OFFICE OF THE COMMISSIONER

New York State Department of Environmental Conservation
625 Broadway, 14th Floor, Albany, New York 12233-1010
P: (518) 402-8545 | F: (518) 402-8541
www.dec.ny.gov

SEP 18 2015

Ms. Judith Enck
Regional Administrator
United States Environmental Protection Agency
Region 2
290 Broadway, 26th Floor
New York, New York 10007-1866

Dear Ms. Enck:

On behalf of the Governor of the State of New York, I am submitting for consideration by the United States Environmental Protection Agency (EPA) the "New York State Revised Designation Recommendation for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard." DEC is recommending that EPA designate the Buffalo-Cheektowaga, NY Combined Statistical Area (CSA), which includes the counties of Cattaraugus, Erie and Niagara, as attainment with the 2010 sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS).

On June 2, 2010, EPA strengthened the primary SO_2 NAAQS by establishing a new 1-hour primary standard at the level of 75 parts per billion. This revision of the NAAQS required New York to make recommendations to EPA no later than June 2, 2011 for areas to be designated attainment, nonattainment and/or unclassifiable. DEC submitted that designation recommendation on June 1, 2011.

On July 27, 2012, EPA announced that it had insufficient information to complete the designations for the 1-hour SO_2 NAAQS within two years and extended the designations deadline to June 3, 2013. Then, on February 6, 2013, EPA notified Governor Cuomo that EPA was designating as nonattainment most areas in locations where existing monitoring data from 2009-2011 indicated violations of the 1-hour SO_2 NAAQS. EPA's review of the monitored air quality data from 2009-2011 showed no violations of the 2010 SO_2 standard in any areas in New York, but EPA deferred action to designate areas in New York.

On March 2, 2015, the U.S. District Court for the Northern District of California approved a Consent Decree between EPA and Sierra Club and Natural Resources Defense Council to resolve litigation concerning the deadline for completing the designations. The court's order directed EPA to complete designations for all remaining areas in the country in up to three additional rounds: the first round by July 2, 2016, the second round by December 31, 2017, and the final round by December 31, 2020.

In a letter dated March 20, 2015, EPA informed DEC that two counties (Erie and Niagara) in New York State will be addressed in the next round of designations. In the same letter, EPA requested that if a state would like to submit an updated designation recommendation and supporting information for EPA to consider for the affected areas, that it should do so by September 18, 2015. This submittal constitutes that updated designation recommendation request. DEC acknowledges that EPA intends to designate these areas as either unclassifiable/attainment, nonattainment or unclassifiable by July 2, 2016.

Based on air quality monitoring for the years 2012-2014 and air quality modeling done in accordance with EPA guidance, DEC is recommending that the entire Buffalo-Cheektowaga, NY CSA be designated as attainment with the 2010 SO_2 NAAQS. While EPA is only requiring that Erie and Niagara counties be considered in this round of designations, DEC has included an analysis for Cattaraugus County, the remaining county within the Buffalo-Cheektowaga CSA. Since Cattaraugus County contains no large point sources and nearby monitoring indicates air quality that far exceeds what is required for attainment, DEC included it in this revised designation recommendation.

Should you have any questions regarding this submission, please do not hesitate to contact Mr. David J. Shaw, Director of the Department's Division of Air Resources at (518) 402-8452 with any questions you may have.

Sincerely,

Marc Gerstman
Acting Commissioner

Enclosures

c: D. Shaw
R. Ruvo, EPA Region 2

REVISED DESIGNATION RECOMMENDATION FOR SULFUR DIOXIDE

Buffalo-Cheektowaga, NY CSA

2010 Primary National Ambient Air Quality Standard

September 2015

DIVISION OF AIR RESOURCES
Bureau of Air Quality Planning

Albany, NY 12233-3251
P: (518) 402-8396 | F: (518) 402-9035 | dar.sips@dec.ny.gov

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Introduction

Sulfur dioxide (SO_2) is one of a group of highly reactive gasses known as "oxides of sulfur." The largest sources of SO_2 emissions are from fossil fuel combustion at power plants and other industrial facilities. Smaller sources of SO_2 emissions include industrial processes and the burning of high sulfur containing fuels by locomotives, large ships, and non-road equipment. SO_2 is linked with a number of adverse effects on the respiratory system. Exposure to sulfur dioxide can cause irritation and/or inflammation of the skin and mucous membranes of the eyes, nose, throat, and lungs. The respiratory system is particularly affected during heavy physical activity. High concentrations of SO_2 can affect lung function, worsen asthma attacks, and aggravate existing heart disease in sensitive groups, such as children, the elderly, and those with chronic lung disease.

