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DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF AIR QUALITY  
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June 5, 2013

Mr. Shawn M. Garvin (3RA00)  
Regional Administrator, Region III  
U.S. Environmental Protection Agency (EPA)  
1650 Arch Street  
Philadelphia, PA 19103-2029

Dear Mr. Garvin:

On June 13, 2011 Governor Jack Markell sent you a letter that recommended the EPA designate each of Delaware's three counties as "unclassifiable" for the 2010 75 ppb 1-hour sulfur dioxide (SO<sub>2</sub>) National Ambient Air Quality Standard (NAAQS). That letter indicated an unclassifiable designation was recommended because at that time Delaware's existing SO<sub>2</sub> monitoring network was not sufficient to support an attainment designation, and Delaware had not completed the necessary air dispersion modeling to support either an attainment or nonattainment designation.

Delaware now has a complete SO<sub>2</sub> monitoring network, and has completed necessary air dispersion modeling that clearly supports a designation of attainment for the entire state. Enclosed is a technical support document with all of the information we believe EPA requires to move forward in designating Delaware attainment in accordance with the Clean Air Act.

As always, feel free to contact me if you have any questions concerning the enclosed documents.

Sincerely,

A handwritten signature in black ink, appearing to read "Ali Mirzakhali".

for Ali Mirzakhali, P.E.  
Director

Enclosure

cc: Collin P. O'Mara, w/o encl.  
Amie Howell, w/o encl.  
Diana Esher, EPA w/encl.



**State of Delaware  
Department of Natural Resources and  
Environmental Control**



**Division of Air Quality**

**Technical Support Document to Support a  
Designation of Attainment of the 2010  
1-hour Sulfur Dioxide (SO<sub>2</sub>) NAAQS**

**June 4, 2013**

## Table of Contents

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1.0	Background	3
2.0	Introduction	3
3.0	Level of SO <sub>2</sub> Control, and Sources of SO <sub>2</sub> Emissions	4
4.0	Delaware's SO <sub>2</sub> Ambient Monitoring Data	7
5.0	SO <sub>2</sub> Source Specific Modeling	10
6.0	Conclusion	23

## 1.0 Background

Sulfur dioxide (SO<sub>2</sub>) is a criteria air pollutant for which the Environmental Protection Agency (EPA) has established a national ambient air quality standard (NAAQS) under sections 108 and 109 of the Clean Air Act (CAA). EPA is required to reassess the SO<sub>2</sub> NAAQS every five years and, if warranted by current science, revise the standard so as to protect public health with an adequate margin of safety.

EPA first set standards for SO<sub>2</sub> in 1971. EPA set a 24-hour primary standard (to protect public health) at 140 parts per billion (ppb) and an annual average standard at 30 ppb. EPA also set a 3-hour average secondary standard (to protect public welfare) at 500 ppb. In 1996, EPA reviewed the SO<sub>2</sub> NAAQS and chose not to revise the standards. On June 22, 2010 the EPA published a revised primary ambient air quality standard for SO<sub>2</sub> by establishing a 1-hour standard at a level of 75 ppb, or 196 micrograms per cubic meter (ug/m<sup>3</sup>), which became effective on August 23, 2010<sup>1</sup>. EPA also revoked the two existing primary standards because they would not provide additional public health protection given a 1-hour standard at 75 ppb.

In the June 22, 2010 final rule EPA recommended a hybrid approach for designating areas under Section 107 of the CAA that combines monitoring and modeling as the most technically appropriate and cost effective method to assess 1-hour ambient SO<sub>2</sub> concentrations. For initial designations, EPA determined that areas would be designated “nonattainment” if either available monitoring data or appropriate refined modeling results show a violation, or “attainment” if both available monitoring data and appropriate modeling indicate the area is attaining. All other areas would be designated “unclassifiable.”

Delaware submitted a designation recommendation to EPA on May 11, 2011 as required by Section 107(d)(1)(A) of the CAA. In accordance with the final NAAQS rule, Delaware proposed that the entire State be designated as unclassifiable because, while available monitoring data showed compliance with the SO<sub>2</sub> NAAQS, no modeling was yet available to provide a spatially robust assessment of compliance around large SO<sub>2</sub> emitting sources. Subsequent to Delaware’s recommendation, on August 3, 2012, EPA extended the date by which it would issue initial designations from June 2, 2012 to June 2, 2013.

Delaware now, with this technical support document, presents a combination of ambient monitoring data analysis and conservative source-specific modeling to support a designation of attainment for the 2010 1-hour SO<sub>2</sub> NAAQS for the entire state of Delaware.

## 2.0 Introduction

The 2010 1-hour SO<sub>2</sub> NAAQS is designed to protect the public against exposure to the entire group of sulfur oxides (SO<sub>x</sub>). SO<sub>2</sub> is the component of greatest concern and is used as the indicator for the larger group of SO<sub>x</sub>. Other gaseous sulfur oxides (e.g., SO<sub>3</sub>) are found in the atmosphere at concentrations much lower than SO<sub>2</sub>. SO<sub>2</sub> emissions are a concern as both a

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<sup>1</sup> See 75 Fed. Reg. 35520 at <http://www.gpo.gov/fdsys/pkg/FR-2010-06-22/pdf/2010-13947.pdf>

criteria pollutant itself, and because SO<sub>2</sub> contributes to other air quality problems. For example, SO<sub>2</sub> is a precursor pollutant to the secondary formation of fine particulate matter, defined under the CAA as particles smaller than 2.5 microns (PM<sub>2.5</sub>). SO<sub>2</sub> can bind to dust particles and aerosols in the atmosphere, traveling long distances on the prevailing winds. It can also be oxidized to SO<sub>3</sub> and combine with water vapor to form sulfuric acid and fall as acid rain, causing materials damage and harming aquatic life. Sulfur compounds contribute to visibility degradation in many areas including national parks and other scenic areas, and SO<sub>2</sub> in the atmosphere can also cause plant chlorosis and stunted growth.

SO<sub>2</sub> is a pungent, poisonous gas. Short-term exposure to SO<sub>2</sub> is a public health concern. Current scientific evidence, according to EPA, links short-term exposures to SO<sub>2</sub>, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms. These effects are of particular concern for persons with asthma at times of elevated activity (e.g., while exercising or playing.) Studies also show a connection between short-term exposure and increased visits to emergency departments and hospital admissions for respiratory illnesses, particularly in at-risk populations including children, the elderly, and asthmatics.

### **3.0 Level of SO<sub>2</sub> Control, and Sources of SO<sub>2</sub> Emissions**

#### **3.1 Level of SO<sub>2</sub> Control in Delaware**

Delaware's SO<sub>2</sub> control efforts have focused primarily on requiring advanced SO<sub>2</sub> emission controls on its largest point sources, and lowering the sulfur content of fuel used by all in-state sources. In summary:

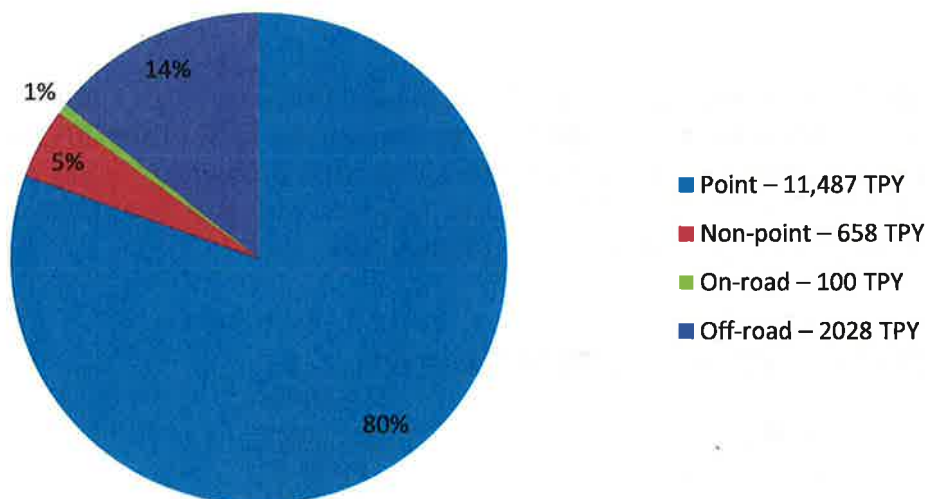
- The sulfur content of coal and residual oil in New Castle County has been limited to 1% since 1971 (7 DE Admin. Code 1108).
- Coal fired EGUs, statewide, have been limited to emit at or below 0.26 lb/mmBtu since 2006 (7 DE Admin. Code 1146).
- The allowable sulfur content of residual oil fired EGUs was reduced to an allowable level of 0.5% in 2006 (7 DE Admin. Code 1146).
- The carbon monoxide (CO) boilers at the Delaware City Refinery (DCR), historically the largest SO<sub>2</sub> emitters in the state, were controlled with scrubbers in 2007/8 (Consent Decree).
- Recent amendments to 7 DE Admin. Code 1108 will reduce the sulfur limit for residual oil to 0.5%, statewide, for all source sectors.
- Distillate oil has been regulated statewide at a level of 3000ppm since 1971 (7 DE Admin. Code 1108), and recent amendments to this regulation reduce the allowable limit to 15 ppm.

