sub> allowances over the period. For other states, the emissions were below the allowances for some years and exceeded the allowances for some other years.

State-by-state NO<sub>x</sub> allocations and emissions are evaluated further by comparing the total power generation and generation by fuel type. Figure 3-3 presents a comparison of the fuel types used to generate power in these states. The generation data by fuel type was obtained from eGRID for the year 2004. Figure 3-3 compares the actual generation by fuel type for each of the six states. Coal is the predominant fuel in all states, except D.C. Maryland, Pennsylvania, and Virginia have a similar mix of coal, oil, gas, and nuclear fuels as a part of their fuel portfolio, suggesting fuel mix does not contribute to the incidence of emissions exceeding allocations in Maryland and Pennsylvania.

**Figure 3-1 Statewide Ozone Season Average NOx Emission Rates (in lb/MMBtu)**



**Figure 3-2 Comparison of NO<sub>x</sub> Allowances and Actual Emissions for Maryland and Surrounding States**



**Figure 3-3 Comparison of State-Wide Power Generation by Fuel Type**

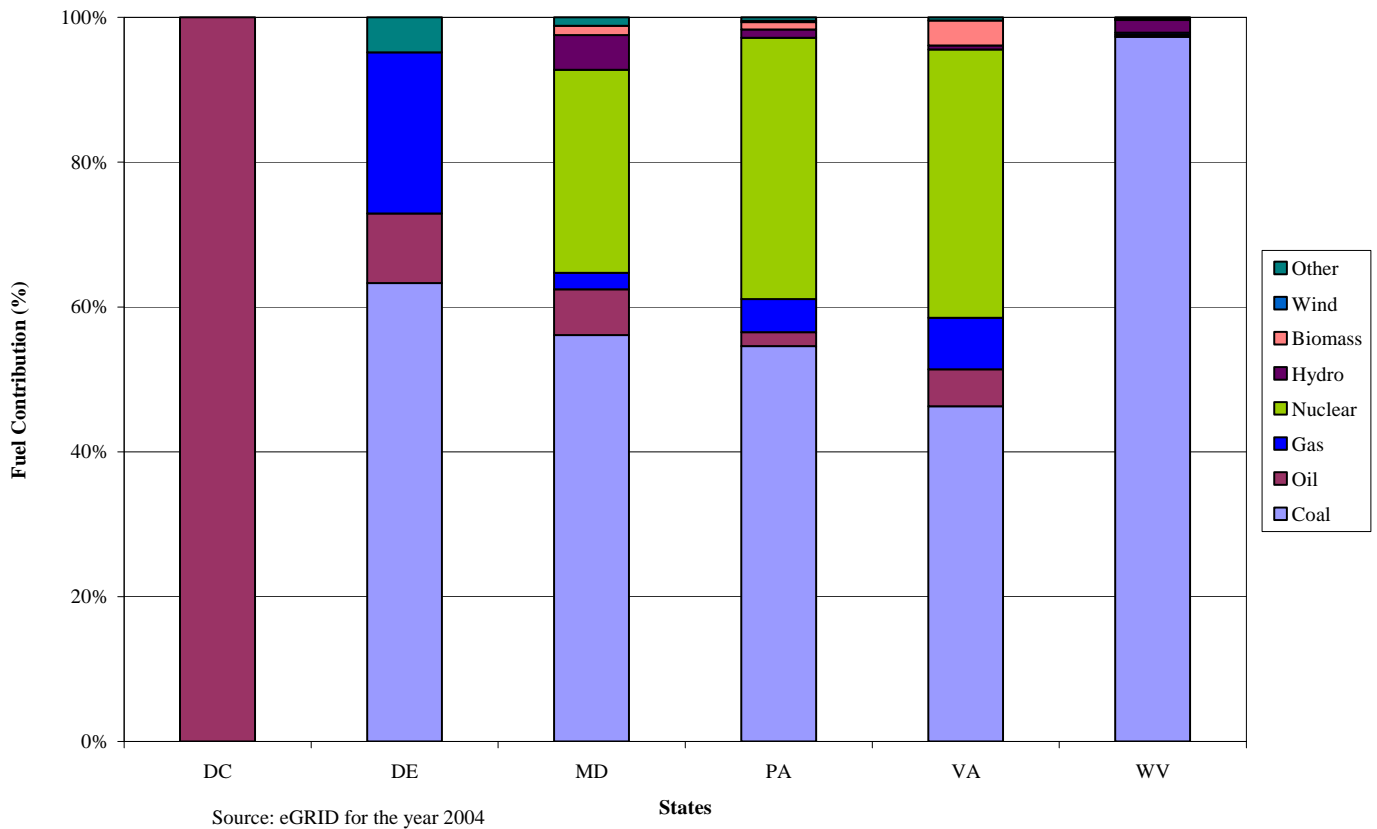


Table 3-2 presents a comparison of power generated and power consumed for the year 2005, which is a measure of the total power exported or imported by the state. It was assumed that inferences drawn from annual power generation rates would provide useful insights into ozone season NO<sub>x</sub> emissions, because the peak demand for power is generally summertime in this part of the country.

From Table 3-2, it can be seen that Pennsylvania and West Virginia were net exporters of power, i.e., the total generation from sources in the state was more than that consumed by sources in the state. On the other hand, Maryland, Delaware, D.C., and Virginia were net importers of electricity. Therefore, the exceedance of allocations in Pennsylvania may be attributable to the fact that power plants in the state generate more electricity than is used within the state; similar reasoning cannot be

advanced for Maryland. More insights can be gained by comparing the control technologies installed at plants in Maryland and surrounding states during the same period, as discussed in the next section.

**Table 3-2** *Summary of Power Consumption and Power Generation in All Six States*  
1, 2, 3

State	Power Consumed (Million MWh) <sup>2</sup>	Power Generated (Million MWh) <sup>3</sup>	Net Generation (Million MWh) <sup>4</sup>
Delaware	12.137	8.14	-4.00
D.C.	11.816	0.23	-11.59
Maryland	68.365	52.66	-15.70
Pennsylvania	148.273	218.09	69.82
Virginia	108.85	78.94	-29.91
West Virginia	30.152	93.63	63.47

Notes:

1. Data for the year 2005 used in this table.
2. Source of the power consumption data is EIA (<http://www.energy.ca.gov/electricity/index.html#consumption>)
3. Source of the power generation data is EIA state-wide summary files (<http://tonto.eia.doe.gov/ftproot/electricity/06292005.pdf>)
4. A negative value indicates that the total generation within the state is less than the consumption.

It can be seen that the cap-and-trade mechanism available with the NO<sub>x</sub> SIP Call allowed for some states, including Maryland and Pennsylvania, to continuously exceed their statewide NO<sub>x</sub> allocations during the entire period. The exceedance in Pennsylvania may be influenced by the fact that Pennsylvania generates significantly more power than is required by the State and therefore is a net exporter of generation; the NO<sub>x</sub> exceedance in Maryland is likely attributable to the fact that only one power plant, Brandon Shores, had installed state-of-the-art NO<sub>x</sub> controls (SCR) during the study period.

### 3.2.2 *NO<sub>x</sub> Controls*

After the NO<sub>x</sub> SIP Call became effective, emissions reductions were achieved for sources in some of the six states. The source of the emissions reductions can be evaluated by reviewing the NO<sub>x</sub> emission controls installed during this period. Only information on EGU and some non-EGU sources was readily available and reviewed for this project. The source of the NO<sub>x</sub> control technology information used in this study was the EIA-767 database, which includes mostly EGU sources and some non-EGU sources. Note that all sources in the EIA-767 database are not NO<sub>x</sub> SIP Call rule sources. “Existing” controls on EGUs for two years – 1998 and 2005 – were compiled to capture pre- and post-NO<sub>x</sub> SIP Call periods.

Figure 3-4 displays the percentage of control equipment systems installed before and after the NO<sub>x</sub> SIP Call became effective. The number of control systems is expressed as a percentage of the total number of combustion units (i.e., boilers, CTs, etc.) for each state included in the EIA data. Detailed information on specific controls on sources in all six states is presented in Appendix B. The following observations can be made from Figure 3-4:

- The number of units without any NO<sub>x</sub> controls dropped significantly in all five states after the rule (DC is the only exception);
- No changes in NO<sub>x</sub> controls were observed in DC;
- Low NO<sub>x</sub> burners (LN) and over fire air (OV) were predominantly used as the NO<sub>x</sub> control before and after the rule and the percentage of these type of controls increased with implementation of the rule;
- Fewer than 20% of the units in all six states had SCR or SNCR after the rule became effective.

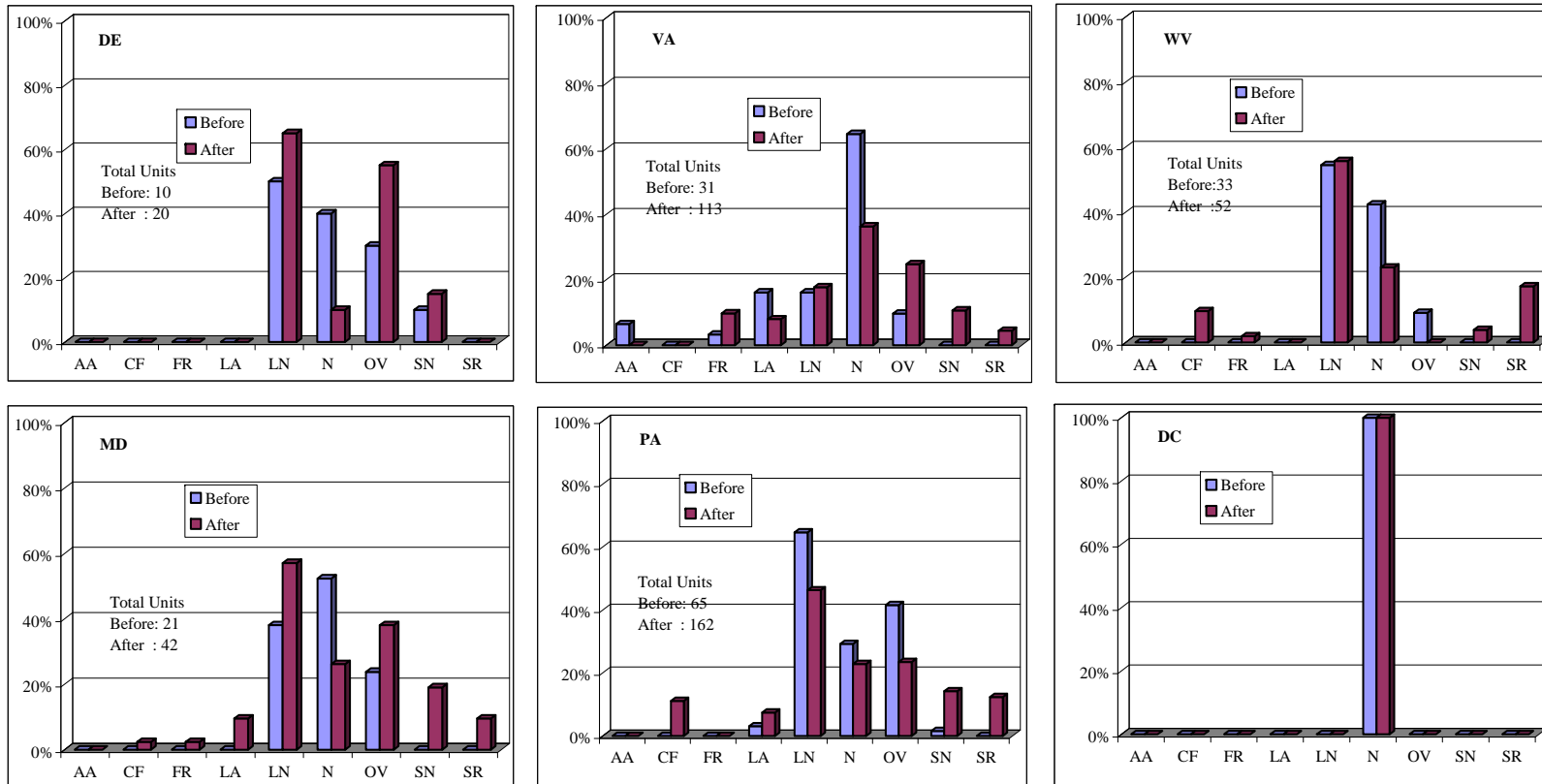
### 3.2.3 *Summary*

All six states have achieved reduction in emissions to comply with the NO<sub>x</sub> SIP Call rule. The reductions achieved in D.C., Delaware, West Virginia, and Virginia are observed to be sufficient for NO<sub>x</sub> SIP Call sources to allow these states to meet the NO<sub>x</sub> Budget allowances for the state for most years. For Pennsylvania, there was an apparent allowance deficit (more NO<sub>x</sub> generated in-state by NO<sub>x</sub> SIP Call sources than allowances allocated annually); however, Pennsylvania is also a net exporter of power. The emissions reductions in Maryland appear to have been insufficient to meet the NO<sub>x</sub> budgets locally; in fact, only one power plant in Maryland, Brandon Shores, had installed advanced NO<sub>x</sub> controls

(SCR) during the study period. Further reductions are expected to be achieved by regulations that were passed in 2007 and are discussed in Section 4.2.