On March 2, 2015, the U.S. District Court for the Northern District of California accepted as an enforceable order an agreement between the EPA and Sierra Club and Natural Resources Defense Council to resolve litigation concerning the deadline for completing designations for the 2010 primary SO_2 National Ambient Air Quality Standard (NAAQS). In the first round of designations to be completed by EPA no later than July 2, 2016, EPA must designate two groups of areas: 1) areas that have newly monitored violations of the 2010 SO_2 NAAQS, and 2) areas that contain any stationary source that, according to the EPA's Air Markets Database, either emitted more than 16,000 tons of SO_2 in 2012 or emitted more than 2,600 tons of SO_2 and had an emission rate of at least 0.45 lbs. SO_2/mmBtu in 2012 and that has not been announced (as of March 2, 2015) for retirement.

EPA has identified two electric power plant sources in New York State (NRG Huntley Generating Station (Huntley), Erie County and AES Somerset LLC (Somerset), Niagara County) as meeting the first-round criteria established in the court order. Consequently, the New York State Department of Environmental Conservation (DEC) is submitting a revised designation request for the entire Buffalo-Cheektowaga, NY Combined Statistical Area (CSA) for the 2010 primary SO_2 NAAQS pursuant to section 107(d) of the Clean Air Act (CAA). Since the Buffalo-Cheektowaga, NY CSA also includes Cattaraugus County, DEC included an analysis of the attainment status for Cattaraugus County.

Background

NAAQS and Designations

On June 2, 2010, EPA strengthened the primary SO_2 NAAQS by establishing a new 1-hour standard at a level of 75 parts per billion (ppb). At the same time, EPA revoked the two existing primary standards of 140 ppb evaluated over 24-hours, and 30 ppb evaluated over an entire year, because they will not add additional public health protection given a 1-hour standard of 75 ppb. The 2010 SO_2 standard includes a new form; the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations.

DEC submitted New York's designation request for the 2010 SO_2 NAAQS on June 1, 2011. This request provided details of New York's SO_2 Emissions Monitoring System in 2011 as well as actual monitoring data for New York and adjacent states. DEC recommended that all areas of New York be designated as "attainment", with the exception of the Poughkeepsie-Middletown-Newburgh Core-Based Statistical Area (CBSA). DEC recommended that this area be classified as "unclassifiable" since sufficient monitoring data was not available at the time to make an attainment determination. No area of the State indicated nonattainment based on the monitoring data.

On July 27, 2012, EPA extended the deadline for area designations for the 2010 primary SO_2 standard by approximately 1 year due to comments received on the approach for informing initial designations, and remaining uncertainties about the analytic approach states would use for designation determinations and for general implementation. With this extension, EPA intended to complete initial designations by June 3, 2013.

EPA responded to New York's June 1, 2011 designation request on February 6, 2013. At that time, EPA was only proceeding with designating as nonattainment areas in locations where existing monitoring data for 2009-2011 indicated violations of the 1-hour SO_2 standard. Since EPA's review of the monitoring data for 2009-2011 showed no violations of the 2010 SO_2 NAAQS in any areas in New York State, EPA deferred action to designate any areas in New York.

Three lawsuits were filed against EPA alleging the agency failed to designate areas by June 2013. On March 2, 2015 U.S. District Court for the Northern District of California issued an enforceable order under which EPA must complete 1-hour SO_2 NAAQS designations of the remaining areas of the country in up to three additional rounds: the first round by July 2, 2016, the second round by December 31, 2017, and the final round by December 31, 2020.