These controls, along with federal on-and-off-road sulfur limits, have drastically reduced, and will continue to reduce, Delaware's SO<sub>2</sub> emissions inventory. Delaware's first SO<sub>2</sub> SIP from 1970 indicates that statewide 1970 SO<sub>2</sub> emissions were 232,000 tons per year, and in 2011 they have been reduced to 14,273 tons (almost a 95% reduction). This indicates that Delaware's SO<sub>2</sub> control strategy has been very effective.

### 3.2 Dominance of Point Sources of SO<sub>2</sub> Emissions

Delaware analyzed in detail its SO<sub>2</sub> emissions inventory between 1999 and 2011, and found that in all years SO<sub>2</sub> emissions are driven by point sources. For example, in 2011<sup>2</sup> all Delaware sources emitted 14,273 tons of SO<sub>2</sub>. The vast majority of these emissions (11,487 tons -- 80.5%) were emitted from point sources.

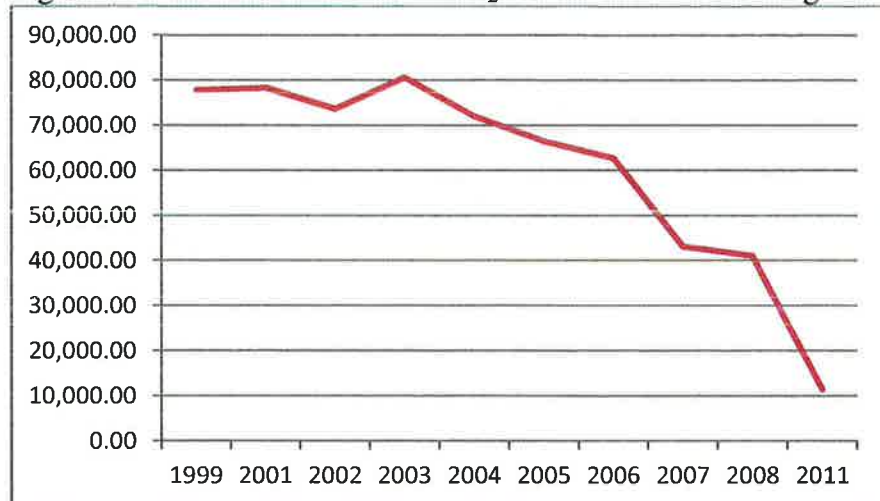
Figure 1: Delaware Overall 2011 SO<sub>2</sub> Emissions



Point source emissions are of particular concern relative to the 2010 1-hour SO<sub>2</sub> NAAQS because the highest ambient concentrations of SO<sub>2</sub> generally occur relatively close to one or a few key SO<sub>2</sub> sources in an area. In 1999 Delaware SO<sub>2</sub> point source emissions were just less than 80,000 tons, and in 2011 they were reduced to just over 11,000 tons. Preliminary 2012 emissions data indicates that statewide point emissions have been reduced to less than 4,000 tons per year. Figure 2 shows how Delaware's SO<sub>2</sub> control strategy has reduced SO<sub>2</sub> point source emissions since 1999.

<sup>2</sup> Delaware's most recent emissions inventory is the 2011 periodic emission inventory (PEI).

Figure 2: Delaware Point Source SO<sub>2</sub> Emissions: 1999 through 2011



Fifty-nine (59) facilities reported having SO<sub>2</sub> emissions in Delaware’s 2011 PEI (see Table 1). Two facilities, NRG Indian River and NRG Dover, account for 91% of the 2011 point source emissions. These two facilities include Delaware’s only coal fired units.<sup>3</sup> Only four facilities had SO<sub>2</sub> emissions greater than 100 TPY; the two facilities with coal fired units, a petroleum refinery, and a facility that fires residual oil as a primary fuel.

Table 1: Delaware Point Sources that Emitted SO<sub>2</sub> in 2011

Facility	SO <sub>2</sub> (tons per year)
NRG Indian River Power Plant	9,194.44
NRG Energy Center Dover	1,274.11
Delaware City Refinery (Premcor)	333.17
DuPont Experimental Station	247.73
Calpine - Edge Moor (Conectiv)	83.11
DuPont - Chestnut Run	66.97
Mountaire Farms - Selbyville	49.35
DuPont - Red Lion	45.51
Evraz Claymont Steel	42.21
DSWA Southern Landfill	39.30
Sunoco	23.67
DuPont - Edge Moor	18.00
DSWA Central Landfill	16.20

<sup>3</sup> NRG Dover no longer fires coal effective 2/28/2013. NRG Indian River Unit 3 will be retired at the end of 2013. Indian River Unit 4 incorporates SO<sub>2</sub> scrubbers, and will be Delaware’s only remaining coal fired unit.



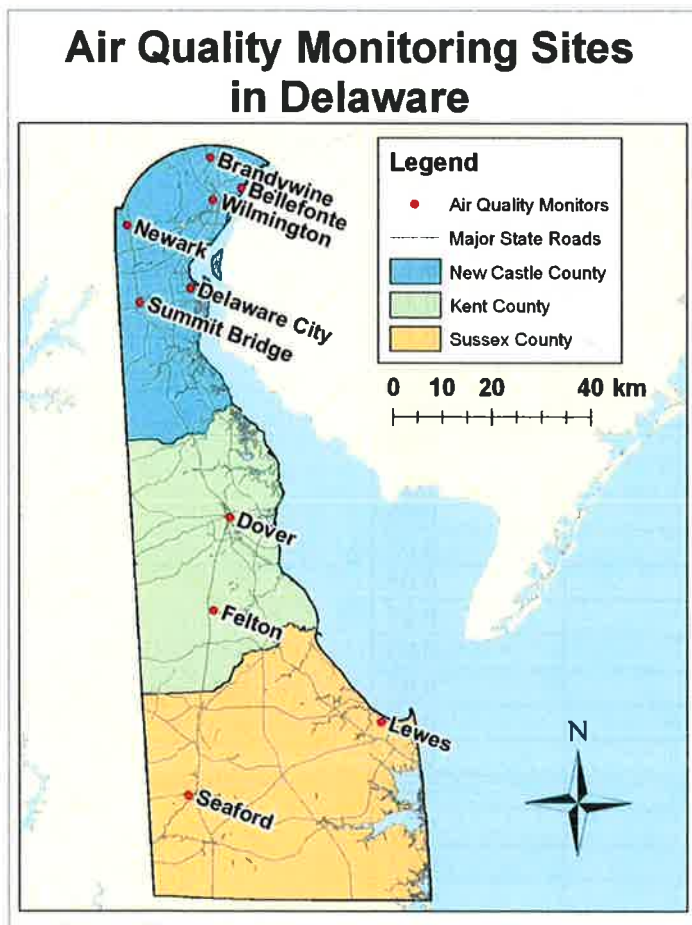
Calpine - Hay Road (Conectiv)	11.20
Perdue Farms - Georgetown	8.05
Clean Earth of New Castle	6.81
DuPont Stine-Haskell Lab	5.10
Pinnacle Foods	3.87
DSWA Cherry Island Landfill	3.32
Magellan Terminals	2.85
Justin Tanks	2.21
Perdue Farms - Bridgeville	1.48
Dover Air Force Base	1.11
A.I. DuPont Hospital	0.95
DuPont Building - Wilmington	0.69
Wilmington WWTP	0.65
City of Dover - Van Sant	0.50
Diamond Materials	0.46
Hanover Foods	0.46
Calpine - Christiana (Conectiv)	0.42
University of Delaware - Newark	0.32
Delaware State University	0.30
City of Dover - McKee Run	0.30
Calpine - West Substation (Conectiv)	0.28
Formosa Plastics	0.22
Mountaire Farms - Millsboro	0.21
FMC	0.19
BASF (Ciba Specialty Chemicals)	0.17
Astrazeneca Pharmaceuticals	0.13
Christiana Hospital	0.13
Croda (Uniqema)	0.12
Perdue Farms - Milford	0.12
Invista	0.11
Calpine - Delaware City (Conectiv)	0.09
Delaware Correctional Center - Smyrna	0.08
Warren F. Beasley Power Station	0.07
General Motors	0.06
Ashland Research Center (Hercules)	0.05
Rohm & Haas Electronic Materials	0.05
Veterans Administration Hospital	0.05
Kent General Hospital	0.03
Amtrak Maintenance Facility	0.02
Amick Farms (Allen's Milling)	0.02
Printpack	0.02
Johnson Controls Battery	0.02
Dassault Falcon Jet	0.01
Kuehne Chemical	0.01
Hirsh Industries	0.01
<b>Total</b>	<b>11,487</b>

#### 4.0 Delaware's SO<sub>2</sub> Ambient Monitoring Data

On June 22, 2010 the EPA published a revised primary ambient air quality standard for SO<sub>2</sub> by establishing a 1-hour standard at a level of 75 parts per billion (ppb) or 196 micrograms per cubic meter (ug/m<sup>3</sup>), which became effective on August 23, 2010. The form of the 1-hour standard is a 3-year average of the 99<sup>th</sup> percentile of the annual distribution of daily maximum 1-hour average concentrations. For ambient monitoring purposes, the 3-year average of the 99<sup>th</sup> percentile of the annual distribution of daily maximum 1-hour average concentrations defines the design value. The design value is valid if it encompasses three consecutive calendar years of complete data. A year meets data completeness requirements when all 4 quarters are complete. A quarter is complete when at least 75 percent of the sampling days for each quarter have complete data. A sampling day has complete data if 75 percent of the hourly concentration values are reported.