It appears that implementation of NO<sub>x</sub> SIP programs (and possibly other regulatory programs that continue to develop) resulted in significant environmental benefits by reducing NO<sub>x</sub> emissions through the addition of NO<sub>x</sub> control systems.

Figure 3-4 Comparison of Sources with NOx Control Equipment Installed Before and After the NOx SIP Call Rule



**Legend**

- |    |                         |    |                                  |
|----|-------------------------|----|----------------------------------|
| AA | Advanced Overfire Air   | LN | Low NOx Burner                   |
| CF | Fluidized Bed Combustor | N  | No Controls                      |
| FR | Flue Gas Recirculation  | OV | Overfire Air                     |
| LA | Low Excess Air          | SN | Selective Noncatalytic Reduction |
|    |                         | SR | Selective Catalytic Reduction    |

X- Axis represents the type of control technology installed; Y-Axis represents the number of control equipment per total number of units (percentage).

## 4.0 *FUTURE REGULATIONS*

### 4.1 *CLEAN AIR INTERSTATE RULE (CAIR)*

On March 15, 2005, EPA finalized the Clean Air Interstate Rule (CAIR), which was targeted at reducing emissions of SO<sub>2</sub> and NO<sub>x</sub> from EGUs in 28 eastern states. CAIR ozone season reductions will apply to 28 states including Alabama, Arkansas, Connecticut, Delaware, Florida, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, and Wisconsin. Similar to the NO<sub>x</sub> SIP Call, CAIR will require states to update their SIPs to incorporate additional NO<sub>x</sub> (and SO<sub>2</sub>) reduction programs. CAIR reductions will be implemented in two phases: 2009 (NO<sub>x</sub>)/2010 (SO<sub>2</sub>) in Phase 1, and 2015 (NO<sub>x</sub> and SO<sub>2</sub>) in Phase 2.

On July 11, 2008 the D.C. Circuit Court vacated CAIR in its entirety. Many states, including Maryland, had previously revised their SIPs to incorporate the requirements of the CAIR, including NO<sub>x</sub> allocations. On September 24, 2008, EPA requested the D. C. Circuit to rehear the case or remand the rule instead of vacating it. The D. C. Circuit issued an order requesting response from the other parties in response to EPA's request. On December 23, 2008, the D. C. Circuit issued an opinion that remanded CAIR without vacatur. The CAIR will remain in effect until EPA proposes revisions to the rule to comply with the concerns raised by the Court to the original EPA rule. The Court refrained from setting deadlines for EPA to correct the existing CAIR. For states that amended their state regulations and SIPs to incorporate CAIR, the provisions of CAIR will continue to be in effect until EPA proposes revisions to the rule. For states that do not have their own multi-pollutant regulations, the requirements of CAIR will result in further reductions of NO<sub>x</sub> (and SO<sub>2</sub>). The statewide NO<sub>x</sub> allocations for Maryland and surrounding states based on CAIR are summarized in Table 4-1.

**Table 4-1 Summary of NO<sub>x</sub> Allocations Based on CAIR**

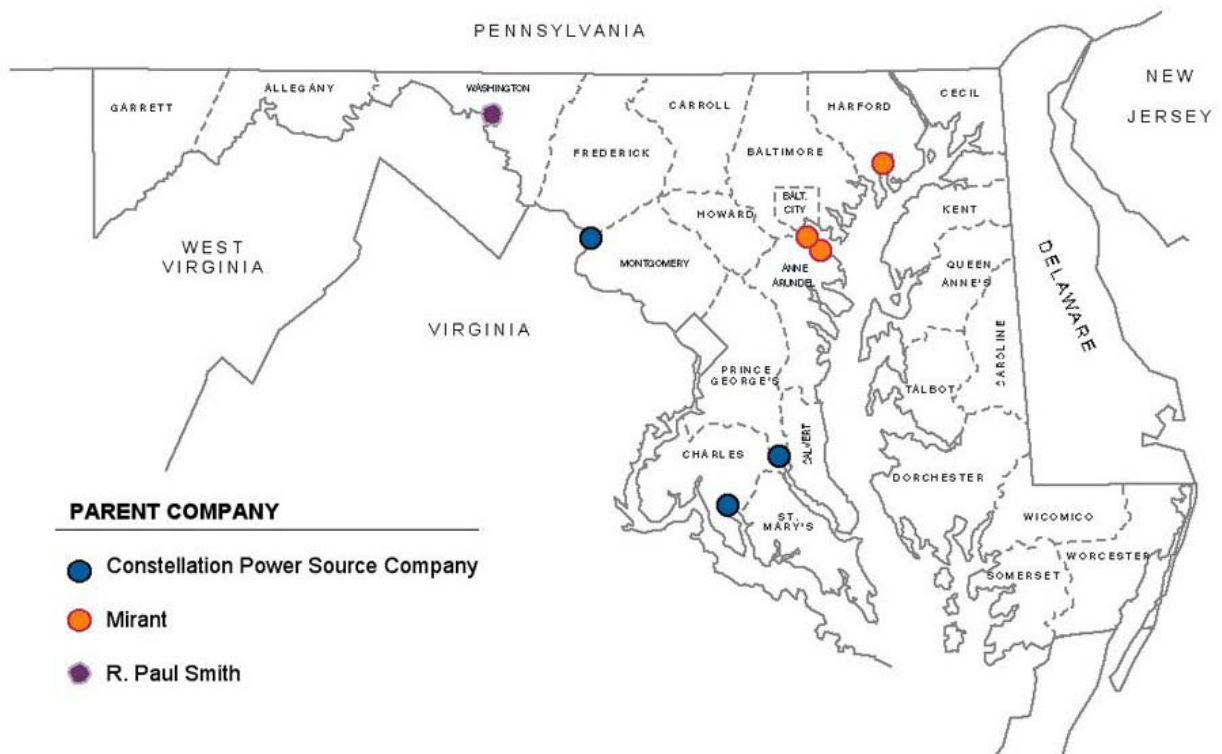
State	CAIR NO <sub>x</sub> Budget (tons)	
	2009	2015
D.C.	112	94
Delaware	2,226	1,855
Maryland	12,834	10,695
Pennsylvania	42,171	35,143
Virginia	15,994	13,328
West Virginia	26,859	26,525

Source: Table V-4, 40 CFR Parts 72, 51, et al., 2006.

#### 4.2 MARYLAND HEALTHY AIR ACT (HAA)

The Maryland Healthy Air Act (HAA) of 2006 is Maryland’s version of a multi-pollutant control program requiring substantial reductions in NO<sub>x</sub>, SO<sub>2</sub>, and mercury emissions from coal-fired power plants in the State. To comply with the HAA, the 15 affected coal-fired generating units at seven power plants in Maryland are installing add-on pollution controls and/or switching fuels (Figure 4-1). Table 4-2 summarizes the proposed controls on sources in Maryland to comply with the HAA. The NO<sub>x</sub> SIP Call, CAIR, and HAA NO<sub>x</sub> budgets for EGUs in Maryland are summarized in Table 4-3.

Figure 4-1 Coal-Fired Units in Maryland Affected by HAA



**Table 4-2 Summary of Control Equipment Installed in Maryland to Comply with HAA**

<b>Project</b>	<b>CPCN Case No.</b>	<b>Rated Capacity (MW)</b>	<b>Pre-HAA Controls</b>	<b>NOx Control &amp; % Reduction</b>
Brandon Shores FGD	9075	Unit 1: 685 Unit 2: 685	Unit 1: H-ESP, SCR, 0.7% sulfur coal Unit 2: H-ESP, SCR, 0.7% sulfur coal	Existing SCR to operate year-round
Chalk Point SCR	9079	Unit 1: 342	Unit 1: ESP 99.5%, LNB Unit 2: ESP 99.5%, LNB and SACR	SCR >85% reduction
Wagner SNCR	9083	Unit 2: 136 Unit 3: 359	Unit 2: ESP Unit 3: ESP, SCR	SNCR 34-58% reduction
Crane SNCR	9084	Unit 1: 190 Unit 2: 209	Unit 1: FF Unit 2: FF	SNCR 25-50% reduction
Morgantown FGD	9085	Unit 1: 624 Unit 2: 624	Unit 1: ESP, LNB w/SOFA Unit 2: ESP, LNB w/SOFA	SCR under construction
Chalk Point FGD	9086	Unit 1: 342 Unit 2: 342	Unit 1: ESP 99.5%, LNB Unit 2: ESP 99.5%, LNB and SACR	No changes
Dickerson FGD	9087	Unit 1: 182 Unit 2: 182 Unit 3: 182	Unit 1, Unit 2, and Unit 3: ESP, FF, LNB w/SOFA	No Changes
Dickerson SNCR	9140	Unit 1: 182 Unit 2: 182 Unit 3: 182	Unit 1, Unit 2, and Unit 3: ESP, FF, LNB w/SOFA	SNCR 20-25% reduction

ESP: Electrostatic Precipitator;  
H-ESP: Hot-side ESP;  
FF: Fabric Filter;  
SNCR: Selective Non-Catalytic Reduction System;  
SACR: Selective Auto-Catalytic Reduction System;  
LNB: Low NOx Burners;  
SCR: Selective Catalytic Reduction System;  
SOFA: Separated Over-Fire Air.

**Table 4-3** *NO<sub>x</sub> SIP Call, CAIR, and HAA NO<sub>x</sub> Ozone Season Allocations for EGUs in Maryland*

<b>Generating Facilities</b>	<b>NO<sub>x</sub> SIP Call (2003) Year (t/O<sub>3</sub>)</b>	<b>CAIR NO<sub>x</sub> (2009-2014) (t/O<sub>3</sub>)</b>	<b>HAA NO<sub>x</sub> (2009) (t/O<sub>3</sub>)</b>	<b>HAA NO<sub>x</sub> (2012) Ozone Season (t/O<sub>3</sub>)</b>
Brandon Shores	3,669	3,285	2,808	2,319
C.P. Crane	496	852	730	601
H.A. Wagner	1,036	1,006	861	710
Chalk Point	1,612	1,482	1,268	1,045
Dickerson	1,354	1,120	958	790
Morgantown	2,547	2,454	2,101	1,732
R. P. Smith	126	198	170	140

Notes:

1. Only emissions from coal-fired utilities were included in the facility-wide allocations.
2. t/O<sub>3</sub> refers to the tons of NO<sub>x</sub> per ozone season

### 4.3 *OTHER STATES*

Similar to Maryland, some other states in the region have adopted additional regulations to reduce emissions from major sources of NO<sub>x</sub>. A brief description of the future NO<sub>x</sub> budget compliance strategy in surrounding states, either through CAIR or other regulation, is provided below.