1. In the designations to be completed by July 2, 2016, EPA will designate in two groups:
    1. Areas that have monitored violations of the 2010 SO_2 standard based on 2013 –2015 air quality data.
    2. Areas that contain any stationary source not announced for retirement that according to EPA's Air Markets Database emitted in 2012 either (a) more than 16,000 tons of SO_2, or (b) more than 2,600 tons of SO_2 and had an average emission rate of at least 0.45 lbs. SO_2/mmBtu.

   On March 20, 2015, EPA notified DEC that two facilities in New York were identified as meeting the nonattainment designation criteria for emitting more than 2,600 tons of SO_2 and having an emission rate of at least 0.45 lbs. SO_2/mmBtu in 2012 and have not announced (as of March 2, 2015) that they will be retired. This revised designation recommendation addresses this issue.

2. The court's order directs the EPA to complete an additional round of area designations by December 31, 2017 addressing areas where states have not installed and begun operating a new SO_2 monitoring network meeting the EPA's specifications referenced in the Agency's anticipated final titled, "Data Requirements Rule for the 1-hour SO_2 primary NAAQS".

3. Lastly, the court's order directs the EPA to designate all remaining areas by December 31, 2020.

EPA's Data Requirement Rule

On April 17, 2014, EPA proposed requirements for air agencies to characterize SO_2 air quality more extensively for purposes of implementing the 2010 SO_2 NAAQS. Air agencies would have the flexibility to characterize air quality using either modeling of actual source emissions or using appropriately sited ambient air quality monitors. EPA intends to use these data in two future rounds of area designations in 2017 and 2020.

The proposed Data Requirements Rule includes options for emissions thresholds which would identify the sources around which air agencies would need to characterize SO_2 air quality. To increase public health protection in more highly populated areas, each option includes a lower annual emissions threshold for sources located in metropolitan areas greater than 1 million in population, and a higher threshold for sources outside these areas.

1. Option 1 would cover sources greater than 1,000 tons of SO_2 in metro areas with population greater than 1 million; and sources greater than 2,000 tons everywhere else.

2. Option 2 would cover sources greater than 2,000 tons of SO_2 in metro areas with population greater than 1 million; and sources greater than 5,000 tons everywhere else.

3. Option 3 would cover sources greater than 3,000 tons of SO_2 in metro areas with population greater than 1 million; and sources greater than 10,000 tons everywhere else.