Delaware has established and operates SO<sub>2</sub> monitors at its monitoring stations located in Wilmington, Bellefonte, Lums Pond (also known as Summit Bridge), Delaware City, and Lewes. SO<sub>2</sub> SLAMS monitoring began in Lewes in January 2013.

Figure 3: Delaware Air Monitoring Stations.



All Delaware air quality monitoring sites that measure SO<sub>2</sub> currently measure compliance with the 2010 1-hour SO<sub>2</sub> NAAQS. Figure 4 shows a declining trend in design values over the longer

term for all Delaware SO<sub>2</sub> monitoring sites. Table 2 indicates that current 2011 concentrations are all less than 25% of the NAAQS. Note that in comparing the 1-hour averages to the new standard a significant improvement is noted at the Delaware City site beginning in 2007; which is due to emission controls being added to the carbon monoxide boilers at the nearby oil refinery.<sup>4</sup> Also note that the data include incomplete years for all monitors.

Figure 4: 1-hour SO<sub>2</sub> Design Value Trends

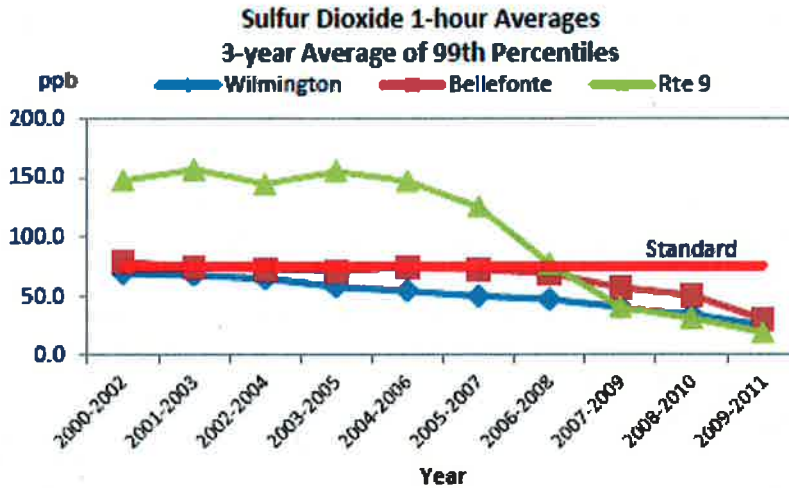


Table 2: Annual 99<sup>th</sup> percentile 1-hour Average in ppb

Site	Year											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bellefonte	82	77	78	68	72	72	77	69	60	41	25.0	19.4
Wilm.-MLK	61	72	73	57	63	52	47	50	43	28	31.6	14.2
Summit Br.	64	58	86	61	58	59	42	29	ND <sup>5</sup>	ND	ND	ND
Del City	136	143	163	164	106	195	139	41	51	28	13.3	14.7

Delaware concludes that its monitoring network adequately demonstrates compliance with the 2010 1-hour NAAQS when one considers current design values in relation to the NAAQS, and the trends in these values over the past decade.

<sup>4</sup> Control of the CO Boilers reduced facility-wide emissions by two orders of magnitude (i.e., from 35,000 TPY to about 350 TPY).

<sup>5</sup> Due to resource restrictions, there was no monitoring at the Summit Bridge site since 2008. Monitoring resumed in 2013.

## **5.0 SO<sub>2</sub> Source Specific Modeling**

The highest ambient concentrations of SO<sub>2</sub> generally occur relatively close to one or a few key SO<sub>2</sub> sources in an area, often within 10-20 kilometers of the parent source. Additionally, the SO<sub>2</sub> health standard is a one hour standard and therefore, particular attention needs to be paid to units that are capable of emitting high rates of SO<sub>2</sub>. Given this, the monitoring data discussed in Section 4.0 is not alone sufficient to ensure all areas of Delaware are in attainment with the 2010 SO<sub>2</sub> NAAQS.

This Section 5.0 presents a spatially robust modeling assessment of compliance around Delaware's SO<sub>2</sub> emitting sources with the largest hourly potential SO<sub>2</sub> emission rates.

### **5.1 Selection of Sources to be Modeled**

The amount of uncontrolled SO<sub>2</sub> emitted from combustion sources is almost entirely dependent on the sulfur content of the fuel and is essentially independent of burner design. In evaluating which of its sources to model, Delaware determined that based on the low sulfur content of natural gas fired units and the low allowable sulfur content limits of distillate oil in Delaware, gas and distillate oil fired units do not likely have the ability to cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS. Further, short term SO<sub>2</sub> concentrations are driven by many variables, to include stack height, flows, hourly emission rate, etc. Given this, Delaware determined that any source regardless of size that is fired on a higher sulfur containing fuel (i.e., coal or residual oil) warrants a more detailed analysis of whether it could cause an exceedance of the health based 2010 1-hour SO<sub>2</sub> NAAQS.

Delaware conducted American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) modeling on every source in Delaware that is allowed to burn coal or residual oil as either a primary or backup fuel. In addition, Delaware conducted modeling of the Delaware City petroleum refinery and the Red Lion sulfuric acid plant. More specifically, Delaware modeled the potential to emit (PTE) SO<sub>2</sub> (i.e., the maximum capacity of a source to emit hourly SO<sub>2</sub> emissions under its physical and operational design) for 44 emission units located at 17 facilities in order to determine the maximum design impacts on 1-hour ambient SO<sub>2</sub> levels in Delaware. Where multiple units were located at a single facility, these units were conservatively modeled together, with all units emitting at their PTE. The list of sources was developed and verified through analysis of 1999 through 2011 emission inventory data, permit review, and discussion with DAQ facility engineers. Table 3 presents a complete list of all Delaware point sources that emitted SO<sub>2</sub> in any year between 1999 and 2011, sorted from highest to lowest based on their maximum annual emissions during this 12 year period. Table 3 provides a short overview of the fuels used at each facility, and information to support a decision to model versus not model.

Sources, stack parameters, emission rates, and map coordinates for modeled sources are detailed in Table 4. Modeled sources and their emissions for each county are shown in Figures 5, 6, and 7.

Table 3: Comprehensive List of Delaware's SO<sub>2</sub> Emitting Facilities

Facility Name	Highest Annual Emissions (TPY) (1999-2011)	Analysis
Delaware City Refining Co-Delaware City	38,049.58	Petroleum Refinery. The main SO <sub>2</sub> emission sources are now controlled with Scrubbers -- modeled.
Indian River Power LLC	24,643.18	Power Plant. Three of the four coal units are shutdown. Unit 4 is controlled by a Scrubber -- Unit 4 was modeled.
Calpine Mid-Atlantic Generation-Edge Moor	12,315.28	Power Plant. Two of three units converted from coal to gas; third unit (Unit 5) is subject to 0.5% sulfur residual oil limit -- Unit 5 was modeled.
Invista	5,191.77	Facility converted to gas, not allowed to burn coal -- not modeled.
NRG Energy Center Dover, LLC	2,182.91	Cogen Unit. Coal unit ceased operation on 2/28/2013, allowed to burn gas/distillate only -- not modeled.
Sunoco, Inc (R & M)	867.11	Facility Closed -- not modeled.
City Of Dover - McKee Run Generating Station	859.76	Power Plant. Converted to gas with distillate backup, not allowed to burn residual oil -- not modeled.
General Chemical Corporation	679.43	Facility Closed -- not modeled.
Croda, Inc	599.82	Boilers, natural gas and landfill gas with No. 2 as backup only in boiler 3 -- not modeled.
DuPont Experimental Station	593.15	Boilers, residual oil primary fuel, Boiler 2 shutdown and will not restart on oil (gas only) -- modeled.
Mountaire Farms Of Delaware-Millsboro	539.61	Boilers, converted to gas, not allowed to fire oil -- not modeled.
DuPont Chestnut Run	163.72	Boilers, converted to gas, not allowed to fire oil -- not modeled.
Procter & Gamble Dover Wipes Company	149.97	Boilers, not allowed to fire residual oil, natural gas and distillate only -- not modeled.
DuPont Stine - Haskell Laboratory	146.88	Boilers, no longer allowed to burn residual oil -- not modeled.
Christiana Care - Christiana Hospital	142.42	Boilers, uses gas and residual oil -- modeled.

Perdue Farms, Inc - Georgetown	135.66	Boilers, converted to gas but can still use residual oil -- modeled.
DuPont Titanium Technologies - Edgemoor	120.87	Boilers, gas primary fuel, permitted to burn No.5, No.6 as a secondary fuel -- modeled.
Delaware Solid Waste Authority, Southern	114.90	Landfill -- not modeled.
Mountaire Farms Of Delmarva-Selbyville	106.94	Boilers, converted to gas, not allowed to burn oil -- not modeled.
Fisker Automotive, Inc.	103.10	Auto Assembly Plant, allowed to burn residual in permit, facility not operating -- modeled.
Alfred I DuPont Hospital For Children	97.30	Boilers, residual oil no longer allowed -- not modeled.
Amick Farms, LLC	95.20	Boilers, residual oil -- modeled.
Hercules Incorporated, Research Center	93.97	Boilers, allowed to burn only gas/distillate, old boilers dismantled -- not modeled.
Dow Reichhold Specialty Latex LLC	85.40	Facility Closed -- not modeled.
Perdue Grain & Oilseed LLC - Bridgeville	76.80	Boilers, residual oil and distillate oil allowed -- modeled.
DuPont Wilmington Office Building	76.53	Boilers, converted to gas, not allowed to burn residual oil -- not modeled.
Sea Watch International, Ltd	70.10	Boilers, No. 5 fuel oil allowed -- modeled.
Allen Harim Foods, Inc.	65.20	Boilers, natural gas primary, residual oil backup -- modeled.
Mountaire Farms Of Delmarva-Frankford	64.49	Boilers, residual oil not allowed -- not modeled.
E. I. DuPont - Red Lion Plant	60.97	Sulfuric Acid Plant -- modeled.
Dover Air Force Base	60.65	Boilers, central Heat Plant closed on April 20, 2012, facility no longer allowed to use residual oil -- not modeled.
Pinnacle Foods Group LLC	47.13	Boilers, residual oil not allowed -- not modeled.
1743 Holdings LLC	45.51	Facility Closed (Old Chrysler Facility) -- not modeled.