### 4.3.1 *Pennsylvania*

In April 2008, all provisions of the federal CAIR requirements specified in 40 CFR Part 96, except the provisions of the CAIR NO<sub>x</sub> allocation methodology, were incorporated by reference in 25 Pa. Code §145.212. In Pennsylvania, NO<sub>x</sub> allocations from the federal CAIR program will be applicable beginning in 2009. Of the total CAIR NO<sub>x</sub> allocation, 95% of the allocations were distributed among existing EGU and non-EGU sources. The remaining 5% of the allocations were set aside for future sources.

### 4.3.2 *Delaware*

In 2007, Delaware promulgated multi-pollutant regulations that required reductions in emissions of NO<sub>x</sub>, SO<sub>2</sub>, and mercury from EGUs. This regulation is included in Title 7, Chapter 1146 of the Delaware regulations and is known as the EGU Multi Pollutant Regulation. The regulation is targeted at compliance with NAAQS for ozone and fine particulate matter (PM<sub>2.5</sub>). The sources regulated by the multi-pollutant regulations include coal-and residual oil-fired EGUs with a nameplate capacity of greater than 25 MW and that commenced operations on or before the promulgation of this regulation. A total of eight EGUs were impacted by this regulation. A NO<sub>x</sub> emission rate of 0.15 lb/MMBtu (rolling 24-hour basis) was required to comply with this regulation.

### 4.3.3 *Virginia*

In January 2006, a bill to enact a multi-pollutant regulation was introduced in Virginia called Virginia Clean Smokestacks (HB-1055), which was then passed in April 2006. This bill required reductions in emissions of SO<sub>2</sub>, NO<sub>x</sub>, and mercury. The bill regulated only solid fuel-fired EGUs and limited the total NO<sub>x</sub> emissions from these units to 13,328 tons per ozone season. The rule requires that 5% of the NO<sub>x</sub> allocations be set aside for the first five years and 2% for the years after for new and other energy efficiency projects. The Clean Smokestacks allocations are more stringent than CAIR.

#### 4.3.4

#### *West Virginia*

In May 2006, West Virginia promulgated the CAIR NO<sub>x</sub> Budget Trading program, which was included in WV Regulation No. 45 Chapter 40. CAIR regulations in West Virginia follow the federal program, and so apply to:

- EGUs with a nameplate capacity of greater than 25 MW;
- Cogeneration units with a nameplate capacity of greater than 25 MW, which sell more than one-third of the generation to the grid;
- Non-EGUs which were subject to the NO<sub>x</sub> Budget Trading program before 2009; and
- Combustion units with a design heat input rating of greater than 250 MMBtu/hr.

Out of the total ozone season NO<sub>x</sub> budget, EGUs were allocated 92.5% of the total NO<sub>x</sub> allocation.

Since the mid-1990s, EPA and the states in the eastern U.S. have been working on regulations to control and reduce emissions of NO<sub>x</sub> to assist in attainment of the ozone ambient air quality standards. In 1990, the Ozone Transport Commission (OTC) developed a program for the northeastern states that required NO<sub>x</sub> controls in excess of then-existing NO<sub>x</sub> RACT requirements and paved the way for federal regulations to reduce ozone season (May through September) NO<sub>x</sub> emissions. EPA finalized its NO<sub>x</sub> SIP Call rule in 1998, which required 22 states to revise their SIPs to incorporate ozone season NO<sub>x</sub> reductions.

The OTC rule and the NO<sub>x</sub> SIP Call rule resulted in significant reductions in summertime NO<sub>x</sub> emissions from sources in Maryland and the surrounding states. Between 1999 and 2006, all six states showed an increase in the number of installations of more advanced NO<sub>x</sub> controls such as SCR and SNCR, and an overall increase in the number of NO<sub>x</sub> controls. The cap-and-trade mechanism available with the NO<sub>x</sub> SIP Call allowed for some states, including Maryland and Pennsylvania, to continuously exceed their statewide NO<sub>x</sub> allocations during the entire period. The exceedance in Pennsylvania may be influenced by the fact that Pennsylvania generates more power than that consumed in the state (i.e., a net exporter of generation); the NO<sub>x</sub> exceedance in Maryland is likely attributable to the fact that only one power plant, Brandon Shores, has installed state-of-the-art controls (SCR).

EPA promulgated the CAIR in 2006, which will result in further reductions in emissions of NO<sub>x</sub> (and SO<sub>2</sub>). The rule was originally vacated by the D.C. Circuit Court in July 2008 and subsequently remanded without vacatur in December 2008. Some of the states in the region have also promulgated state-level multi-pollutant regulations that will significantly reduce the emissions of NO<sub>x</sub> beyond CAIR. In Maryland, the Healthy Air Act of 2006 will result in significant decreases in NO<sub>x</sub> emissions, and reductions in total annual NO<sub>x</sub>, SO<sub>2</sub>, and mercury emissions. Delaware and Virginia have similar multi-pollutant regulations; while Pennsylvania and West Virginia had been planning to

rely on CAIR to reduce NO<sub>x</sub> and SO<sub>2</sub> emissions. Overall, the NO<sub>x</sub> SIP Call and other cap-and-trade regulations have proven beneficial in controlling NO<sub>x</sub> emissions from the largest stationary sources; additional regulatory programs, such as "CAIR Plus" will continue to develop until ozone and fine particulate matter ambient standards are met.

*Appendix A*  
*Detailed List of NO<sub>x</sub> SIP Call*  
*and OTC Sources in Maryland*  
*and Surrounding States*

## *NO<sub>x</sub> SIP Call Sources*

Appendix A - NOx SIP Call Sources

State	Facility Name	Unit ID
DC	Benning Generation Station	15
DC	Benning Generation Station	16
DC	GSA Central Heating	3
DC	GSA Central Heating	4
DC	GSA Central Heating	5C
DE	Christiana Substation	11
DE	Christiana Substation	14
DE	Delaware City	10
DE	Delaware City Refinery	21H701
DE	Delaware City Refinery	37H1
DE	Delaware City Refinery	41H1
DE	Delaware City Refinery	42H123
DE	Delaware City Refinery	CATCOB
DE	Delaware City Refinery	COKCOB
DE	Delaware City Refinery	DCPP1
DE	Delaware City Refinery	DCPP2
DE	Delaware City Refinery	DCPP3
DE	Delaware City Refinery	DCPP4
DE	Delaware City Refinery	MECCU1
DE	Delaware City Refinery	MECCU2
DE	Edge Moor	10
DE	Edge Moor	3
DE	Edge Moor	4
DE	Edge Moor	5
DE	Hay Road	**3
DE	Hay Road	1
DE	Hay Road	2
DE	Hay Road	5
DE	Hay Road	6
DE	Hay Road	7
DE	Indian River	1
DE	Indian River	10
DE	Indian River	2
DE	Indian River	3
DE	Indian River	4
DE	McKee Run	1
DE	McKee Run	2
DE	McKee Run	3
DE	NRG Energy Center Dover	1
DE	NRG Energy Center Dover	2
DE	NRG Energy Center Dover	3
DE	Van Sant	**11
DE	Warren F. Sam Beasley Pwr Station	1
DE	West Substation	10
MD	AES Warrior Run	001
MD	Brandon Shores	1
MD	Brandon Shores	2
MD	C P Crane	1
MD	C P Crane	2
MD	Herbert A Wagner	1
MD	Herbert A Wagner	2

Appendix A - NOx SIP Call Sources

State	Facility Name	Unit ID
MD	Herbert A Wagner	3
MD	Herbert A Wagner	4
MD	Luke Paper Company	PR003
MD	Luke Paper Company	PR004
MD	Luke Paper Company	PR005
MD	Mirant Chalk Point	**GT3
MD	Mirant Chalk Point	**GT4
MD	Mirant Chalk Point	**GT5
MD	Mirant Chalk Point	**GT6
MD	Mirant Chalk Point	1
MD	Mirant Chalk Point	2
MD	Mirant Chalk Point	3
MD	Mirant Chalk Point	4
MD	Mirant Chalk Point	GT2
MD	Mirant Chalk Point	SMECO
MD	Mirant Dickerson	1
MD	Mirant Dickerson	2
MD	Mirant Dickerson	3
MD	Mirant Dickerson	GT2
MD	Mirant Dickerson	GT3
MD	Mirant Morgantown	1
MD	Mirant Morgantown	2
MD	Mirant Morgantown	GT3
MD	Mirant Morgantown	GT4
MD	Mirant Morgantown	GT5
MD	Mirant Morgantown	GT6
MD	Panda Brandywine	1
MD	Panda Brandywine	2
MD	Perryman	**51
MD	Perryman	CT1
MD	Perryman	CT2
MD	Perryman	CT3
MD	Perryman	CT4
MD	R. Paul Smith Power Station	11
MD	R. Paul Smith Power Station	9
MD	Riverside	4
MD	Riverside	CT6
MD	Rock Springs Generating Facility	1
MD	Rock Springs Generating Facility	2
MD	Rock Springs Generating Facility	3
MD	Rock Springs Generating Facility	4
MD	Vienna	8
MD	Westport	CT5
PA	AES Beaver Valley LLC	032
PA	AES Beaver Valley LLC	033
PA	AES Beaver Valley LLC	034
PA	AES Beaver Valley LLC	035
PA	AES Ironwood	0001
PA	AES Ironwood	0002
PA	Allegheny Energy Hunlock Unit 4	4
PA	Allegheny Energy Unit 1 and Unit 2	1

Appendix A - NOx SIP Call Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
PA	Allegheny Energy Unit 1 and Unit 2	2
PA	Allegheny Energy Unit 8 and Unit 9	8
PA	Allegheny Energy Unit 8 and Unit 9	9
PA	Allegheny Energy Units 3, 4 & 5	3
PA	Allegheny Energy Units 3, 4 & 5	4
PA	Armagh Compressor Station	31301
PA	Armstrong Energy Ltd Part	1
PA	Armstrong Energy Ltd Part	2
PA	Armstrong Energy Ltd Part	3
PA	Armstrong Energy Ltd Part	4
PA	Armstrong Power Station	1
PA	Armstrong Power Station	2
PA	Bernville Station	32001
PA	Bethlehem Power Plant	1
PA	Bethlehem Power Plant	2
PA	Bethlehem Power Plant	3
PA	Bethlehem Power Plant	5
PA	Bethlehem Power Plant	6
PA	Bethlehem Power Plant	7
PA	Bruce Mansfield	1
PA	Bruce Mansfield	2
PA	Bruce Mansfield	3
PA	Brunner Island	1
PA	Brunner Island	2
PA	Brunner Island	3
PA	Brunot Island Power Station	2A
PA	Brunot Island Power Station	2B
PA	Brunot Island Power Station	3
PA	Cambria Cogen	1
PA	Cambria Cogen	2
PA	Chambersburg Units 12 and 13	12
PA	Chambersburg Units 12 and 13	13
PA	Cheswick	1
PA	Colver Power Project	AAB01
PA	Conemaugh	1
PA	Conemaugh	2
PA	ConocoPhillips Co., Trainer Refinery	032
PA	ConocoPhillips Co., Trainer Refinery	033
PA	Cromby	1
PA	Cromby	2
PA	Croydon Generating Station	11
PA	Croydon Generating Station	12
PA	Croydon Generating Station	21
PA	Croydon Generating Station	22
PA	Croydon Generating Station	31
PA	Croydon Generating Station	32
PA	Croydon Generating Station	41
PA	Croydon Generating Station	42
PA	Domtar Paper Company, LLC	040
PA	Domtar Paper Company, LLC	041
PA	Ebensburg Power Company	031