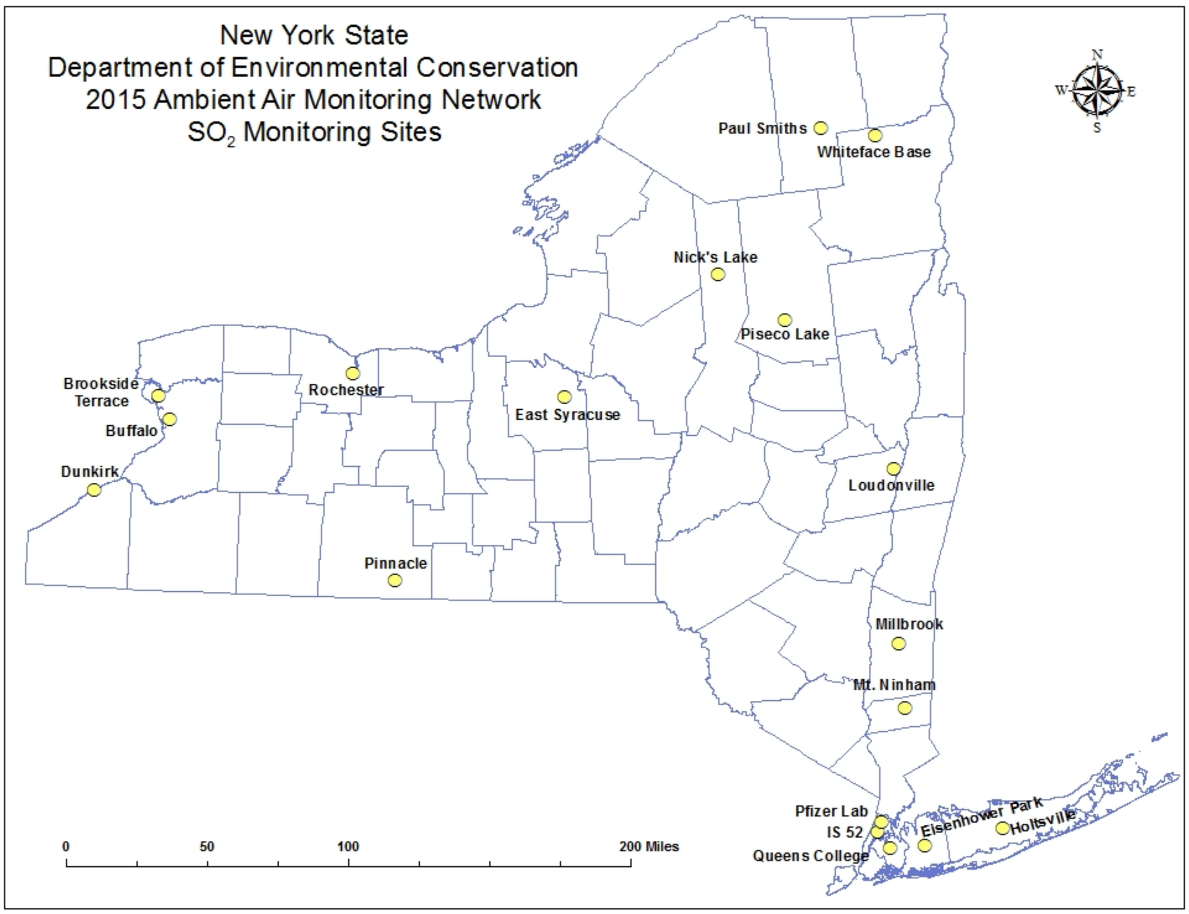
The final proposed Data Requirements Rule was submitted to the Office of Management and Budget on May 28, 2015 with a final rule expected in October 2015. The outcome of the final rule will impact how New York and the EPA proceed with the second round of designation recommendations.

SO_2 Emissions Monitoring and Monitoring Data

New York's SO_2 Emissions Monitoring System

The DEC Division of Air Resources operates an ambient air monitoring network for various air contaminants within New York State, including SO_2. As required by federal regulations, DEC prepares an annual monitoring network plan, which describes in detail the specifics of the monitoring network. This plan includes an annual review of the existing monitoring network to determine the adequacy of the network and to propose any network modifications. Pursuant to the proposed 2015 Annual Monitoring Network Plan, which can be found at http://www.dec.ny.gov/chemical/33276.html, New York State's existing SO_2 monitoring locations are shown in Figure 1.

Figure 1: 2015 Ambient Air Monitoring Network SO_2 Monitoring Sites



Monitoring Data

The 2010 primary SO_2 NAAQS is set at a level of 75 ppb and takes the form of 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years. For example, the design value for 2014 is calculated using monitoring data from 2012, 2013 and 2014. Table 1 provides design values for the SO_2 monitors in and closest to Erie and Niagara counties. When considering all design values from 2011 through 2014, all monitors attain the 2010 primary SO_2 NAAQS by a large margin with SO_2 emissions continuing to decline.

Table 1: SO_2 Design Values for Monitors of Concern from 2011 through 2014*

Monitor	County	Location	SO_2 Design Values (ppb)			
			2011	2012	2013	2014
Rochester	Monroe	RG&E Substation @ 2 Yarmouth Road	24	23	20	20
Buffalo	Erie	Trailer @ 185 Dingens Street	19	17	15	10
Brookside Terrace (Tonawanda II)	Erie	192 Brookside Terrace West	32	29	25	22
Dunkirk	Chautauqua	STP @ Wright Park Drive	34	27	22	18
Addison	Steuben	Pinnacle State Park	16	12	10	9
Niagara Falls*	Niagara	Frontier Ave. @ 55^{th} Street	17	14	N/A	N/A

Source: EPA AQS Design Value Report generated August 3, 2015.
*The Niagara Falls monitor ceased operation at the end of 2012. While not shown in Figure 1, the data from this monitor is used in the dispersion modeling analysis.