Calpine Mid-Atlantic Generation-Hay Road	45.24	Power Plant, boilers can only burn gas/distillate -- not modeled.
Evraz Claymont Steel	42.16	Electric Arc Furnace -- not modeled.
Delaware Solid Waste Authority, Cherry Island	39.30	Landfill -- not modeled.
Delaware Recyclable Products, Inc.	27.70	Landfill -- not modeled.
Perdue Farms, Inc. - Milford	25.88	Boilers, gas primary, permitted to combust 0.5% sulfur No. 5 or 4 fuel oil as backup -- modeled.
IKO Production Wilmington Inc	25.23	Boilers and Asphalt Heater, natural gas with residual oil backup -- modeled.
Clean Earth Of New Castle	24.43	No residual allowed -- not modeled.
International Petroleum Corp Of Delaware	20.69	No residual allowed -- not modeled.
Gardner Asphalt Corporation (GAC Seaford)	18.54	No residual allowed -- not modeled.
Perdue Farms Agrirecycle, LLC	17.80	Boilers, distillate fuel oil or natural gas only, no residual oil -- not modeled.
Hanover Foods Corporation	16.67	Boilers, gas primary with residual oil backup -- modeled.
City Of Dover-Van Sant Generating Sta	16.00	Peaking Unit, distillate only -- not modeled.
Delaware Trust Building - Wilmington	12.49	No residual allowed -- not modeled.
University Of Delaware, Newark	11.95	Natural gas and distillate only -- not modeled.
Bayhealth Medical Center-Milford Memorial Hospital	11.67	No. 4 fuel oil allowed -- modeled.
Magellan Midstream Partners	9.31	No residual allowed -- not modeled.
Ametek Inc., Chemical Products Division	8.64	No residual allowed -- not modeled.
Independence Construction Materials (ICM)-Georgetown	8.36	Asphalt Plant, used oil allowed -- not modeled.

Independence Construction Materials (ICM) - Bay Road	7.73	Asphalt Plant, used oil allowed -- not modeled.
Delaware Solid Waste Authority, Sandtown	7.65	Landfill -- not modeled.
Formosa Plastics Corporation	6.99	Natural gas and No. 2 oil only -- not modeled.
Nanticoke Memorial Hospital	6.78	No. 2 fuel oil -- not modeled.
Arion, Inc.	6.54	No residual allowed -- not modeled.
AstraZeneca Pharmaceuticals LLC,- Fairfax	5.84	Boilers can only burn gas/distillate. Old boilers dismantled. -- not modeled.
Beebe Medical Center	3.59	No. 2 fuel oil -- not modeled.
Justin Tanks, LLC	3.58	Residual oil not allowed -- not modeled.
Bayhealth Medical Center-Kent General Hospital	2.73	No. 2 fuel oil only-- not modeled.
Contractors Materials LLC	2.73	Residual oil not allowed -- not modeled.
PGR Holdings LLC	2.63	Residual oil not allowed -- not modeled.
Warren F Beasley Power Station (DEMEC)	1.97	No. 2 fuel oil -- not modeled.
Delaware Hospital For The Chronically II	1.82	Distillate oil only -- not modeled.
BASF Corporation - Newport	1.50	No residual oil allowed -- not modeled.
Prince Minerals, Inc	1.49	American minerals -- electric dryer -- not modeled.
Dept Of Veterans Affairs Medical Center	1.19	Residual not allowed -- not modeled.
DE Solid Waste Authority, Pigeon Point	0.77	Landfill -- not modeled.
Printpack, Inc	0.75	No residual oil allowed -- not modeled.



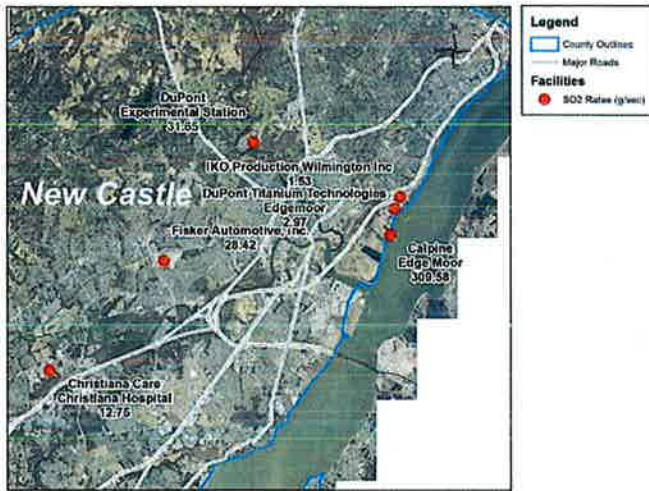
Table 4: Source Data for Delaware Modeled Sources

Facility	Height (ft)	Diameter (ft)	Temp (oF)	Flow (acfm)	Velocity (ft/sec)	PTE SO2 Rate (g/sec)	Lat/long
1. Indian River Power LLC Unit 4 (5091 mmbtu/hr coal fired boiler – only unit left at facility)	400	24	160	2115000	77.96	128.29	38.585952, -75.233656
2. Calpine Edge Moor Unit 5 (4695 mmbtu/hr gas/oil fired boiler – modeled on oil)	275	21	315	1566000	75.39	309.58	39.737855, -75.502907
3. DuPont Experimental Station (5 boilers - Note: Boiler 3 shutdown and will not restart on oil; others modeled on oil, but are converting to gas starting in 2014)							
Boiler 1 and 2 (combined stack - both boilers running)	100	7	500	78500	34.01	12.66	39.772863, -75.569817
Boiler 1 or Boiler 2 (either 96 mmbtu/hr boiler running)	100	7	500	38000	16.47	6.33	39.772863, -75.569817
Boiler 4 (96 mmbtu/hr boiler)	100	7	500	30400	13.17	6.33	39.772848, -75.570011
Boiler 6 (one 96 mmbtu/hr boiler)	100	4	575	36607	48.58	6.33	39.772868, -75.569714
4. Christiana Care - Christiana Hospital (4 boilers – modeled on oil)							
Boiler 1 (49 mmbtu/hr - gas primary, oil backup)	142	3	480	16000	37.74	3.23	39.686397, -75.668997
Boiler 2 (49 mmbtu/hr - gas primary, oil backup)	142	3	480	16000	37.74	3.23	39.686397, -75.668997
Boiler 3 (49 mmbtu/hr - gas primary, oil backup)	142	3	480	16000	37.74	3.23	39.686397, -75.668997
Boiler 4 (46.4 mmbtu/hr - oil fired)	142	2.5	350	15040	51.09	3.06	39.686397, -75.668997
5. Perdue Farms, Inc - Georgetown (2 boilers - oil fired)							
Boiler 1 (20.9 mmbtu/hr)	45	2	400	6405	34.00	1.38	38.698408, -75.382236
Boiler 2 (20.9 mmbtu/hr)	50	2	400	6405	34.00	1.38	38.698364, -75.382249
6. DuPont Titanium Technologies – Edgemoor							
RX-1 (45 mmbtu/hr)	90	3	400	27900	65.82	2.97	39.747775, -75.500858
7. Fisker Automotive, Inc. (5 boilers - facility not operating)							
Boiler 1 (75 mmbtu/hr)	200	10	300	17600	3.74	4.95	39.728181, -75.613181
Boiler 2 (75 mmbtu/hr)	200	10	300	17600	3.74	4.95	39.728181, -75.613181