Appendix A - NOx SIP Call Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
PA	Eddystone Generating Station	1
PA	Eddystone Generating Station	2
PA	Eddystone Generating Station	3
PA	Eddystone Generating Station	4
PA	Elrama	1
PA	Elrama	2
PA	Elrama	3
PA	Elrama	4
PA	Entriiken Compressor Station	31601
PA	Fairless Energy, LLC	1A
PA	Fairless Energy, LLC	1B
PA	Fairless Energy, LLC	2A
PA	Fairless Energy, LLC	2B
PA	Fairless Hills Generating Station	PHBLR3
PA	Fairless Hills Generating Station	PHBLR4
PA	Fairless Hills Generating Station	PHBLR5
PA	Fayette Energy Facility	CTG1
PA	Fayette Energy Facility	CTG2
PA	FPL Energy Marcus Hook, LP	0001
PA	FPL Energy Marcus Hook, LP	0002
PA	FPL Energy Marcus Hook, LP	0003
PA	FPL Energy Marcus Hook, LP	AB01
PA	FPL Energy Marcus Hook, LP	AB02
PA	FPL Energy Marcus Hook, LP	AB03
PA	FPL Energy Marcus Hook, LP	AB04
PA	FPL Energy MH50	001
PA	G F Weaton	34
PA	G F Weaton	35
PA	Gilberton Power Company	031
PA	Gilberton Power Company	032
PA	Grays Ferry Cogen Partnership	2
PA	Grays Ferry Cogen Partnership	25
PA	Handsome Lake Energy	EU-1A
PA	Handsome Lake Energy	EU-1B
PA	Handsome Lake Energy	EU-2A
PA	Handsome Lake Energy	EU-2B
PA	Handsome Lake Energy	EU-3A
PA	Handsome Lake Energy	EU-3B
PA	Handsome Lake Energy	EU-4A
PA	Handsome Lake Energy	EU-4B
PA	Handsome Lake Energy	EU-5A
PA	Handsome Lake Energy	EU-5B
PA	Hatfields Ferry Power Station	1
PA	Hatfields Ferry Power Station	2
PA	Hatfields Ferry Power Station	3
PA	Hazleton Generation	TURB2
PA	Hazleton Generation	TURB3
PA	Hazleton Generation	TURB4
PA	Hazleton Generation	TURBIN
PA	Homer City	1
PA	Homer City	2

Appendix A - NOx SIP Call Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
PA	Homer City	3
PA	Hunlock Power Station	6
PA	Hunterstown Combined Cycle	CT101
PA	Hunterstown Combined Cycle	CT201
PA	Hunterstown Combined Cycle	CT301
PA	Keystone	1
PA	Keystone	2
PA	Kimberly-Clark Tissue Company	034
PA	Kimberly-Clark Tissue Company	035
PA	Liberty Electric Power Plant	0001
PA	Liberty Electric Power Plant	0002
PA	Lower Mount Bethel Energy	CT01
PA	Lower Mount Bethel Energy	CT02
PA	Martins Creek	1
PA	Martins Creek	2
PA	Martins Creek	3
PA	Martins Creek	4
PA	Martins Creek	AUX4B
PA	Merck & Company - West Point	039
PA	Merck & Company - West Point	040
PA	Mitchell Power Station	1
PA	Mitchell Power Station	2
PA	Mitchell Power Station	3
PA	Mitchell Power Station	33
PA	Montour	1
PA	Montour	2
PA	Montour	AUX1
PA	Montour	AUX2
PA	Mountain	031
PA	Mountain	032
PA	Mt. Carmel Cogeneration	SG-101
PA	New Castle	3
PA	New Castle	4
PA	New Castle	5
PA	North East Cogeneration Plant	001
PA	North East Cogeneration Plant	002
PA	Northampton Generating Plant	NGC01
PA	Northeastern Power Company	031
PA	Ontelaunee Energy Center	CT1
PA	Ontelaunee Energy Center	CT2
PA	P H Glatfelter Company	034
PA	P H Glatfelter Company	035
PA	P H Glatfelter Company	036
PA	Panther Creek Energy Facility	1
PA	Panther Creek Energy Facility	2
PA	PEI Power Power Corporation	2
PA	Philadelphia Refinery	150137
PA	Philadelphia Refinery	150138
PA	Philadelphia Refinery	150139
PA	Philadelphia Refinery	150140
PA	Piney Creek Power Plant	031

Appendix A - NOx SIP Call Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
PA	Portland	1
PA	Portland	2
PA	Portland	5
PA	Procter & Gamble Paper Products	328001
PA	Richmond	91
PA	Richmond	92
PA	Schuylkill	1
PA	Scrubgrass Generating Plant	1
PA	Scrubgrass Generating Plant	2
PA	Seward	1
PA	Seward	2
PA	Shawville	1
PA	Shawville	2
PA	Shawville	3
PA	Shawville	4
PA	Shenango Incorporated	6
PA	Shenango Incorporated	9
PA	Shermans Dale Station	31801
PA	St. Nicholas Cogeneration Project	1
PA	Sunbury	1A
PA	Sunbury	1B
PA	Sunbury	2A
PA	Sunbury	2B
PA	Sunbury	3
PA	Sunbury	4
PA	Sunoco Chemicals Frankford Plant	052
PA	Titus	1
PA	Titus	2
PA	Titus	3
PA	Tolna	031
PA	Tolna	032
PA	Trigen Energy - Schuylkill	23
PA	Trigen Energy - Schuylkill	24
PA	Trigen Energy - Schuylkill	26
PA	Trigen Energy Corporation-Edison St	1
PA	Trigen Energy Corporation-Edison St	2
PA	Trigen Energy Corporation-Edison St	3
PA	Trigen Energy Corporation-Edison St	4
PA	US Steel (Clariton Coke)	CLBLR1
PA	US Steel (Clariton Coke)	CLBLR2
PA	US Steel (Edgar Thompson)	ETBLR1
PA	US Steel (Edgar Thompson)	ETBLR2
PA	US Steel (Edgar Thompson)	ETBLR3
PA	Warren	005
PA	Wheelabrator - Frackville	GEN1
PA	WPS Westwood Generation, LLC	031
VA	Altavista Power Station	1
VA	Altavista Power Station	2
VA	Bellemeade Power Station	1
VA	Bellemeade Power Station	2
VA	Birchwood Power Facility	001

Appendix A - NOx SIP Call Sources

State	Facility Name	Unit ID
VA	Bremo Power Station	3
VA	Bremo Power Station	4
VA	Buchanan -- Units 1 and 2	1
VA	Buchanan -- Units 1 and 2	2
VA	Celanese Acetate LLC	BLR007
VA	Celanese Acetate LLC	BLR008
VA	Chesapeake Energy Center	1
VA	Chesapeake Energy Center	2
VA	Chesapeake Energy Center	3
VA	Chesapeake Energy Center	4
VA	Chesterfield Power Station	**8A
VA	Chesterfield Power Station	3
VA	Chesterfield Power Station	4
VA	Chesterfield Power Station	5
VA	Chesterfield Power Station	6
VA	Chesterfield Power Station	7
VA	Clinch River	1
VA	Clinch River	2
VA	Clinch River	3
VA	Clover Power Station	1
VA	Clover Power Station	2
VA	Cogentrix-Hopewell	BLR01A
VA	Cogentrix-Hopewell	BLR01B
VA	Cogentrix-Hopewell	BLR01C
VA	Cogentrix-Hopewell	BLR02A
VA	Cogentrix-Hopewell	BLR02B
VA	Cogentrix-Hopewell	BLR02C
VA	Cogentrix-Portsmouth	BLR01A
VA	Cogentrix-Portsmouth	BLR01B
VA	Cogentrix-Portsmouth	BLR01C
VA	Cogentrix-Portsmouth	BLR02A
VA	Cogentrix-Portsmouth	BLR02B
VA	Cogentrix-Portsmouth	BLR02C
VA	Commonwealth Chesapeake	CT-001
VA	Commonwealth Chesapeake	CT-002
VA	Commonwealth Chesapeake	CT-003
VA	Commonwealth Chesapeake	CT-004
VA	Commonwealth Chesapeake	CT-005
VA	Commonwealth Chesapeake	CT-006
VA	Commonwealth Chesapeake	CT-007
VA	Darbytown Combustion Turbine	1
VA	Darbytown Combustion Turbine	2
VA	Darbytown Combustion Turbine	3
VA	Darbytown Combustion Turbine	4
VA	Doswell Limited Partnership	501
VA	Doswell Limited Partnership	502
VA	Doswell Limited Partnership	601
VA	Doswell Limited Partnership	602
VA	Doswell Limited Partnership	CT1
VA	Elizabeth River Combustion Turbine Sta	CT-1
VA	Elizabeth River Combustion Turbine Sta	CT-2

Appendix A - NOx SIP Call Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
VA	Elizabeth River Combustion Turbine Sta	CT-3
VA	Glen Lyn	51
VA	Glen Lyn	52
VA	Glen Lyn	6
VA	Gordonsville Power Station	1
VA	Gordonsville Power Station	2
VA	GP Big Island, LLC	4
VA	GP Big Island, LLC	6
VA	Gravel Neck Combustion Turbine	3
VA	Gravel Neck Combustion Turbine	4
VA	Gravel Neck Combustion Turbine	5
VA	Gravel Neck Combustion Turbine	6
VA	Honeywell Intl, Inc Hopewell Plant	10C
VA	Hopewell Cogeneration Facility	1
VA	Hopewell Cogeneration Facility	2
VA	Hopewell Cogeneration Facility	3
VA	Hopewell Power Station	1
VA	Hopewell Power Station	2
VA	International Paper-Franklin Mill	003
VA	International Paper-Franklin Mill	029
VA	Ladysmith Combustion Turbine Sta	1
VA	Ladysmith Combustion Turbine Sta	2
VA	Louisa Generation Facility	EU1
VA	Louisa Generation Facility	EU2
VA	Louisa Generation Facility	EU3
VA	Louisa Generation Facility	EU4
VA	Louisa Generation Facility	EU5
VA	Marsh Run Generation Facility	EU1
VA	Marsh Run Generation Facility	EU2
VA	Marsh Run Generation Facility	EU3
VA	MeadWestvaco of Virginia, Covington	001
VA	MeadWestvaco of Virginia, Covington	002
VA	MeadWestvaco of Virginia, Covington	003
VA	MeadWestvaco of Virginia, Covington	004
VA	MeadWestvaco of Virginia, Covington	005
VA	MeadWestvaco of Virginia, Covington	011
VA	Mecklenburg Power Station	1
VA	Mecklenburg Power Station	2
VA	Mirant Potomac River	1
VA	Mirant Potomac River	2
VA	Mirant Potomac River	3
VA	Mirant Potomac River	4
VA	Mirant Potomac River	5
VA	Possum Point Power Station	3
VA	Possum Point Power Station	4
VA	Possum Point Power Station	5
VA	Possum Point Power Station	6A
VA	Possum Point Power Station	6B
VA	Remington Combustion Turbine Station	1
VA	Remington Combustion Turbine Station	2
VA	Remington Combustion Turbine Station	3

Appendix A - NOx SIP Call Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
VA	Remington Combustion Turbine Station	4
VA	Smurfit-Stone Container Enterprises, Inc	002
VA	Southampton Power Station	1
VA	Southampton Power Station	2
VA	Spruance Genco, LLC	BLR01A
VA	Spruance Genco, LLC	BLR01B
VA	Spruance Genco, LLC	BLR02A
VA	Spruance Genco, LLC	BLR02B
VA	Spruance Genco, LLC	BLR03A
VA	Spruance Genco, LLC	BLR03B
VA	Spruance Genco, LLC	BLR04A
VA	Spruance Genco, LLC	BLR04B
VA	Tasley	TA10
VA	Tenaska Virginia Generating Station	CTGDB1
VA	Tenaska Virginia Generating Station	CTGDB2
VA	Tenaska Virginia Generating Station	CTGDB3
VA	Wolf Hills Energy	WH01
VA	Wolf Hills Energy	WH02
VA	Wolf Hills Energy	WH03
VA	Wolf Hills Energy	WH04
VA	Wolf Hills Energy	WH05
VA	Wolf Hills Energy	WH06
VA	Wolf Hills Energy	WH07
VA	Wolf Hills Energy	WH08
VA	Wolf Hills Energy	WH09
VA	Wolf Hills Energy	WH10
VA	Yorktown Power Station	1
VA	Yorktown Power Station	2
VA	Yorktown Power Station	3
WV	Albright Power Station	1
WV	Albright Power Station	2
WV	Albright Power Station	3
WV	ArcelorMittal Weirton, Inc.	089
WV	ArcelorMittal Weirton, Inc.	090
WV	ArcelorMittal Weirton, Inc.	091
WV	ArcelorMittal Weirton, Inc.	092
WV	ArcelorMittal Weirton, Inc.	093
WV	Bayer Cropscience Institute Plant	070
WV	Bayer Cropscience Institute Plant	080
WV	Bayer Cropscience Institute Plant	090
WV	Big Sandy Peaker Plant	GS01
WV	Big Sandy Peaker Plant	GS02
WV	Big Sandy Peaker Plant	GS03
WV	Big Sandy Peaker Plant	GS04
WV	Big Sandy Peaker Plant	GS05
WV	Big Sandy Peaker Plant	GS06
WV	Big Sandy Peaker Plant	GS07
WV	Big Sandy Peaker Plant	GS08
WV	Big Sandy Peaker Plant	GS09
WV	Big Sandy Peaker Plant	GS10
WV	Big Sandy Peaker Plant	GS11