The Erie County monitor now located to 192 Brookside Terrace West (Tonawanda II) was originally located at 779 Two Mile Creek Road (Tonawanda I). It was moved as part of the Tonawanda Community Air Quality Study in 2007 and now borders a residential neighborhood and industrial complex approximately 0.2 mile northeast of the original site. While this move occurred well before the new 1-hour SO_2 NAAQS became effective, DEC wants to assure EPA that moving the monitor was not the cause of the sharp decline in peak 1-hour SO_2 concentrations and design values that occurred during the same time period.

The primary reason for the sharp decline in peak 1-hour SO_2 concentrations and design values was the precipitous drop in SO_2 emissions from stationary sources located in Erie County as a result of the PSD (Prevention of Significant Deterioration) Consent

Decrees involving coal power generating facilities and new regulations taking effect at the time, especially 6 NYCRR Part 245, CAIR SO_2 Trading Program. Erie County stationary source emissions decreased from 11,609 tons of SO_2 in 2007 to 7,422 tons of SO_2 in 2008. Huntley alone decreased from 10,613 tons of SO_2 in 2007 to 6,853 tons of SO_2 in 2008. Additionally, EPA implemented Ultra Low Sulfur Diesel (ULSD) standards for on-road diesel fuel. The new requirement of 15 ppm was phased in from 2006-2010.

Monitoring data shows that the Tonawanda I monitor exceeded the 1-hour SO_2 NAAQS of 75 ppb in 2007 with a design value of 119 ppb and in 2008 with a design value of 88 ppb. Since this is the only monitor that exceeded the 1-hour SO_2 NAAQS with actual monitor data, these values were examined more closely. Because of the Tonawanda I monitor's proximity to the new Tonawanda II monitor location, design values were calculated for the years that were missing data at that location by substituting the values for the adjacent monitor instead; that allowed DEC to calculate values for all three-year Design Value periods, for both monitors. Those three-year design value periods are shown below in red in order to distinguish them from the non-substituted values:

Table 2: SO_2 Design Values for Tonawanda Monitors

TONAWANDA MONITOR STREET ADDRESS	SO_2 Design Values (ppb)			
	2007	2008	2009	2010
192 BROOKSIDE TERRACE WEST (Tonawanda II)	88	62	39	36
779 TWO MILE CREEK ROAD (Tonawanda I)	119	88	65	30

Table 3 provides additional evidence that the monitor site change in Tonawanda was not the reason for the sharp decline observed in peak 1-hour concentrations. Both monitors were operating for the sixth month period from July 2007 through December 2007 and showed comparable peak concentrations and a precipitous drop in November 2007. Sampling at the Tonawanda I monitor terminated on December 31, 2007.

Table 3: Peak 1-hour SO_2 Concentrations for Tonawanda Monitors

Month	Tonawanda I (ppb)	Tonawanda II (ppb)
July 2007	17	40
August 2007	51	39
September 2007	32	35
October 2007	63	58
November 2007	24	18
December 2007	31	25

With a decreasing trend in SO_2 values clearly demonstrated for these two monitoring locations since 2007, it can be concluded that the Tonawanda II monitoring location does not present an area of heightened concern for the 2010 SO_2 NAAQS.

Supporting Information (Five-Factor Analysis)

Factor 1: Dispersion Modeling

DEC performed dispersion modeling to assess the areas around Huntley and Somerset in the context of the proposed federal 1-hour SO_2 Data Requirements Rule (DRR). DEC's methodology was based on policies and procedures contained in EPA's Guideline on Air Quality Models (40 CFR Appendix W) and DEC's Air Quality Modeling Procedures as outlined in DAR-10 / NYSDEC Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis, modified by the SO_2 NAAQS Designations Modeling Technical Assistance Document (Modeling TAD) where applicable.