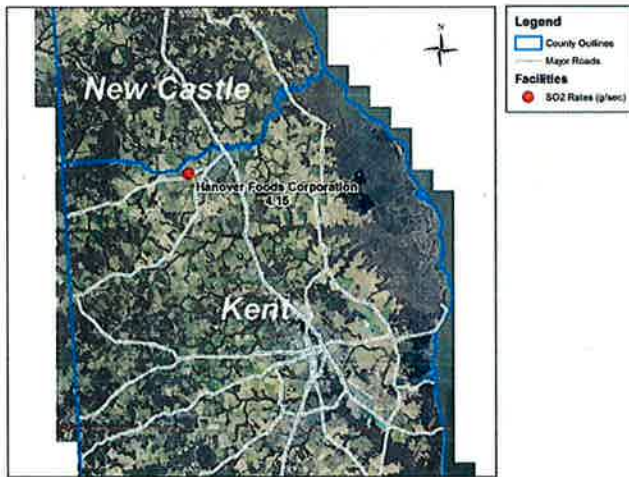


Boiler No. 2 (6.3 mmbtu/hr)	25	2	800	3262	17.31	0.42	39.752337, -75.498232
14. Hanover Foods Corporation (2 gas/residual oil fired boilers, modeled on oil)							
Boiler 1 (33.5 mmbtu/hr)	50	1.67	350	3000	22.84	2.21	39.289563, -75.640884
Boiler 2 (29.4 mmbtu/hr)	60	2	350	3000	15.92	1.94	39.289561, -75.640767
15. Milford Memorial Hospital (3 boilers – gas primary, only two allowed to fire residual oil)							
Boiler 1 (14.6 mmbtu/hr)	85	3.5	360	9150	15.86	0.96	38.907018, -75.432793
Boiler 2 (14.6 mmbtu/hr)	85	3.5	360	9150	15.86	0.96	38.907018, -75.432793
16. Delaware City Refining Co-Delaware City							
FCCU	195	12.5	115	474184.6	64.4	10.13	39.586943, -75.633127
FCU	175	8.5	115	229172.0	67.3	5.24	39.587945, -75.632822
CU	350	11	410	285133.8	50.0	2.32	39.586645, -75.633299
CT1	160	13	275	635394.5	79.8	0.53	39.591668, -75.632495
CT2	160	13	275	635394.5	79.8	0.53	39.59191117, -75.6324970
DCCP Boiler	500	20	275	7690626.1	40.8	5.26	39.592575, -75.634142
SCOT-1	225	5	600	68329.7	58.0	15.37	39.588437, -75.630160
SCOT-2	199	4.9	600	67930.4	60.0	15.37	39.588025, -75.629667
17. E. I. DuPont - Red Lion Plant Acid Plant							
Sulfuric Acid Regeneration Plant (Main Stack)	199	4.75	175	39400	37.08	34.65	39.592449, -75.637904

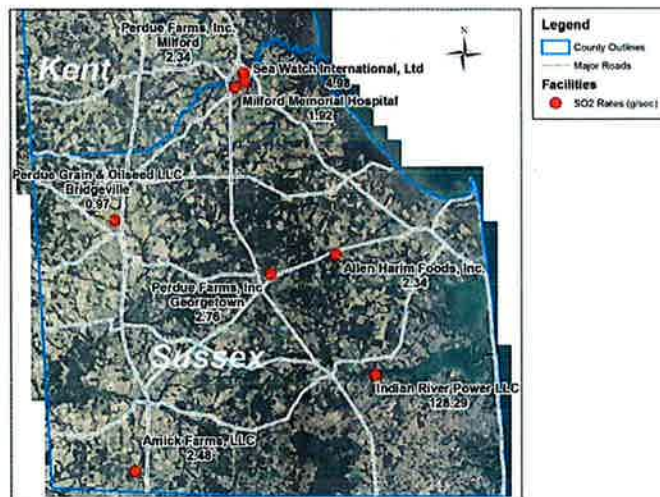
**Figure 5: Modeled sources in New Castle County**



**Figure 6: Modeled Sources in Kent County**



**Figure 7: Modeled Sources in Sussex County**



## 5.2 Modeling Results

Sources, emissions and stack parameter inputs modeled are presented in Section 5.1 above. Delaware chose AERMOD, the USEPA local-scale dispersion model, for assessing SO<sub>2</sub> source impacts. AERMOD is the EPA preferred model for estimating source impacts out to 50 km. To account for year-to-year variations in meteorology, Delaware modeled the source impacts for the years of 2006 – 2011 with the surface measurements from New Castle County airport. Modeling receptors were placed at every 100 m up to a distance of 2.5 km from each facility and then at every 200 m up to a distance of 5 km from the facility. Since the form of SO<sub>2</sub> NAAQS is 99<sup>th</sup> percentile of 1-hour daily maximum averaged over three years, the design value determinations require the highest-4<sup>th</sup>-high hourly (H4H) modeled concentrations.

The 1-hour SO<sub>2</sub> modeled design value refers to the highest (across all modeled receptors) of the 5-year average of the 99<sup>th</sup> -percentile (4<sup>th</sup> -highest) of the annual distribution of daily maximum 1-hour values based on National Weather Service (NWS) meteorological data, or the multiyear average of the 99<sup>th</sup> -percentile of the annual distribution of daily maximum 1-hour values based on one or more complete years (up to 5 years) of site-specific meteorological data. Thus for this modeling assessment, the 5-yr average of the highest-4<sup>th</sup>-high modeled concentrations represents the impact of each facility.

The monitored design value for the 1-hour SO<sub>2</sub> standard is based on the 99th-percentile of the annual distribution of daily maximum 1-hour values averaged across the most recent three years of monitored data. EPA recommends that the monitored SO<sub>2</sub> design value of the most recent three years of monitored data should be used irrespective of the meteorological data period used in the dispersion modeling. A first tier approach to determining the monitored background concentrations is based on the monitored design value from a representative monitor.

Delaware conservatively selected the Bellefonte monitoring site as the site for background concentrations. The Bellefonte site is conservative because this site has recorded the highest SO<sub>2</sub> concentrations in the State since SO<sub>2</sub> emissions were controlled at the Delaware City Refinery in 2008. For screening purposes Delaware conservatively considered the 2010-2012 design value (17 ppb, or 44.5 µg/m<sup>3</sup>) as the background concentration from Bellefonte.

Whether a facility complies with the 1-hour SO<sub>2</sub> NAAQS is determined by assessing whether the total impact of modeled design value and monitored background concentrations is less than the NAAQS or not. The modeled results are summarized in the Table 5; the units are µg/m<sup>3</sup>. Note that the 1-hour SO<sub>2</sub> NAAQS is 75 ppb or 196 µg/m<sup>3</sup>. Model input and output files are available from DNREC/DAQ upon request.

**Table 5: Modeling Results (µg/m<sup>3</sup>) for 1-hour SO<sub>2</sub> Max Hourly PTE Emissions**

Facility Name	1-h SO <sub>2</sub> (H4H) Modeled Concentrations		Bellefonte Background (2010-2012 DV)	Total Impact
	Meteorological Years	5-yr Average		
Indian River Power Plant	2006-2010	30.8	44.5	75.3
	2007-2011	31.0	44.5	75.5

Dupont Experimental Station Boiler 3 down; 1&2, 4, & 6 up	2006-2010	157.9	44.5	202.4
	2007-2011	159.3	44.5	203.8
Calpine Edge Moor Unit 5	2006-2010	88.5	44.5	133.0
	2007-2011	88.2	44.5	132.7
Christiana Care	2006-2010	80.6	44.5	125.1
	2007-2011	80.5	44.5	125.0
Perdue Georgetown	2006-2010	120.5	44.5	165.0
	2007-2011	120.2	44.5	164.7
DuPont Titanium: Boiler RX1	2006-2010	62.0	44.5	106.5
	2007-2011	61.6	44.5	106.1
Fisker Automotive: Boilers 1,2,&3 merged, 4 & 5 separate	2006-2010	200.2	44.5	244.7
	2007-2011	200.9	44.5	245.4
Amick Farms	2006-2010	465.1	44.5	509.6
	2007-2011	456.0	44.5	500.5
Perdue Grain - Bridgeville	2006-2010	118.0	44.5	162.5
	2007-2011	119.6	44.5	164.1
Sea Watch International	2006-2010	470.8	44.5	515.3
	2007-2011	474.8	44.5	519.3
Allen Harim Foods	2006-2010	117.9	44.5	162.4
	2007-2011	117.3	44.5	161.8
Perdue Farms - Milford	2006-2010	184.9	44.5	229.4
	2007-2011	186.7	44.5	231.2
IKO Production Wilmington	2006-2010	173.2	44.5	217.7
	2007-2011	169.8	44.5	221.5
Hanover Foods	2006-2010	207.6	44.5	252.1
	2007-2011	207.4	44.5	251.9
Milford Memorial Hospital	2006-2010	33.9	44.5	78.4
	2007-2011	33.5	44.5	78.0
DuPont Red Lion	2006-2010	134.14	44.5	178.64
	2007-2011	136.42	44.5	180.92
Delaware City Refinery	2006-2010	54.9	44.5	99.4
	2007-2011	55.2	44.5	99.7

### 5.3 Model Results Analysis

Seven facilities (i.e., Fisker, DuPont Experimental Station, Amick Farms, Sea Watch International, Perdue Farms-Milford, IKO Production, and Hanover Foods) are identified as Delaware facilities which have potential emissions capable of causing an exceedance of the 1-hour SO<sub>2</sub> NAAQS based on the conservative modeling discussed on Section 5.2.

### 5.4 Determination of Any Current Violation of the 2010 SO<sub>2</sub> NAAQS

Delaware evaluated each of the facilities identified in Section 5.3 to determine if any violation of the 2010 1-hour SO<sub>2</sub> NAAQS is now occurring.