Appendix A - NOx SIP Call Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
WV	Big Sandy Peaker Plant	GS12
WV	Ceredo Generating Station	01
WV	Ceredo Generating Station	02
WV	Ceredo Generating Station	03
WV	Ceredo Generating Station	04
WV	Ceredo Generating Station	05
WV	Ceredo Generating Station	06
WV	Dupont Belle Plant	612
WV	Fort Martin Power Station	1
WV	Fort Martin Power Station	2
WV	Grant Town Power Plant	1A
WV	Grant Town Power Plant	1B
WV	Harrison Power Station	1
WV	Harrison Power Station	2
WV	Harrison Power Station	3
WV	John E Amos	1
WV	John E Amos	2
WV	John E Amos	3
WV	John E Amos	AUX1
WV	John E Amos	AUX3
WV	Kammer	1
WV	Kammer	2
WV	Kammer	3
WV	Kanawha River	1
WV	Kanawha River	2
WV	Mitchell (WV)	1
WV	Mitchell (WV)	2
WV	Mitchell (WV)	AUX1
WV	Morgantown Energy Facility	CFB1
WV	Morgantown Energy Facility	CFB2
WV	Mount Storm Power Station	1
WV	Mount Storm Power Station	2
WV	Mount Storm Power Station	3
WV	Mountaineer (1301)	1
WV	Mountaineer (1301)	AUX1
WV	Mountaineer (1301)	AUX2
WV	North Branch Power Station	1A
WV	North Branch Power Station	1B
WV	Phil Sporn	11
WV	Phil Sporn	21
WV	Phil Sporn	31
WV	Phil Sporn	41
WV	Phil Sporn	51
WV	Pleasants Energy, LLC	1
WV	Pleasants Energy, LLC	2
WV	Pleasants Power Station	1
WV	Pleasants Power Station	2
WV	PPG Industries, Inc - Natrium Plant	001
WV	PPG Industries, Inc - Natrium Plant	002
WV	PPG Industries, Inc - Natrium Plant	003
WV	Rivesville Power Station	7

Appendix A - NO<sub>x</sub> SIP Call Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
WV	Rivesville Power Station	8
WV	UCC South Charleston Plant	B25
WV	UCC South Charleston Plant	B26
WV	UCC South Charleston Plant	B27
WV	Willow Island Power Station	1
WV	Willow Island Power Station	2
WV	WV Alloys, Inc.	BLR4

## *OTC Sources*

Appendix A - OTC Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
DC	Benning Generation Station	15
DC	Benning Generation Station	16
DC	Buzzard Point	E1
DC	Buzzard Point	E2
DC	Buzzard Point	E3
DC	Buzzard Point	E4
DC	Buzzard Point	E5
DC	Buzzard Point	E6
DC	Buzzard Point	E7
DC	Buzzard Point	E8
DC	Buzzard Point	W10
DC	Buzzard Point	W11
DC	Buzzard Point	W12
DC	Buzzard Point	W13
DC	Buzzard Point	W14
DC	Buzzard Point	W15
DC	Buzzard Point	W16
DC	Buzzard Point	W9
DC	GSA Central Heating	1
DC	GSA Central Heating	2
DC	GSA Central Heating	3
DC	GSA Central Heating	4
DC	GSA Central Heating	5
DC	GSA Central Heating	6
DE	Christiana Substation	11
DE	Christiana Substation	14
DE	Delaware City	10
DE	Delaware City Refinery	21H701
DE	Delaware City Refinery	37H1
DE	Delaware City Refinery	41H1
DE	Delaware City Refinery	42H123
DE	Delaware City Refinery	DCPP1
DE	Delaware City Refinery	DCPP2
DE	Delaware City Refinery	DCPP3
DE	Delaware City Refinery	DCPP4
DE	Delaware City Refinery	MECCU1
DE	Delaware City Refinery	MECCU2
DE	Edge Moor	10
DE	Edge Moor	3
DE	Edge Moor	4
DE	Edge Moor	5
DE	Hay Road	**3
DE	Hay Road	1
DE	Hay Road	2
DE	Hay Road	5
DE	Hay Road	6
DE	Hay Road	7
DE	Indian River	1
DE	Indian River	10
DE	Indian River	2
DE	Indian River	3

Appendix A - OTC Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
DE	Indian River	4
DE	Madison Street	10
DE	McKee Run	1
DE	McKee Run	2
DE	McKee Run	3
DE	NRG Energy Center Dover	1
DE	NRG Energy Center Dover	2
DE	NRG Energy Center Dover	3
DE	Van Sant	**11
DE	Warren F. Sam Beasley Pwr Station	1
DE	West Substation	10
MD	AES Warrior Run	001
MD	Brandon Shores	1
MD	Brandon Shores	2
MD	C P Crane	1
MD	C P Crane	2
MD	Gould Street	3
MD	Herbert A Wagner	1
MD	Herbert A Wagner	2
MD	Herbert A Wagner	3
MD	Herbert A Wagner	4
MD	Luke Paper Company	PR003
MD	Luke Paper Company	PR004
MD	Luke Paper Company	PR005
MD	Mirant Chalk Point	**GT3
MD	Mirant Chalk Point	**GT4
MD	Mirant Chalk Point	**GT5
MD	Mirant Chalk Point	**GT6
MD	Mirant Chalk Point	1
MD	Mirant Chalk Point	2
MD	Mirant Chalk Point	3
MD	Mirant Chalk Point	4
MD	Mirant Chalk Point	GT1
MD	Mirant Chalk Point	GT2
MD	Mirant Chalk Point	SMECO
MD	Mirant Dickerson	1
MD	Mirant Dickerson	2
MD	Mirant Dickerson	3
MD	Mirant Dickerson	GT2
MD	Mirant Dickerson	GT3
MD	Mirant Morgantown	1
MD	Mirant Morgantown	2
MD	Mirant Morgantown	GT1
MD	Mirant Morgantown	GT2
MD	Mirant Morgantown	GT3
MD	Mirant Morgantown	GT4
MD	Mirant Morgantown	GT5
MD	Mirant Morgantown	GT6
MD	Notchcliff	1
MD	Notchcliff	2
MD	Notchcliff	3

Appendix A - OTC Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
MD	Notchcliff	4
MD	Notchcliff	5
MD	Notchcliff	6
MD	Notchcliff	7
MD	Notchcliff	8
MD	Panda Brandywine	1
MD	Panda Brandywine	2
MD	Perryman	**51
MD	Perryman	CT1
MD	Perryman	CT2
MD	Perryman	CT3
MD	Perryman	CT4
MD	Philadelphia Road	CT1
MD	Philadelphia Road	CT2
MD	Philadelphia Road	CT3
MD	Philadelphia Road	CT4
MD	R. Paul Smith Power Station	11
MD	R. Paul Smith Power Station	9
MD	Riverside	4
MD	Riverside	CT6
MD	Riverside	CT7
MD	Riverside	CT8
MD	Vienna	10
MD	Vienna	8
MD	Westport	CT5
PA	AES Beaver Valley LLC	032
PA	AES Beaver Valley LLC	033
PA	AES Beaver Valley LLC	034
PA	AES Beaver Valley LLC	035
PA	AES Ironwood	0001
PA	AES Ironwood	0002
PA	Allegheny Energy Unit 1 and Unit 2	1
PA	Allegheny Energy Unit 1 and Unit 2	2
PA	Allegheny Energy Unit 8 and Unit 9	8
PA	Allegheny Energy Unit 8 and Unit 9	9
PA	Allentown	CT1
PA	Allentown	CT2
PA	Allentown	CT3
PA	Allentown	CT4
PA	Armstrong Energy Ltd Part	1
PA	Armstrong Energy Ltd Part	2
PA	Armstrong Energy Ltd Part	3
PA	Armstrong Energy Ltd Part	4
PA	Armstrong Power Station	1
PA	Armstrong Power Station	2
PA	Bernville Station	32001
PA	Bethlehem Power Plant	1
PA	Bethlehem Power Plant	2
PA	Blossburg	031
PA	Bruce Mansfield	1
PA	Bruce Mansfield	2

Appendix A - OTC Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
PA	Bruce Mansfield	3
PA	Brunner Island	1
PA	Brunner Island	2
PA	Brunner Island	3
PA	Brunot Island Power Station	1A
PA	Brunot Island Power Station	1B
PA	Brunot Island Power Station	1C
PA	Brunot Island Power Station	2A
PA	Brunot Island Power Station	2B
PA	Brunot Island Power Station	3
PA	Cambria Cogen	1
PA	Cambria Cogen	2
PA	Chambersburg Units 12 and 13	12
PA	Chambersburg Units 12 and 13	13
PA	Cheswick	1
PA	Colver Power Project	AAB01
PA	Conemaugh	1
PA	Conemaugh	2
PA	ConocoPhillips Co., Trainer Refinery	032
PA	ConocoPhillips Co., Trainer Refinery	033
PA	ConocoPhillips Co., Trainer Refinery	038
PA	ConocoPhillips Co., Trainer Refinery	044
PA	ConocoPhillips Co., Trainer Refinery	045
PA	Cromby	1
PA	Cromby	2
PA	Croydon Generating Station	11
PA	Croydon Generating Station	12
PA	Croydon Generating Station	21
PA	Croydon Generating Station	22
PA	Croydon Generating Station	31
PA	Croydon Generating Station	32
PA	Croydon Generating Station	41
PA	Croydon Generating Station	42
PA	Delaware	71
PA	Delaware	81
PA	Delaware	9
PA	Domtar Paper Company, LLC	040
PA	Domtar Paper Company, LLC	041
PA	Ebensburg Power Company	031
PA	Eddystone Generating Station	1
PA	Eddystone Generating Station	2
PA	Eddystone Generating Station	3
PA	Eddystone Generating Station	30
PA	Eddystone Generating Station	4
PA	Eddystone Generating Station	40
PA	Elrama	1
PA	Elrama	2
PA	Elrama	3
PA	Elrama	4
PA	Fairless Hills Generating Station	PHBLR3
PA	Fairless Hills Generating Station	PHBLR4