For the Huntley modeling analysis (2012-2014 time period), included in this report as Appendix A, actual hourly emissions data obtained from the facility were matched with three years of concurrent surface and upper-air meteorological data from Buffalo Niagara International Airport to run AERMOD version 14134 using true stack height regardless of Good Engineering Practice (GEP). AERMOD calculated impacts show that Huntley contributed 44.1 ppb to the 54.3 ppb 4^{th} highest concentration that includes seasonally-based hourly background concentrations for SO_2. This maximum impact, which is located at the southeastern boundary of the facility's property, falls well below the 2010 SO_2 NAAQS of 75 ppb.

For the Somerset modeling analysis (2011-2013 time period), included in this report as Appendix B, AERMOD version 14134 was run for two scenarios:

1. Three years of hourly emissions data obtained from the facility were matched with 3 years of concurrent meteorological data from both Buffalo Niagara International Airport and Niagara Falls International Airport to run AERMOD version 14134 using the actual stack height.
2. A fixed emission rate based on a permit limit to comply with the Mercury Air Toxics Standards (MATS) was modeled with 5 years of meteorological data and the GEP stack height.

AERMOD calculated impacts for Scenario 1 show that Somerset contributes 35.1 ppb to the 42.6 ppb 4th highest concentration that includes seasonally-based hourly background concentrations for SO_2. AERMOD calculated impacts for Scenario 2 show that Somerset contributes 13.1 ppb to the 20.6 ppb 4th highest concentration that includes seasonally-based hourly background concentrations for SO_2. The maximum impact from both scenarios, which occurs just northeast and southeast of the facility's property, falls well below the 2010 SO_2 NAAQS of 75 ppb. Given the recent Supreme Court decision[1] resulting in an uncertain future for the MATS rule, only Scenario 1 was considered in making this designation recommendation.

[1] June 29, 2015: MICHIGAN ET AL. v. ENVIRONMENTAL PROTECTION AGENCY ET AL. http://www.supremecourt.gov/opinions/14pdf/14-46_10n2.pdf

Factor 2: Emissions-Related Data

Over the years, New York has adopted several regulations that have had a significant impact on reducing SO_2 emissions. These include:

Regulation	Title
6 NYCRR Part 248	Use of Ultra Low Sulfur Diesel Fuel and Best Available Retrofit Technology for Heavy Duty Vehicles
6 NYCRR Subpart 225-1	Fuel Use and Composition – Sulfur Limitations
6 NYCRR Part 245	CAIR SO_2 Trading Program
6 NYCRR Part 249	Best Available Retrofit Technology (BART)

6 NYCRR Part 248 (regulation effective 2009) requires the use of Ultra low sulfur diesel fuel (ULSD) having a content of 0.0015 percent (15 ppm) of sulfur or less and applies to all heavy duty vehicles except for:

(1) locomotives;
(2) alternative fuel vehicles;
(3) any HDV subject to a lease or contract entered into or last renewed prior to February 12, 2007; and
(4) any on road vehicle with engine model years prior to 1960.

6 NYCRR Part 248 also requires that on or after December 31, 2013, all diesel powered heavy duty vehicles owned by, operated by, or leased by each BART regulated entity or which are owned by, operated by, or leased by a contractor and used to provide labor, services, materials and/or equipment on behalf of a BART regulated entity to perform regulated entity work were required to utilize and maintain BART.

For 6 NYCRR Part 225:

- 6 NYCRR Part 225-1.2(c) requires owners and/or operators of any stationary combustion installation in Erie and Niagara Counties that fires solid fuels are limited to the firing of solid fuel with a maximum sulfur content of 1.7 pounds per million Btu and an average sulfur content of 1.4 pounds per million Btu on or after July 1, 2014.

- 6 NYCRR Part 225-1.2(e) requires owners and/or operators of any stationary combustion installation in Erie and Niagara Counties that fires residual oil are limited to the purchase of residual oil with a sulfur content of 0.50 percent sulfur by weight low on or after July 1, 2014, and are limited to the firing of residual oil with a sulfur content of 0.50 percent sulfur by weight on or after July 1, 2016.