- Fisker: The highest annual emissions from this facility since 1999 are 103.1 TPY. This facility has not been in operation since 2008. Delaware determines that this facility is not currently causing an exceedance of the 2010 1-hour SO<sub>2</sub> NAAQS because it has not operated since 2008.
- DuPont Experimental Station: The highest annual emissions from this facility since 1999 are 593 TPY. This facility has five (5) boilers rated at 96 mmbtu/hr each. Boiler 3 is now offline and will restart on natural gas, with no residual oil allowed. Conservative modeling presented in 5.2 above indicates that the facility has the capability to exceed the 1-hour SO<sub>2</sub> NAAQS when the remaining four boilers simultaneously operate on residual oil at their rated capacity. However, Delaware has determined that the facility steam demand is such that the facility uses up to four boilers simultaneously in the cold of winter; and only one boiler in the summer. Given this, Delaware re-modeled the PTE of this facility and winter meteorology.

DUPONT EXP. STATION - WINTER MONTHS ONLY				
Met. Year		1-h SO <sub>2</sub> (H4H)	Background (2010-2012 DV)	Total Impact
		5-yr Average	Bellefonte	
2006-2010		127.1	44.5	171.6
2007-2011		127.4	44.5	171.9

Based on this revised modeling Delaware determines that this facility is not currently, causing an exceedance of the 2010 1-hour SO<sub>2</sub> NAAQS.

- Perdue Farms, Milford: The highest annual emissions from this facility since 1999 are 25.88 TPY. This facility uses natural gas as a primary fuel. However, conservative modeling presented in Section 5.2 indicates this facility has the capability to exceed the 1-hour SO<sub>2</sub> NAAQS when background concentrations are added to its two boilers (20.9 mmbtu/hr and 14.6 mmbtu/hr), simultaneously operating on residual oil at their rated capacity. Delaware determines that this facility is not currently causing an exceedance of the 2010 1-hour SO<sub>2</sub> NAAQS because it operates on natural gas. Delaware's 2011 PEI reflects gas usage; facility had total SO<sub>2</sub> emissions of 0.12 TPY.
- Amick Farms: The highest annual emissions from this facility since 1999 are 95.2 TPY. This facility uses natural gas as a primary fuel. However, conservative modeling presented in Section 5.2 indicates this facility has the capability to exceed the 1-hour SO<sub>2</sub> NAAQS when both its boilers (20.9 mmbtu/hr and 16.7 mmbtu/hr) simultaneously operate on residual oil at their rated capacity. Delaware determines that this facility is not currently causing an exceedance of the 2010 1-hour SO<sub>2</sub> NAAQS because it operates on

natural gas. Delaware's 2011 PEI reflects gas usage; facility had total SO<sub>2</sub> emissions of 0.02 TPY.

- SeaWatch International: The highest annual emissions from this facility since 1999 are 70.1 TPY. This facility uses natural gas as a primary fuel. However, this facility has the capability to exceed the 1-hour SO<sub>2</sub> NAAQS when its three boilers (25.1 mmbtu/hr each) simultaneously operate on residual oil at their rated capacity based on the conservative modeling presented in Section 5.2. Delaware determines that this facility is not currently causing an exceedance of the 2010 1-hour SO<sub>2</sub> NAAQS because it operates on natural gas. This facility is not included in Delaware's 2011 PEI because it was too small to meet PEI reporting criteria.
- IKO Production: The highest annual emissions from this facility since 1999 are 25.23 TPY. This facility uses natural gas as a primary fuel. This facility operates an asphalt oxidizer (10.5 mmbtu/hr), and two small boilers (6.3 mmbtu/hr each). The facility has the capability to marginally exceed the 1-hour SO<sub>2</sub> NAAQS when background concentrations are added to all three units simultaneously operating on residual oil at their rated capacity. Delaware determines that this facility is not currently causing an exceedance of the 2010 1-hour SO<sub>2</sub> NAAQS because it operates on natural gas. This facility is not included in Delaware's 2011 PEI because it was too small to meet PEI reporting criteria.
- Hanover Foods: The highest annual emissions from this facility since 1999 are 16.67 TPY. This facility uses natural gas as a primary fuel. The facility has the capability to marginally exceed the 1-hour SO<sub>2</sub> NAAQS when both its boilers (33.5 mmbtu/hr and 29.4 mmbtu/hr) simultaneously operate on residual oil at their rated capacity. Delaware determines that this facility is not currently causing an exceedance of the 2010 1-hour SO<sub>2</sub> NAAQS because it operates on natural gas. Delaware's 2011 PEI reflects gas usage; facility had total SO<sub>2</sub> emissions of 0.46 TPY.

Delaware concludes that no facility identified in Section 5.3 is currently causing an exceedance of the 2010 1-hour SO<sub>2</sub> NAAQS.

## **5.5 Determination of Any Future Violations of the 2010 SO<sub>2</sub> NAAQS**

The seven facilities identified in Section 5.3, which have potential operating scenarios that may lead to an exceedance of the NAAQS, are prohibited by Delaware's current SIP from causing any such exceedance.

- 7 DE Admin. Code 1101, Section 3.2 provides, *"In addition to or supplemental to these air quality standards, certain emission requirements will be specified. Such emission requirements are selected as minimum controls necessary to ensure a reasonable quality of air throughout the State. Where it is established that these emission requirements are inadequate to attain or maintain the applicable air quality standard, the Department shall exercise its authority to require additional control measures."*



- 7 DE Admin. Code 1102:
  - Section 6.2 provides, “The Department may suspend or revoke an operating permit for violation of any permit condition or violation of this or any other applicable rule or regulation of the Department or any law administered by the Department and may take such other actions as it deems necessary...”
  - Section 11.6 provides, “*No permit shall be issued by the Department unless the applicant shows to the satisfaction of the Department that the equipment, facility, or air contaminant control device is designed to operate or is operating without causing a violation of the State Implementation Plan, or any rule or regulation of the Department, and without interfering with the attainment or maintenance of National and State ambient air quality standards, and without endangering the health, safety, and welfare of the people of the State of Delaware. The Department may, from time to time, issue or accept criteria for the guidance of applicants indicating the technical specifications which it deems will comply with the performance standards referenced herein.*”
- 7 DE Admin. Code 1103, Section 1.3 provides, “*The absence of a specific ambient air quality standard shall not preclude actions by the Department to control contaminants to assure protection, safety, welfare, and comfort of the people of the State of Delaware.*”
- 7 DE Admin. Code 1108, Section 1.1 provides, “*The emission of sulfur dioxide from fuel burning equipment shall be controlled to a limit that shall meet the ambient air quality requirements.*”

Each of the seven facilities in Section 5.3 have been notified by letter, 1) that Delaware’s air regulations prohibit emissions that cause an exceedance of any NAAQS, 2) that Delaware has conducted screening modeling that indicates operations at their facility may under certain operational conditions cause a violation of the 1-hour SO<sub>2</sub> NAAQS, 3) that prior to utilizing residual oil the facility shall ensure its operations do not cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS, and 4) that follow-on steps must be taken to determine and clarify the conditions under which residual oil may be used by the facility in the future. The seven letters are attached to this document.

Delaware’s current, EPA approved SIP does not allow any facility to emit to the atmosphere at rates that cause an exceedance of any NAAQS. Given this, and the steps identified above, Delaware concludes that no source in Delaware is currently allowed to emit at rates in the future that may cause an exceedance of the 2010 SO<sub>2</sub> NAAQS.

## **6.0 Conclusion**

The analysis in this document demonstrates that the entire State of Delaware is in attainment with the 2010 SO<sub>2</sub> NAAQS, and that Delaware’s current SIP is sufficient to ensure the entire State of Delaware will remain in attainment.

- Monitored SO<sub>2</sub> levels are well below the NAAQS at all monitoring sites in Delaware.
- Delaware has completed modeling of all sources in Delaware that could reasonably cause an exceedance of the SO<sub>2</sub> NAAQS under their highest emitting operating scenario, and has concluded that no source is currently, or will in the future, cause an exceedance of the 2010 NAAQS.

In response, the EPA should designate the entire State of Delaware as attainment for the SO<sub>2</sub> NAAQS.



STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF AIR QUALITY  
655 S. Bay Road, Suite 5N  
DOVER, DELAWARE 19901

June 4, 2013

Telephone: (302) 739-9402  
Fax No.: (302) 739-3106

Amick Farms, LLC  
10281 Amick Dr.  
Delmar DE 19940

RE: 2010 1-hour Sulfur Dioxide (SO<sub>2</sub>) National Ambient Air Quality Standard (NAAQS)

Dear Mr. Scott Lee,

On June 22, 2010 the EPA published a revised primary NAAQS for SO<sub>2</sub> by establishing a 1-hour standard at a level of 75 ppb, or 196 micrograms per cubic meter (ug/m<sup>3</sup>). This new air quality standard became effective on August 23, 2010.

Your facility is permitted to operate a 20.9 mmbtu/hr boiler and a 16.7 mmbtu/hr boiler, with natural gas as a primary fuel and residual oil as a secondary fuel. The Department has conducted screening modeling that indicates these two boilers may under certain operational conditions cause a violation of the 1-hour SO<sub>2</sub> NAAQS when residual oil is utilized.

- Screening modeling indicates that when both boilers operate simultaneously on residual oil at their rated capacity SO<sub>2</sub> concentrations estimated at more than 450 ug/m<sup>3</sup> are predicted. This concentration is more than double the NAAQS, even before background concentrations are considered.
- Either of your boilers operated on residual oil at or near their rated capacity may cause an exceedance of the NAAQS based on this screening modeling.

In order to verify our modeling results please provide the Department with the following information for each of your boilers: Stack Height (ft), Stack Diameter at exit (ft), Stack Exit Temp. (°F), and Stack flow (ACFM).