Appendix A - OTC Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
PA	Fairless Hills Generating Station	PHBLR5
PA	Falls Generating Station	1
PA	Falls Generating Station	2
PA	Falls Generating Station	3
PA	Fishbach	CT1
PA	Fishbach	CT2
PA	FPL Energy MH50	001
PA	G F Weaton	34
PA	G F Weaton	35
PA	Gilberton Power Company	031
PA	Gilberton Power Company	032
PA	Grays Ferry Cogen Partnership	2
PA	Grays Ferry Cogen Partnership	25
PA	Hamilton	031
PA	Handsome Lake Energy	EU-1A
PA	Handsome Lake Energy	EU-1B
PA	Handsome Lake Energy	EU-2A
PA	Handsome Lake Energy	EU-2B
PA	Handsome Lake Energy	EU-3A
PA	Handsome Lake Energy	EU-3B
PA	Handsome Lake Energy	EU-4A
PA	Handsome Lake Energy	EU-4B
PA	Handsome Lake Energy	EU-5A
PA	Handsome Lake Energy	EU-5B
PA	Harrisburg	CT1
PA	Harrisburg	CT2
PA	Harrisburg	CT3
PA	Harrisburg	CT4
PA	Harwood	CT1
PA	Harwood	CT2
PA	Hatfields Ferry Power Station	1
PA	Hatfields Ferry Power Station	2
PA	Hatfields Ferry Power Station	3
PA	Hazleton Generation	TURB2
PA	Hazleton Generation	TURB3
PA	Hazleton Generation	TURB4
PA	Hazleton Generation	TURBIN
PA	Homer City	1
PA	Homer City	2
PA	Homer City	3
PA	Hunlock Power Station	6
PA	Hunterstown	031
PA	Hunterstown	032
PA	Hunterstown	033
PA	Hunterstown Combined Cycle	CT101
PA	International Paper, Erie Mill	037
PA	International Paper-Lock Haven Mill	1
PA	International Paper-Lock Haven Mill	2
PA	Jenkins	CT1
PA	Jenkins	CT2
PA	Keystone	1

Appendix A - OTC Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
PA	Keystone	2
PA	Kimberly-Clark Tissue Company	034
PA	Kimberly-Clark Tissue Company	035
PA	Liberty Electric Power Plant	0001
PA	Liberty Electric Power Plant	0002
PA	Lock Haven	CT1
PA	Martins Creek	1
PA	Martins Creek	2
PA	Martins Creek	3
PA	Martins Creek	4
PA	Martins Creek	AUX4B
PA	Martins Creek	CT1
PA	Martins Creek	CT2
PA	Martins Creek	CT3
PA	Martins Creek	CT4
PA	Merck & Company - West Point	039
PA	Merck & Company - West Point	040
PA	Mitchell Power Station	1
PA	Mitchell Power Station	2
PA	Mitchell Power Station	3
PA	Mitchell Power Station	33
PA	Montour	1
PA	Montour	2
PA	Montour	AUX1
PA	Montour	AUX2
PA	Moser Generating Station	1
PA	Moser Generating Station	2
PA	Moser Generating Station	3
PA	Mountain	031
PA	Mountain	032
PA	Mt. Carmel Cogeneration	SG-101
PA	Naval Surface Warfare Center	99
PA	New Castle	3
PA	New Castle	4
PA	New Castle	5
PA	North East Cogeneration Plant	001
PA	North East Cogeneration Plant	002
PA	Northampton Generating Plant	NGC01
PA	Northeastern Power Company	031
PA	Ontelaunee Energy Center	CT1
PA	Ontelaunee Energy Center	CT2
PA	Orrtanna	031
PA	P H Glatfelter Company	034
PA	P H Glatfelter Company	035
PA	P H Glatfelter Company	036
PA	Panther Creek Energy Facility	1
PA	Panther Creek Energy Facility	2
PA	PEI Power Power Corporation	031
PA	PEI Power Power Corporation	2
PA	Philadelphia Refinery	150101
PA	Philadelphia Refinery	150110

Appendix A - OTC Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
PA	Philadelphia Refinery	150137
PA	Philadelphia Refinery	150138
PA	Philadelphia Refinery	150139
PA	Philadelphia Refinery	150140
PA	Piney Creek Power Plant	031
PA	Portland	033
PA	Portland	034
PA	Portland	1
PA	Portland	2
PA	Portland	5
PA	Procter & Gamble Paper Products	328001
PA	Richmond	91
PA	Richmond	92
PA	Schuylkill	1
PA	Schuylkill	11
PA	Scrubgrass Generating Plant	1
PA	Scrubgrass Generating Plant	2
PA	Seward	12
PA	Seward	14
PA	Seward	15
PA	Shawnee	031
PA	Shawville	1
PA	Shawville	2
PA	Shawville	3
PA	Shawville	4
PA	Shermans Dale Station	31801
PA	St. Nicholas Cogeneration Project	1
PA	Sunbury	1A
PA	Sunbury	1B
PA	Sunbury	2A
PA	Sunbury	2B
PA	Sunbury	3
PA	Sunbury	4
PA	Sunbury	CT1
PA	Sunbury	CT2
PA	Sunoco (R&M) - Marcus Hook	089
PA	Sunoco Chemicals Frankford Plant	052
PA	Titus	034
PA	Titus	035
PA	Titus	1
PA	Titus	2
PA	Titus	3
PA	Tolna	031
PA	Tolna	032
PA	Trigen Energy - Schuylkill	23
PA	Trigen Energy - Schuylkill	24
PA	Trigen Energy - Schuylkill	26
PA	Trigen Energy Corporation-Edison St	1
PA	Trigen Energy Corporation-Edison St	2
PA	Trigen Energy Corporation-Edison St	3
PA	Trigen Energy Corporation-Edison St	4

Appendix A - OTC Sources

<b>State</b>	<b>Facility Name</b>	<b>Unit ID</b>
PA	Warren	005
PA	Warren	1
PA	Warren	2
PA	Warren	3
PA	Warren	4
PA	Wayne	031
PA	West Shore	CT1
PA	West Shore	CT2
PA	Wheelabrator - Frackville	GEN1
PA	Williamsport	CT1
PA	Williamsport	CT2
PA	WPS Westwood Generation, LLC	031

*Appendix B*  
*Detailed List of NO<sub>x</sub> Control*  
*Equipment Installed on Sources*  
*in Maryland and Surrounding*  
*States*

*NOx Controls Installed After  
1998*

Appendix B - NOx Controls for Sources in MD and Surrounding States in 1998

Plant State	Plant Name	Boiler Code	NOx Control 1	NOx Control 2	NOx Control 3
DC	Benning	15	N		
DC	Benning	16	N		
DE	Edge Moor	3	SN		
DE	Edge Moor	4	LN		
DE	Edge Moor	5	OV	LN	
DE	Indian River Generating Station	1	N		
DE	Indian River Generating Station	2	N		
DE	Indian River Generating Station	3	LN	OV	
DE	Indian River Generating Station	4	OV	LN	
DE	McKee Run	1	N		
DE	McKee Run	2	N		
DE	McKee Run	3	LN		
MD	Brandon Shores	1	LN		
MD	Brandon Shores	2	LN		
MD	C P Crane	1	N		
MD	C P Crane	2	N		
MD	Chalk Point LLC	1	LN	OV	
MD	Chalk Point LLC	2	LN	OV	
MD	Chalk Point LLC	3	N		
MD	Chalk Point LLC	4	OV		
MD	Dickerson	1	N		
MD	Dickerson	2	N		
MD	Dickerson	3	N		
MD	Herbert A Wagner	1	N		
MD	Herbert A Wagner	2	LN		
MD	Herbert A Wagner	3	N		
MD	Herbert A Wagner	4	N		
MD	Morgantown Generating Plant	1	LN	OV	
MD	Morgantown Generating Plant	2	LN	OV	
MD	R Paul Smith Power Station	11	LN		
MD	R Paul Smith Power Station	9	LN		
MD	Riverside	4	N		
MD	Vienna Operations	8	N		
PA	Armstrong Power Station	1	LN	OV	
PA	Armstrong Power Station	2	LN	OV	
PA	Bruce Mansfield	1	LN	OV	
PA	Bruce Mansfield	2	LN	OV	
PA	Bruce Mansfield	3	OV	LN	
PA	Cheswick Power Plant	1	LN	OV	
PA	Conemaugh	1	LN	OV	
PA	Conemaugh	2	LN	OV	
PA	Cromby Generating Station	1	LN	OV	
PA	Cromby Generating Station	2	OV		
PA	Eddystone Generating Station	1	N		
PA	Eddystone Generating Station	2	N		
PA	Eddystone Generating Station	3	N		
PA	Eddystone Generating Station	4	N		
PA	Elrama Power Plant	1	LN		
PA	Elrama Power Plant	2	LN		
PA	Elrama Power Plant	3	LN		

Appendix B - NOx Controls for Sources in MD and Surrounding States in 1998

Plant State	Plant Name	Boiler Code	NOx Control 1	NOx Control 2	NOx Control 3
PA	Elrama Power Plant	4	LN		
PA	Hatfields Ferry Power Station	1	LN		
PA	Hatfields Ferry Power Station	2	LN		
PA	Hatfields Ferry Power Station	3	LN		
PA	Homer City Station	1	LN	OV	
PA	Homer City Station	2	LN	OV	
PA	Homer City Station	3	LN	OV	
PA	Keystone	1	OV	LN	
PA	Keystone	2	OV	LN	
PA	Mitchell Power Station	1	N		
PA	Mitchell Power Station	2	N		
PA	Mitchell Power Station	3	N		
PA	Mitchell Power Station	33	LN	OV	
PA	New Castle Plant	1	N		
PA	New Castle Plant	2	N		
PA	New Castle Plant	3	LA		
PA	New Castle Plant	4	LA		
PA	New Castle Plant	5	LN		
PA	Portland	1	LN	OV	
PA	Portland	2	LN	OV	
PA	PPL Brunner Island	1	LN	OV	
PA	PPL Brunner Island	2	LN	OV	
PA	PPL Brunner Island	3	LN	OV	
PA	PPL Martins Creek	1	LN	OV	
PA	PPL Martins Creek	2	LN	OV	
PA	PPL Martins Creek	3	N		
PA	PPL Martins Creek	4	N		
PA	PPL Montour	1	LN	OA	
PA	PPL Montour	2	LN	OA	
PA	Schuylkill Generating Station	1	N		
PA	Seward	12	N		
PA	Seward	14	LN		
PA	Seward	15	SN		
PA	Shawville	1	LN		
PA	Shawville	2	LN		
PA	Shawville	3	LN	OV	
PA	Shawville	4	LN	OV	
PA	Springdale Power Station	77	N		
PA	Springdale Power Station	88	N		
PA	Titus	1	LN	OV	
PA	Titus	2	LN	OV	
PA	Titus	3	LN	OV	
PA	WPS Energy Servs Sunbury Gen	1A	N		
PA	WPS Energy Servs Sunbury Gen	1B	N		
PA	WPS Energy Servs Sunbury Gen	2A	N		
PA	WPS Energy Servs Sunbury Gen	2B	N		
PA	WPS Energy Servs Sunbury Gen	3	LN	AA	
PA	WPS Energy Servs Sunbury Gen	4	LN	AA	
VA	Bremo Bluff	3	N		
VA	Bremo Bluff	4	N		

Appendix B - NOx Controls for Sources in MD and Surrounding States in 1998

Plant State	Plant Name	Boiler Code	NOx Control 1	NOx Control 2	NOx Control 3
VA	Chesapeake	1	OV	LN	
VA	Chesapeake	2	OV	LN	
VA	Chesapeake	3	N		
VA	Chesapeake	4	N		
VA	Chesterfield	3	N		
VA	Chesterfield	4	N		
VA	Chesterfield	5	N		
VA	Chesterfield	6	N		
VA	Clinch River	1	N		
VA	Clinch River	2	N		
VA	Clinch River	3	N		
VA	Clover	1	LN	AA	
VA	Clover	2	LN	AA	
VA	Glen Lyn	51	N		
VA	Glen Lyn	52	N		
VA	Glen Lyn	6	LN		
VA	Possum Point	1	N		
VA	Possum Point	2	N		
VA	Possum Point	3	N		
VA	Possum Point	4	N		
VA	Possum Point	5	OV	FR	
VA	Potomac River	1	LA		
VA	Potomac River	2	LA		
VA	Potomac River	3	LA		
VA	Potomac River	4	LA		
VA	Potomac River	5	LA		
VA	Yorktown	1	N		
VA	Yorktown	2	N		
VA	Yorktown	3	N		
WV	Albright	1	LN	OV	
WV	Albright	2	LN	OV	
WV	Albright	3	LN		
WV	Fort Martin Power Station	1	N		
WV	Fort Martin Power Station	2	N		
WV	Harrison Power Station	1	LN		
WV	Harrison Power Station	2	LN		
WV	Harrison Power Station	3	LN		
WV	John E Amos	1	LN		
WV	John E Amos	2	LN		
WV	John E Amos	3	LN		
WV	Kammer	1	N		
WV	Kammer	2	OV		
WV	Kammer	3	N		
WV	Kanawha River	1	N		
WV	Kanawha River	2	N		
WV	Mitchell	1	LN		
WV	Mitchell	2	LN		
WV	Mountaineer	1	LN		
WV	Mt Storm	1	LN		
WV	Mt Storm	2	N		