- 6 NYCRR Part 225-1.2(f) requires owners and/or operators of commercial, industrial, or residential emission sources that fire number two heating oil on or after July 1, 2012 are limited to the purchase of number two heating oil with 0.0015 percent sulfur by weight or less.

- 6 NYCRR Part 225-1.2(g) requires owners and/or operators of a stationary combustion installation that fires distillate oil other than number two heating oil are limited to the purchase of distillate oil with 0.0015 percent sulfur by weight or less on or after July 1, 2014.

- 6 NYCRR Part 225-1(h) requires owners and/or operators of any stationary combustion installation that fires distillate oil including number two heating oil are limited to the firing of distillate oil with 0.0015 percent sulfur by weight or less on or after July 1, 2016.

- 6 NYCRR Part 225-1.2(i) requires owners and/or operators of any stationary combustion installation that fires waste oil on or after July 1, 2014 are limited to the firing of waste oil with 0.75 percent sulfur by weight or less.

6 NYCRR Part 245 established an annual SO_2 Budget Trading Program for EGU's beginning in 2010 (New York State emissions cap = 135,139 tons) and required further emission reductions starting January 1, 2015. However, 6 NYCRR Part 245 has been superseded by the federal Cross-State Air Pollution Rule (CSAPR) with a 2015 (Phase I) New York State SO_2 emissions cap of 36,296 tons. CSAPR Phase II in 2017 has a New York State SO_2 emissions cap of 27,556 tons. In Erie County, Huntley has a 2015 SO_2 allocation of 2,673 tons which is reduced to 1,950 tons in 2017. In Niagara County, Somerset has a 2015 allocation of 5,147 tons which is reduced to 3,754 tons in 2017. These are substantial SO_2 emissions reductions that are expected to have the continued effect of lower 1-hour SO_2 design values in Erie and Niagara Counties, as well as statewide.

6 NYCRR Part 249 restricts the emissions of visibility-impairing pollutants, including SO_2, by requiring the installation of Best Available Retrofit Technology (BART) on a BART-eligible stationary source to reduce regional haze and restore natural visibility conditions to Federal Class I Areas. While no BART-eligible stationary sources exist in Erie and Niagara counties, reductions in SO_2 emissions from BART-eligible stationary sources will be realized in other parts of New York State.

Table 4 provides SO_2 emissions trends for Cattaraugus, Erie and Niagara counties. All three counties exhibit a declining emissions trend from 2005 to 2014, with the exception of Niagara County. The 2011 point source emissions for Niagara County was noticeably higher than previous years because Somerset emitted approximately 10,024 tons of SO_2 that year. Since 2011, Somerset's emissions have returned to pre-2011 levels with 2014 emissions being less than half the 2011 emissions. (See Table 7).

Table 4: SO_2 Emissions Trends for Cattaraugus, Erie and Niagara Counties

County	Source Category	2005 (tons)	2008 (tons)	2011 (tons)	2014* (tons)
Cattaraugus	Point	2.37	0.74	0.36	0.81
	Non Point	955.50	405.37	275.64	186.87
	On Road	49.51	9.01	10.02	10.02
	Non Road	49.73	39.88	1.14	1.14
	Total	1,057.11	455.00	287.16	198.84
Erie	Point	19,897.63	7,422.75	4,924.42	3,456.11
	Non Point	8,918.02	3,849.50	2,824.83	1,808.82
	On Road	418.85	102.31	68.26	68.26
	Non Road	508.49	78.13	8.49	8.49
	Total	29,742.98	11,452.69	7,826.00	4,341.68
Niagara	Point	4,255.33	5,058.62	10,759.85	5,855.06
	Non Point	2,043.80	1,101.07	853.99	652.20
	On Road	73.38	18.83	13.97	13.97
	Non Road	379.13	21.26	2.42	2.42
	Total	6,751.64	6,199.78	11,630.22	6,523.65

*2014 Point Source Emissions Data is preliminary data. 2014 Non-Point Emissions Data is projected. 2014 On-Road and Non-Road Emissions Inventories are under development, and, because they constitute a small fraction of the total inventory, were assumed constant from 2011 for purposes of this analysis.