Note that 7 DE Admin. Code 1101, 1102, 1103 and 1108 prohibit emissions that cause an exceedance of any NAAQS, and any operations at your facility that cause a violation of the 1-hour SO<sub>2</sub> NAAQS are prohibited. Prior to utilizing any residual oil Amick Farms, LLC shall ensure its operations do not cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS. The company may satisfy this requirement by following one or a combination of alternatives outlined below:

- 1) Submit to the Department refined modeling that demonstrates compliance with the SO<sub>2</sub> NAAQS using the facility's existing configuration and permitted emission levels,
- 2) Request a permit modification to replace the back-up fuel from residual oil with a lower sulfur containing fuel, such as distillate oil or gaseous fuel,

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- 3) Propose physical and administrative modifications to the facility that when implemented would demonstrate compliance with the SO<sub>2</sub> NAAQS. Such proposal must be supported by air quality modeling that is acceptable to the Department. The proposed modifications must become part of a revised permit issued to the facility.

Please provide a response to this letter not later than September 6, 2013. We are available to meet and review and discuss our findings, and to assist you in finding a solution to this issue. Please direct any questions to Melanie Smith.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Foster", written over a faint horizontal line.

Paul Foster, P.E.  
Program Manager

cc: Melanie Smith  
Ron Amirikian  
Mohammed Majeed



STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF AIR QUALITY  
655 S. Bay Road, Suite 5N  
DOVER, DELAWARE 19901

June 4, 2013

Telephone: (302) 739 - 9402  
Fax No.: (302) 739 - 3106

Sea Watch International  
242 South Rehoboth Boulevard  
Milford, DE 19963

RE: 2010 1-hour Sulfur Dioxide (SO<sub>2</sub>) National Ambient Air Quality Standard (NAAQS)

Dear Mr. Clay Walton,

On June 22, 2010 the EPA published a revised primary NAAQS for SO<sub>2</sub> by establishing a 1-hour standard at a level of 75 ppb, or 196 micrograms per cubic meter (ug/m<sup>3</sup>). This new air quality standard became effective on August 23, 2010.

Your facility is permitted to operate three 25.1 mmbtu/hr boilers, with natural gas as a primary fuel and residual oil as a secondary fuel. The Department has conducted screening modeling that indicates these boilers may under certain operational conditions cause a violation of the 1-hour SO<sub>2</sub> NAAQS when residual oil is utilized.

- Screening modeling indicates that when these boilers operate simultaneously on residual oil at their rated capacity SO<sub>2</sub> concentrations estimated at more than 470 ug/m<sup>3</sup> are predicted.
- This concentration is more than double the NAAQS, but when background concentrations are considered a violation is predicted.

In order to verify our modeling results please provide the Department with the following information for each of your boilers: Stack Height (ft), Stack Diameter at exit (ft), Stack Exit Temp. (°F), and Stack flow (ACFM).

Note that 7 DE Admin. Code 1101, 1102, 1103 and 1108 prohibit emissions that cause an exceedance of any NAAQS, and any operations at your facility that cause a violation of the 1-hour SO<sub>2</sub> NAAQS are prohibited. Prior to utilizing any residual oil Sea Watch shall ensure its operations do not cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS. The company may satisfy this requirement by following one or a combination of alternatives outlined below:

- 1) Submit to the Department refined modeling that demonstrates compliance with the SO<sub>2</sub> NAAQS using the facility's existing configuration and permitted emission levels,
- 2) Request a permit modification to replace the back-up fuel from residual oil with a lower sulfur containing fuel, such as distillate oil or gaseous fuel,
- 3) Propose physical and administrative modifications to the facility that when implemented would demonstrate compliance with the SO<sub>2</sub> NAAQS. Such proposal must be supported by air quality

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modeling that is acceptable to the Department. The proposed modifications must become part of a revised permit issued to the facility.

Please provide a response to this letter not later than September 6, 2013. We are available to meet and review and discuss our findings, and to assist you in finding a solution to this issue. Please direct any questions to Tom Lilly.

Sincerely,

A handwritten signature in black ink, appearing to read 'Paul Foster', with a large, stylized flourish extending to the right.

Paul Foster, P.E.  
Program Manager

cc: Tom Lilly  
Ron Amirikian  
Mohammed Majeed



STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF AIR QUALITY  
655 S. Bay Road, Suite 5N  
DOVER, DELAWARE 19901

June 4, 2013

Telephone: (302) 739-9402  
Fax No.: (302) 739-3106

IKO Production  
120 Hay Road  
Wilmington DE 19809

RE: 2010 1-hour Sulfur Dioxide (SO<sub>2</sub>) National Ambient Air Quality Standard (NAAQS)

Dear Mr. David Hargreaves,

On June 22, 2010 the EPA published a revised primary NAAQS for SO<sub>2</sub> by establishing a 1-hour standard at a level of 75 ppb, or 196 micrograms per cubic meter (ug/m<sup>3</sup>). This new air quality standard became effective on August 23, 2010.

Your facility is permitted to operate a 10.5 mmbtu/hr asphalt oxidizer and two 6.3 mmbtu/hr boilers, with natural gas as a primary fuel and residual oil as a secondary fuel. The Department has conducted screening modeling that indicates these units may under certain operational conditions cause a violation of the 1-hour SO<sub>2</sub> NAAQS when residual oil is utilized.

- Screening modeling indicates that when these units operate simultaneously on residual oil at their rated capacity SO<sub>2</sub> concentrations estimated at more than 170 ug/m<sup>3</sup> are predicted.
- This concentration is itself marginally below the NAAQS, but when background concentrations are considered a violation is predicted.

In order to verify our modeling results please provide the Department with the following information for each of your boilers: Stack Height (ft), Stack Diameter at exit (ft), Stack Exit Temp. (°F), and Stack flow (ACFM).

Note that 7 DE Admin. Code 1101, 1102, 1103 and 1108 prohibit emissions that cause an exceedance of any NAAQS, and any operations at your facility that cause a violation of the 1-hour SO<sub>2</sub> NAAQS are prohibited. Prior to utilizing any residual oil IKO shall ensure its operations do not cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS. The company may satisfy this requirement by following one or a combination of alternatives outlined below:

- 1) Submit to the Department refined modeling that demonstrates compliance with the SO<sub>2</sub> NAAQS using the facility's existing configuration and permitted emission levels,
- 2) Request a permit modification to replace the back-up fuel from residual oil with a lower sulfur containing fuel, such as distillate oil or gaseous fuel,
- 3) Propose physical and administrative modifications to the facility that when implemented would demonstrate compliance with the SO<sub>2</sub> NAAQS. Such proposal must be supported by air quality

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modeling that is acceptable to the Department. The proposed modifications must become part of a revised permit issued to the facility.

Please provide a response to this letter not later than September 6, 2013. We are available to meet and review and discuss our findings, and to assist you in finding a solution to this issue. Please direct any questions to Karen Mattio.

Sincerely,

A handwritten signature in black ink, appearing to read 'Paul Foster', written over a faint circular stamp or watermark.

Paul Foster, P.E.  
Program Manager

cc: Karen Mattio  
Ron Amirikian  
Mohammed Majeed





STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF AIR QUALITY  
655 S. Bay Road, Suite 5N  
DOVER, DELAWARE 19901

Telephone: (302) 739-9402  
Fax No.: (302) 739-3106

June 4, 2013

Hanover Foods  
Route 6 & Duck Creek Road  
Clayton DE 19938

RE: 2010 1-hour Sulfur Dioxide (SO<sub>2</sub>) National Ambient Air Quality Standard (NAAQS)

Dear Mr. William Simpson,

On June 22, 2010 the EPA published a revised primary NAAQS for SO<sub>2</sub> by establishing a 1-hour standard at a level of 75 ppb, or 196 micrograms per cubic meter (ug/m<sup>3</sup>). This new air quality standard became effective on August 23, 2010.

Your facility is permitted to operate a 33.5 mmbtu/hr boiler and a 29.4 mmbtu/hr boiler, with natural gas as a primary fuel and residual oil as a secondary fuel. The Department has conducted screening modeling that indicates these two boilers may under certain operational conditions cause a violation of the 1-hour SO<sub>2</sub> NAAQS when residual oil is utilized.

- Screening modeling indicates that when both boilers operate simultaneously on residual oil at their rated capacity SO<sub>2</sub> concentrations estimated at more than 207 ug/m<sup>3</sup> are predicted.
- This concentration is more than the NAAQS, even before background concentrations are considered.

In order to verify our modeling results please provide the Department with the following information for each of your boilers: Stack Height (ft), Stack Diameter at exit (ft), Stack Exit Temp. (°F), and Stack flow (ACFM).

Note that 7 DE Admin. Code 1101, 1102, 1103 and 1108 prohibit emissions that cause an exceedance of any NAAQS, and any operations at your facility that cause a violation of the 1-hour SO<sub>2</sub> NAAQS are prohibited. Prior to utilizing any residual oil Hanover Foods shall ensure its operations do not cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS. The company may satisfy this requirement by following one or a combination of alternatives outlined below:

- 1) Submit to the Department refined modeling that demonstrates compliance with the SO<sub>2</sub> NAAQS using the facility's existing configuration and permitted emission levels,
- 2) Request a permit modification to replace the back-up fuel from residual oil with a lower sulfur containing fuel, such as distillate oil or gaseous fuel,

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- 3) Propose physical and administrative modifications to the facility that when implemented would demonstrate compliance with the SO<sub>2</sub> NAAQS. Such proposal must be supported by air quality modeling that is acceptable to the Department. The proposed modifications must become part of a revised permit issued to the facility.