Appendix B - NOx Controls for Sources in MD and Surrounding States in 1998

Plant State	Plant Name	Boiler Code	NOx Control 1	NOx Control 2	NOx Control 3
WV	Mt Storm	3	LN		
WV	Philip Sporn	11	LN		
WV	Philip Sporn	21	LN		
WV	Philip Sporn	31	N		
WV	Philip Sporn	41	LN		
WV	Philip Sporn	51	N		
WV	Pleasants Power Station	1	N		
WV	Pleasants Power Station	2	LN		
WV	Rivesville	7	N		
WV	Rivesville	8	N		
WV	Willow Island	1	N		
WV	Willow Island	2	N		

Legend			
AA	Advanced Overfire Air	LN	Low NOx Burner
CF	Fluidized Bed Combustor	N	No Controls
FR	Flue Gas Recirculation	OV	Overfire Air
LA	Low Excess Air	SN	Selective Noncatalytic Reduction
		SR	Selective Catalytic Reduction

*NOx Controls Installed After  
2005*

Appendix B - NOx Controls for Sources in MD and Surrounding States for 2005

State	Plant Name	Boiler ID	NOx Control 1	NOx Control 2	NOx Control 3
DC	Benning	15	NA		
DC	Benning	16	NA		
DE	Delaware City Plant	BLR1	OV		
DE	Delaware City Plant	BLR2	OV		
DE	Delaware City Plant	BLR3	OV		
DE	Delaware City Plant	BLR4	OV		
DE	Delaware City Plant	HRSG 1	LN	OT	
DE	Delaware City Plant	HRSG 2	LN	OT	
DE	Edge Moor	3	SN		
DE	Edge Moor	4	LN	OV	
DE	Edge Moor	5	LN	OV	
DE	Indian River Generating Station	1	LN	OV	
DE	Indian River Generating Station	2	LN	OV	
DE	Indian River Generating Station	3	LN	OV	SN
DE	Indian River Generating Station	4	OV	LN	SN
DE	McKee Run	1	NA		
DE	McKee Run	2	NA		
DE	McKee Run	3	LN	OV	
DE	NRG Energy Center Dover	COGEN1	LN		
DE	Seaford Delaware Plant	BLR1	LN		
DE	Seaford Delaware Plant	BLR2	LN		
DE	Seaford Delaware Plant	BLR3	LN		
MD	AES Warrior Run Cogeneration Facility	BLR1	SN	SR	CF
MD	Brandon Shores	1	LN	SR	
MD	Brandon Shores	2	LN	SR	
MD	C P Crane	1	OV		
MD	C P Crane	2	OV		
MD	Chalk Point LLC	1	LN	OV	
MD	Chalk Point LLC	2	LN	OV	
MD	Chalk Point LLC	3	OV	LN	
MD	Chalk Point LLC	4	OV	LN	
MD	Dickerson	1	LN	OV	
MD	Dickerson	2	LN	OV	
MD	Dickerson	3	LN	OV	
MD	Domino Sugar Baltimore	C1	LN	LA	
MD	Domino Sugar Baltimore	C2	LN	LA	
MD	Domino Sugar Baltimore	C3	LN	LA	
MD	Domino Sugar Baltimore	C4	LN	LA	
MD	Domino Sugar Baltimore	C6	LN	FR	
MD	Herbert A Wagner	1	NA		
MD	Herbert A Wagner	2	LN		
MD	Herbert A Wagner	3	LN	SR	
MD	Herbert A Wagner	4	NA		
MD	Luke Mill	24PB	SN		
MD	Luke Mill	25PB	LN	OV	
MD	Luke Mill	26PB	NA		
MD	Luke Mill	2RB	NA		
MD	Luke Mill	3RB	NA		
MD	Montgomery County Resource Recovery	1	LN	OV	SN
MD	Montgomery County Resource Recovery	2	LN	OV	SN

Appendix B - NOx Controls for Sources in MD and Surrounding States for 2005

State	Plant Name	Boiler ID	NOx Control 1	NOx Control 2	NOx Control 3
MD	Montgomery County Resource Recovery	3	LN	OV	SN
MD	Morgantown Generating Plant	1	LN	OV	
MD	Morgantown Generating Plant	2	LN	OV	
MD	R Paul Smith Power Station	11	LN	OV	
MD	R Paul Smith Power Station	9	LN		
MD	Riverside	4	NA		
MD	Sparrows Point	1	NA		
MD	Sparrows Point	2	NA		
MD	Sparrows Point	3	NA		
MD	Sparrows Point	4	NA		
MD	Vienna Operations	8	NA		
MD	Wheelabrator Baltimore Refuse	BLR1	SN		
MD	Wheelabrator Baltimore Refuse	BLR2	SN		
MD	Wheelabrator Baltimore Refuse	BLR3	SN		
PA	AES Beaver Valley Partners Beaver Valley	2	LN	OV	LA
PA	AES Beaver Valley Partners Beaver Valley	3	LN	OV	LA
PA	AES Beaver Valley Partners Beaver Valley	4	LN	OV	LA
PA	AES Beaver Valley Partners Beaver Valley	5	LN	LA	
PA	American Eagle Paper Mills	7	NA		
PA	American Ref-Fuel of Delaware Valley	BLR1	NA		
PA	American Ref-Fuel of Delaware Valley	BLR2	NA		
PA	American Ref-Fuel of Delaware Valley	BLR3	NA		
PA	American Ref-Fuel of Delaware Valley	BLR4	NA		
PA	American Ref-Fuel of Delaware Valley	BLR5	NA		
PA	American Ref-Fuel of Delaware Valley	BLR6	NA		
PA	Archbald Power Station	MAIN	LN	FR	OV
PA	Armstrong Power Station	1	LN	OV	
PA	Armstrong Power Station	2	LN	OV	
PA	Bruce Mansfield	1	LN	OV	SR
PA	Bruce Mansfield	2	LN	OV	SR
PA	Bruce Mansfield	3	OV	LN	
PA	Brunot Island	HRSG2A	SR		
PA	Brunot Island	HRSG2B	SR		
PA	Brunot Island	HRSG3	SR		
PA	Cambria Cogen	B1	CF	SN	
PA	Cambria Cogen	B2	CF	SN	
PA	Chester Operations	10	CF		
PA	Cheswick Power Plant	1	SR	LN	AA
PA	Clairton Works	1BLR	NA		
PA	Clairton Works	2BLR	NA		
PA	Clairton Works	R1BLR	NA		
PA	Clairton Works	R2BLR	NA		
PA	Clairton Works	T1BLR	NA		
PA	Clairton Works	T2BLR	NA		
PA	Colver Power Project	ABB01	CF		
PA	Conemaugh	1	LN		
PA	Conemaugh	2	LN		
PA	Cromby Generating Station	1	LN	OV	SN
PA	Cromby Generating Station	2	OV	OT	
PA	Cromby Generating Station	FB1	NA		

Appendix B - NOx Controls for Sources in MD and Surrounding States for 2005

State	Plant Name	Boiler ID	NOx Control 1	NOx Control 2	NOx Control 3
PA	Cromby Generating Station	FB2	NA		
PA	Ebensburg Power	031	CF		
PA	Eddystone Generating Station	1	SN	LN	OV
PA	Eddystone Generating Station	2	SN	LN	OV
PA	Eddystone Generating Station	3	LN		
PA	Eddystone Generating Station	4	LN		
PA	Eddystone Generating Station	FB1	NA		
PA	Eddystone Generating Station	FB2	NA		
PA	Elrama Power Plant	1	LN	SN	
PA	Elrama Power Plant	2	LN	SN	
PA	Elrama Power Plant	3	LN	SN	
PA	Elrama Power Plant	4	LN		
PA	Fairless Energy Center	HRSG1A	SR		
PA	Fairless Energy Center	HRSG1B	SR		
PA	Fairless Energy Center	HRSG2A	SR		
PA	Fairless Energy Center	HRSG2B	SR		
PA	Fairless Hills	3	NA		
PA	Fairless Hills	4	LN		
PA	Fairless Hills	5	LN		
PA	Fayette Energy Facility	DB1	LN		
PA	Fayette Energy Facility	DB2	LN		
PA	Foster Wheeler Mt Carmel Cogen	SG-101	CF		
PA	G F Weaton Power Station	BLR1	LN	LA	BF
PA	G F Weaton Power Station	BLR2	LN	LA	BF
PA	Harrisburg Facility	1	OT		
PA	Harrisburg Facility	2	OT		
PA	Harrisburg Facility	3	OT		
PA	Hatfields Ferry Power Station	1	LN	OV	
PA	Hatfields Ferry Power Station	2	LN	OV	
PA	Hatfields Ferry Power Station	3	LN	OV	
PA	Homer City Station	1	LN	SR	OV
PA	Homer City Station	2	LN	OV	SR
PA	Homer City Station	3	LN	OV	SR
PA	Hunlock Power Station	6	LA		
PA	Hunterstown	101	SR		
PA	Hunterstown	201	SR		
PA	Hunterstown	301	SR		
PA	John B Rich Memorial Power Station	CFB1	CF		
PA	John B Rich Memorial Power Station	CFB2	CF		
PA	Johnsonburg Mill	PC81	LN		
PA	Johnsonburg Mill	PC82	LN		
PA	Johnsonburg Mill	RB01	OT		
PA	Keystone	1	OV	LN	
PA	Keystone	2	OV	LN	
PA	Kline Township Cogen Facility	1	CF		
PA	Koppers Susquehanna Plant	1	NA		
PA	Lancaster County Resource Recovery	BLR1	OV	SN	
PA	Lancaster County Resource Recovery	BLR2	OV	SN	
PA	Lancaster County Resource Recovery	BLR3	OV	SN	
PA	Liberty Electric Power Plant	HRSG1	SR		

Appendix B - NOx Controls for Sources in MD and Surrounding States for 2005

State	Plant Name	Boiler ID	NOx Control 1	NOx Control 2	NOx Control 3
PA	Liberty Electric Power Plant	HRSG2	SR		
PA	Mitchell Power Station	1	NA		
PA	Mitchell Power Station	2	NA		
PA	Mitchell Power Station	3	NA		
PA	Mitchell Power Station	33	LN	OV	
PA	Mon Valley Works	ETBLR1	NA		
PA	Mon Valley Works	ETBLR2	NA		
PA	Mon Valley Works	ETBLR3	NA		
PA	Montenay Montgomery LP	1	SN	OV	
PA	Montenay Montgomery LP	2	SN	OV	
PA	New Castle Plant	3	LN	OV	
PA	New Castle Plant	4	LN	OV	
PA	New Castle Plant	5	LN	OV	
PA	Northampton Generating Company	BLR1	SN	CF	
PA	P H Glatfelter	1PB035	LN	OV	
PA	P H Glatfelter	3PB033	NA		
PA	P H Glatfelter	4PB034	LN	OV	
PA	P H Glatfelter	5PB036	CF		
PA	P H Glatfelter	REC037	SC		
PA	Panther Creek Energy Facility	BLR1	CF	OV	SN
PA	Panther Creek Energy Facility	BLR2	CF	OV	SN
PA	Philadelphia Refinery	37	LN		
PA	Philadelphia Refinery	38	LN		
PA	Philadelphia Refinery	39	LN		
PA	Philadelphia Refinery	40	LN		
PA	Piney Creek Project	BRBR1	CF	SN	LA
PA	Portland	1	LN		
PA	Portland	2	LN		
PA	PPL Brunner Island	1	LN		
PA	PPL Brunner Island	2	LN	OV	
PA	PPL Brunner Island	3	LN		
PA	PPL Martins Creek	1	LN		
PA	PPL Martins Creek	2	LN		
PA	PPL Martins Creek	3	NA		
PA	PPL Martins Creek	4	NA		
PA	PPL Montour	1	LN	OV	SR
PA	PPL Montour	2	LN	OV	SR
PA	River Hill Power Company LLC	031			
PA	Schuylkill Generating Station	1	LA	LN	
PA	Scrubgrass Generating	UNIT 1	SN	CF	
PA	Scrubgrass Generating	UNIT 2	SN	CF	
PA	Seward	1	SN		
PA	Seward	2	SN		
PA	Shawville	1	LN		
PA	Shawville	2	LN		
PA	Shawville	3	LN		
PA	Shawville	4	LN		
PA	Shenango Neville Island Coke Works	10	NA		
PA	Shenango Neville Island Coke Works	1PB	LN		
PA	Shenango Neville Island Coke Works	2PB	LN	FR	