Please provide a response to this letter not later than September 6, 2013. We are available to meet and review and discuss our findings, and to assist you in finding a solution to this issue. Please direct any questions to Phaniel Bediako.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Foster", written in a cursive style.

Paul Foster, P.E.  
Program Manager

cc: Phaniel Bediako  
Ron Amirikian  
Mohammed Majeed



STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF AIR QUALITY  
655 S. Bay Road, Suite 5N  
DOVER, DELAWARE 19901

June 4, 2013

Telephone: (302) 739 - 9402  
Fax No.: (302) 739 - 3106

Perdue Farms-Milford  
255 North Rehoboth Boulevard  
Milford, DE 19963

RE: 2010 1-hour Sulfur Dioxide (SO<sub>2</sub>) National Ambient Air Quality Standard (NAAQS)

Dear Mr. Vincent Lynch,

On June 22, 2010 the EPA published a revised primary NAAQS for SO<sub>2</sub> by establishing a 1-hour standard at a level of 75 ppb, or 196 micrograms per cubic meter (ug/m<sup>3</sup>). This new air quality standard became effective on August 23, 2010.

Your facility is permitted to operate a 20.9 mmbtu/hr boiler and a 14.6 mmbtu/hr boiler, with natural gas as a primary fuel and residual oil as a secondary fuel. The Department has conducted screening modeling that indicates these boilers may under certain operational conditions cause a violation of the 1-hour SO<sub>2</sub> NAAQS when residual oil is utilized.

- Screening modeling indicates that when these boilers operate simultaneously on residual oil at their rated capacity SO<sub>2</sub> concentrations estimated at more than 186 ug/m<sup>3</sup> are predicted.
- This concentration is itself marginally below the NAAQS, but when background concentrations are considered a violation is predicted.

In order to verify our modeling results please provide the Department with the following information for each of your boilers: Stack Height (ft), Stack Diameter at exit (ft), Stack Exit Temp. (°F), and Stack flow (ACFM).

Note that 7 DE Admin. Code 1101, 1102, 1103 and 1108 prohibit emissions that cause an exceedance of any NAAQS, and any operations at your facility that cause a violation of the 1-hour SO<sub>2</sub> NAAQS are prohibited. Prior to utilizing any residual oil Perdue shall ensure its operations do not cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS. The company may satisfy this requirement by following one or a combination of alternatives outlined below:

- 1) Submit to the Department refined modeling that demonstrates compliance with the SO<sub>2</sub> NAAQS using the facility's existing configuration and permitted emission levels,
- 2) Request a permit modification to replace the back-up fuel from residual oil with a lower sulfur containing fuel, such as distillate oil or gaseous fuel,
- 3) Propose physical and administrative modifications to the facility that when implemented would demonstrate compliance with the SO<sub>2</sub> NAAQS. Such proposal must be supported by air quality

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modeling that is acceptable to the Department. The proposed modifications must become part of a revised permit issued to the facility.

Please provide a response to this letter not later than September 6, 2013. We are available to meet and review and discuss our findings, and to assist you in finding a solution to this issue. Please direct any questions to Tom Lilly.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Foster", written in a cursive style.

Paul Foster, P.E.  
Program Manager

cc: Tom Lilly  
Ron Amirikian  
Mohammed Majeed



STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF AIR QUALITY  
655 S. Bay Road, Suite 5N  
DOVER, DELAWARE 19901

June 4, 2013

Telephone: (302) 739 - 9402  
Fax No.: (302) 739 - 3108

DuPont Experimental Station  
PO Box 80249  
Wilmington DE 19880-0249

RE: 2010 1-hour Sulfur Dioxide (SO<sub>2</sub>) National Ambient Air Quality Standard (NAAQS)

Dear Mr. Robert Oranzi,

On June 22, 2010 the EPA published a revised primary NAAQS for SO<sub>2</sub> by establishing a 1-hour standard at a level of 75 ppb, or 196 micrograms per cubic meter (ug/m<sup>3</sup>). This new air quality standard became effective on August 23, 2010.

Your facility is permitted to operate five 96 mmbtu/hr boilers with residual oil as a primary fuel. The Department has conducted screening modeling that indicates these five boilers may under certain operational conditions cause a violation of the 1-hour SO<sub>2</sub> NAAQS when residual oil is utilized.

- Screening modeling indicates that when these boilers operate simultaneously on residual oil at their rated capacity SO<sub>2</sub> concentrations estimated at more than 200 ug/m<sup>3</sup> are predicted.
- This concentration is more than the NAAQS, even before background concentrations are considered.

In order to verify our modeling results please provide the Department with the following information for each of your boilers: Stack Height (ft), Stack Diameter at exit (ft), Stack Exit Temp. (°F), and Stack flow (ACFM).

Note that 7 DE Admin. Code 1101, 1102, 1103 and 1108 prohibit emissions that cause an exceedance of any NAAQS, and any operations at your facility that cause a violation of the 1-hour SO<sub>2</sub> NAAQS are prohibited. Dupont shall ensure its operations do not cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS. The company may satisfy this requirement by following one or a combination of alternatives outlined below:

- 1) Submit to the Department refined modeling that demonstrates compliance with the SO<sub>2</sub> NAAQS using the facility's existing configuration and permitted emission levels,
- 2) Request a permit modification to replace the primary fuel from residual oil with a lower sulfur containing fuel, such as distillate oil or gaseous fuel,
- 3) Propose physical and administrative modifications to the facility that when implemented would demonstrate compliance with the SO<sub>2</sub> NAAQS. Such proposal must be supported by air quality modeling that is acceptable to the Department. The proposed modifications must become part of a revised permit issued to the facility.

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Please provide a response to this letter not later than September 6, 2013. We are available to meet and review and discuss our findings, and to assist you in finding a solution to this issue. Please direct any questions to Tap Das.

Sincerely,

A handwritten signature in black ink, appearing to read 'Paul Foster', with a stylized flourish at the end.

Paul Foster, P.E.  
Program Manager

cc: Tap Das  
Ron Amirikian  
Mohammed Majeed



STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF AIR QUALITY  
655 S. Bay Road, Suite 5N  
DOVER, DELAWARE 19901

June 4, 2013

Telephone: (302) 739 - 9402  
Fax No.: (302) 739 - 3106

Fisker  
801 Boxwood Road  
Newport DE 19804

RE: 2010 1-hour Sulfur Dioxide (SO<sub>2</sub>) National Ambient Air Quality Standard (NAAQS)

Dear Mr. Mark Blazejak,

On June 22, 2010 the EPA published a revised primary NAAQS for SO<sub>2</sub> by establishing a 1-hour standard at a level of 75 ppb, or 196 micrograms per cubic meter (ug/m<sup>3</sup>). This new air quality standard became effective on August 23, 2010.

Your facility is permitted to operate a three 75 mmbtu/hr boilers, an 85.9 mmbtu/hr boiler, and a 120 mmbtu/hr boiler on residual oil. The Department has conducted screening modeling that indicates these five boilers may under certain operational conditions cause a violation of the 1-hour SO<sub>2</sub> NAAQS when residual oil is utilized.

- Screening modeling indicates that when these boilers operate simultaneously on residual oil at their rated capacity SO<sub>2</sub> concentrations estimated at more than 200 ug/m<sup>3</sup> are predicted.
- This concentration is more than the NAAQS, even before background concentrations are considered.

In order to verify our modeling results please provide the Department with the following information for each of your boilers: Stack Height (ft), Stack Diameter at exit (ft), Stack Exit Temp. (°F), and Stack flow (ACFM).

Note that 7 DE Admin. Code 1101, 1102, 1103 and 1108 prohibit emissions that cause an exceedance of any NAAQS, and any operations at your facility that cause a violation of the 1-hour SO<sub>2</sub> NAAQS are prohibited. Prior to utilizing any residual oil Fisker shall ensure its operations do not cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS. The company may satisfy this requirement by following one or a combination of alternatives outlined below:

- 1) Submit to the Department refined modeling that demonstrates compliance with the SO<sub>2</sub> NAAQS using the facility's existing configuration and permitted emission levels,
- 2) Request a permit modification to replace the primary fuel from residual oil with a lower sulfur containing fuel, such as distillate oil or gaseous fuel,
- 3) Propose physical and administrative modifications to the facility that when implemented would demonstrate compliance with the SO<sub>2</sub> NAAQS. Such proposal must be supported by air quality

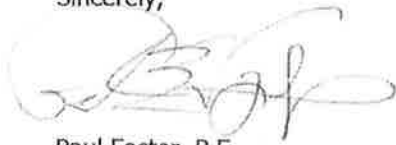
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modeling that is acceptable to the Department. The proposed modifications must become part of a revised permit issued to the facility.

Please provide a response to this letter not later than September 6, 2013. We are available to meet and review and discuss our findings, and to assist you in finding a solution to this issue. Please direct any questions to Tap Das.

Sincerely,

A handwritten signature in black ink, appearing to read 'Paul Foster', written in a cursive style.

Paul Foster, P.E.  
Program Manager

cc: Tap Das  
Ron Amirkian  
Mohammed Majeed