Appendix B - NOx Controls for Sources in MD and Surrounding States for 2005

State	Plant Name	Boiler ID	NOx Control 1	NOx Control 2	NOx Control 3
PA	Shenango Neville Island Coke Works	3PB	LN	FR	
PA	Shenango Neville Island Coke Works	4PB	LN	FR	
PA	Springdale Power Station	77	NA		
PA	St Nicholas Cogen Project	1	CF		
PA	Titus	1	LN		
PA	Titus	2	LN		
PA	Titus	3	LN		
PA	Viking Energy of Northumberland	B1	OV		
PA	Wheelabrator Falls	1	SN		
PA	Wheelabrator Falls	2	SN		
PA	Wheelabrator Frackville Energy	BLR1	CF		
PA	WPS Energy Servs Sunbury Gen	1A	LN		
PA	WPS Energy Servs Sunbury Gen	1B	LN		
PA	WPS Energy Servs Sunbury Gen	2A	LN		
PA	WPS Energy Servs Sunbury Gen	2B	LN		
PA	WPS Energy Servs Sunbury Gen	3	LN		
PA	WPS Energy Servs Sunbury Gen	4	LN		
PA	WPS Westwood Generation LLC	031	NA		
PA	York Cogen Facility	HRSG 1	NA		
PA	York Cogen Facility	HRSG 2	NA		
PA	York Cogen Facility	HRSG 3	NA		
PA	York Cogen Facility	HRSG 4	NA		
PA	York Cogen Facility	HRSG 5	NA		
PA	York Cogen Facility	HRSG 6	NA		
PA	York County Resource Recovery	101	LA		
PA	York County Resource Recovery	102	LA		
PA	York County Resource Recovery	103	LA		
VA	Altavista Power Station	1	OV	SN	
VA	Birchwood Power	1A	LN	OV	SR
VA	Bremo Bluff	3	NA		
VA	Bremo Bluff	4	NA		
VA	Chesapeake	1	OV		
VA	Chesapeake	2	OV		
VA	Chesapeake	3	NA		
VA	Chesapeake	4	NA		
VA	Chesterfield	3	NA		
VA	Chesterfield	4	NA		
VA	Chesterfield	5	NA		
VA	Chesterfield	6	NA		
VA	Cinergy Solutions of Narrows	NO1BLR	NA		
VA	Cinergy Solutions of Narrows	NO2BLR	NA		
VA	Cinergy Solutions of Narrows	NO3BLR	NA		
VA	Cinergy Solutions of Narrows	NO4BLR	NA		
VA	Cinergy Solutions of Narrows	NO5BLR	NA		
VA	Cinergy Solutions of Narrows	NO6BLR	NA		
VA	Cinergy Solutions of Narrows	NO7BLR	SN		
VA	Cinergy Solutions of Narrows	NO8BLR	LN		
VA	Cinergy Solutions of Narrows	NO9BLR	LN		
VA	Clinch River	1	LN		
VA	Clinch River	2	LN		

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State	Plant Name	Boiler ID	NOx Control 1	NOx Control 2	NOx Control 3
VA	Clinch River	3	LN		
VA	Clover	1	LN		
VA	Clover	2	LN		
VA	Cogentrix Hopewell	1A	OV		
VA	Cogentrix Hopewell	1B	OV		
VA	Cogentrix Hopewell	1C	OV		
VA	Cogentrix Hopewell	2A	OV		
VA	Cogentrix Hopewell	2B	OV		
VA	Cogentrix Hopewell	2C	OV		
VA	Cogentrix of Richmond	1A	FR		
VA	Cogentrix of Richmond	1B	FR		
VA	Cogentrix of Richmond	2A	FR		
VA	Cogentrix of Richmond	2B	FR		
VA	Cogentrix of Richmond	3A	FR		
VA	Cogentrix of Richmond	3B	FR		
VA	Cogentrix of Richmond	4A	FR		
VA	Cogentrix of Richmond	4B	FR		
VA	Cogentrix Virginia Leasing Corporation	1A	OV		
VA	Cogentrix Virginia Leasing Corporation	1B	OV		
VA	Cogentrix Virginia Leasing Corporation	1C	OV		
VA	Cogentrix Virginia Leasing Corporation	2A	OV		
VA	Cogentrix Virginia Leasing Corporation	2B	OV		
VA	Cogentrix Virginia Leasing Corporation	2C	OV		
VA	Covanta Alexandria/Arlington Energy	B100	SN		
VA	Covanta Alexandria/Arlington Energy	B200	SN		
VA	Covanta Alexandria/Arlington Energy	B300	SN		
VA	Covanta Fairfax Energy	1	SN		
VA	Covanta Fairfax Energy	2	SN		
VA	Covanta Fairfax Energy	3	SN		
VA	Covanta Fairfax Energy	4	SN		
VA	Covington Facility	10PB	NA		
VA	Covington Facility	11PB	FR	LA	
VA	Covington Facility	1RB	NA		
VA	Covington Facility	2RB	NA		
VA	Covington Facility	6PB	LN	LA	
VA	Covington Facility	7PB	OV	FR	LA
VA	Covington Facility	8PB	OV	FR	LA
VA	Covington Facility	9PB	OV	LA	
VA	Doswell Energy Center	HR501	SR		
VA	Doswell Energy Center	HR502	SR		
VA	Doswell Energy Center	HR601	SR		
VA	Doswell Energy Center	HR602	SR		
VA	Glen Lyn	51	OT		
VA	Glen Lyn	52	OT		
VA	Glen Lyn	6	LN		
VA	Hopewell Power Station	1	NA		
VA	International Paper Franklin Mill	4RB	NA		
VA	International Paper Franklin Mill	5PB	NA		
VA	International Paper Franklin Mill	5RB	NA		
VA	International Paper Franklin Mill	6PB	OV		

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State	Plant Name	Boiler ID	NOx Control 1	NOx Control 2	NOx Control 3
VA	International Paper Franklin Mill	6RB	NA		
VA	International Paper Franklin Mill	7PB	NA		
VA	Mecklenburg Power Station	BLR1	AA	LN	
VA	Mecklenburg Power Station	BLR2	AA	LN	
VA	Multitrade of Pittsylvania LP	101	OV	SN	
VA	Multitrade of Pittsylvania LP	102	OV	SN	
VA	Multitrade of Pittsylvania LP	103	OV	SN	
VA	Park 500 Philip Morris USA	2	OV		
VA	Park 500 Philip Morris USA	3	OV		
VA	Possum Point	3	NA		
VA	Possum Point	4	NA		
VA	Possum Point	5	OV		
VA	Potomac River	1	LA	LN	
VA	Potomac River	2	LA	LN	
VA	Potomac River	3	LA	LN	
VA	Potomac River	4	LA	LN	
VA	Potomac River	5	LA	LN	
VA	Radford Army Ammunition Plant	1	NA		
VA	Radford Army Ammunition Plant	2	NA		
VA	Radford Army Ammunition Plant	3	NA		
VA	Radford Army Ammunition Plant	4	NA		
VA	Radford Army Ammunition Plant	5	NA		
VA	Southampton Power Station	1	OV		
VA	SPSA Waste To Energy Power Plant	12300	NA		
VA	SPSA Waste To Energy Power Plant	12400	NA		
VA	SPSA Waste To Energy Power Plant	12500	NA		
VA	SPSA Waste To Energy Power Plant	12600	NA		
VA	Stone Container Hopewell Mill	CB1	OV		
VA	Stone Container Hopewell Mill	RB1	NA		
VA	Waynesboro Virginia Plant	BLR1	LN		
VA	Waynesboro Virginia Plant	BLR2	LN		
VA	Waynesboro Virginia Plant	BLR3	LN		
VA	West Point Mill	PB06	NA		
VA	West Point Mill	PB08	NA		
VA	West Point Mill	PB10	NA		
VA	West Point Mill	RF04	NA		
VA	West Point Mill	RF05	AA		
VA	Yorktown	1	NA		
VA	Yorktown	2	NA		
VA	Yorktown	3	NA		
WV	ISG Weirton	3	NA		
WV	ISG Weirton	4	NA		
WV	ISG Weirton	5	NA		
WV	ISG Weirton	SG101	NA		
WV	ISG Weirton	SG102	NA		
WV	Albright	1	LN		
WV	Albright	2	LN		
WV	Albright	3	LN	OV	
WV	Alloy Steam Station	BLR4	NA		
WV	Belle West Virginia Plant	BLR10	NA		

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State	Plant Name	Boiler ID	NOx Control 1	NOx Control 2	NOx Control 3
WV	Belle West Virginia Plant	BLR14	NA		
WV	Belle West Virginia Plant	BLR15	NA		
WV	Belle West Virginia Plant	BLR6	NA		
WV	Fort Martin Power Station	1	LN	OV	SN
WV	Fort Martin Power Station	2	LN	OV	SN
WV	Grant Town Power Plant	BLR1A	CF		
WV	Grant Town Power Plant	BLR1B	CF		
WV	Harrison Power Station	1	LN	SR	
WV	Harrison Power Station	2	LN	SR	
WV	Harrison Power Station	3	LN	SR	
WV	John E Amos	1	LN	SR	
WV	John E Amos	2	LN	SR	
WV	John E Amos	3	LN	SR	
WV	Kammer	1	OV		
WV	Kammer	2	OV		
WV	Kammer	3	OV		
WV	Kanawha River	1	LN		
WV	Kanawha River	2	LN		
WV	Mitchell	1	LN		
WV	Mitchell	2	LN		
WV	Morgantown Energy Facility	CFB1	CF		
WV	Morgantown Energy Facility	CFB2	CF		
WV	Mountaineer	1	LN	SR	
WV	Mt Storm	1	LN		
WV	Mt Storm	2	NA		
WV	Mt Storm	3	LN		
WV	North Branch	A	CF		
WV	Philip Sporn	11	LN		
WV	Philip Sporn	21	LN		
WV	Philip Sporn	31	LN		
WV	Philip Sporn	41	LN		
WV	Philip Sporn	51	LN		
WV	Pleasants Power Station	1	LN	SR	
WV	Pleasants Power Station	2	LN	SR	
WV	PPG Natrium Plant	3BLR	LN	OV	
WV	PPG Natrium Plant	4BLR	LN	OV	
WV	PPG Natrium Plant	5BLR	LN	OV	
WV	PPG Natrium Plant	6BLR	FR	LN	
WV	Rivesville	7	NA		
WV	Rivesville	8	NA		
WV	Willow Island	1	OV		
WV	Willow Island	2	OV		

Legend			
AA	Advanced Overfire Air	LN	Low NOx Burner
CF	Fluidized Bed Combustor	N	No Controls
FR	Flue Gas Recirculation	OV	Overfire Air
LA	Low Excess Air	SN	Selective Noncatalytic Reduction
		SR	Selective Catalytic Reduction