Tables 5, 6 and 7 provide SO_2 emissions for point sources in Cattaraugus, Erie and Niagara Counties respectively. Generally speaking, there is a downward trend in SO_2 emissions from point sources in all three counties.

Table 5: SO_2 Emissions (tons): Cattaraugus County Point Sources

Facility	2007	2008	2009	2010	2011	2012	2013	2014
Indeck Olean Energy Center	1.42	0.74	0.46	0.71	0.36	0.33	0.35	0.81
Laidlaw Energy *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.42	0.74	0.46	0.71	0.36	0.33	0.35	0.81

*Laidlaw Energy has not operated during the period of 2007-2014, but still has a valid Title V permit.

Table 6: SO_2 Emissions (tons): Erie County Point Sources

Facility	2007	2008	2009	2010	2011	2012	2013	2014
Huntley Generating Station	10,612.50	6,852.60	6,043.92	6,041.41	4,315.60	2,715.50	3,218.00	3,192.00
PVS Chemical Solutions Inc*	198.38	121.73	96.32	147.88	138.14	109.06	139.29	163.11
3M Tonawanda*	52.96	64.78	41.50	48.90	37.08	43.32	45.33	47.68
Chaffee Landfill	17.99	44.43	47.31	42.54	48.66	49.78	46.39	45.61
Bird Island STP*	4.02	3.67	3.95	3.70	3.69	3.50	3.75	3.84
Tennessee Gas Pipeline Co Comp Stat 229	0.07	0.09	0.14	0.16	0.18	0.14	0.57	2.68
Indeck-Yerkes Energy Services	0.22	0.30	0.27	0.21	0.26	0.29	0.41	0.41
Tonawanda Engine Plant-GM Powertrain	0.26	0.23	0.09	0.20	0.15	0.19	0.17	0.28
Aurubis Buffalo Inc (aka. Luvata Buffalo Inc)*	0.18	0.18	0.15	0.17	0.18	0.18	0.27	0.21
Goodyear Dunlop Tires North America Ltd	153.83	0.20	3.36	0.16	0.16	0.15	0.17	0.19
International Imaging	0.02	0.02	0.02	0.05	0.02	0.02	0.02	0.03
Noco Energy Corp	94.48	16.11	0.32	0.10	0.17	0.05	0.03	0.03
Cello-Pack Corporation of Buffalo	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Whiting Door Manufacturing Corp	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
General Mills Operations LLC*	0.35	0.39	0.07	0.11		0.26	0.09	0.00
Buffalo State College	73.75	30.43	35.91	6.73	0.09	0.09	4.47	0.00
Concord Compressor Station*	0.00	0.12	0.00	0.01	0.01	0.02	0.10	0.00
Lackawanna Plant- Republic Steel*	0.43	0.46	0.29	0.37	0.39	0.41	0.36	0.00
E I Dupont Yerkes Plant*	0.01	0.00	0.00	0.06	1.49	0.34	0.10	0.00
Tonawanda Coke Corp*	353.70	285.85	127.22	378.02	378.01	347.30	401.39	0.00
Buffalo Terminal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unicell Body Company Inc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunoco Tonawanda Terminal	0.07	0.73	0.05	0.03	0.02	0.00	0.00	0.00
Henkel Corporation	0.01	0.01	0.01	0.00				0.00
QG Printing Corp		0.04	0.03	0.03				0.00
Arcelormittal Lacakawanna LLC	0.44	0.36	0.09	0.00				0.00
Great Lakes MDF	0.00	0.00	0.00					0.00
Quebecor World Buffalo Inc	44.89	0.04	0.03					0.00
Total	11,608.58	7,422.80	6,401.07	6,670.81	4,924.32	3,270.62	3,860.93	3,456.09

* 2014 emission statement is not technically complete (either data not entered or data may change)

Figure 2: Sources Emitting Greater Than 40 tons/year of SO_2 near Huntley

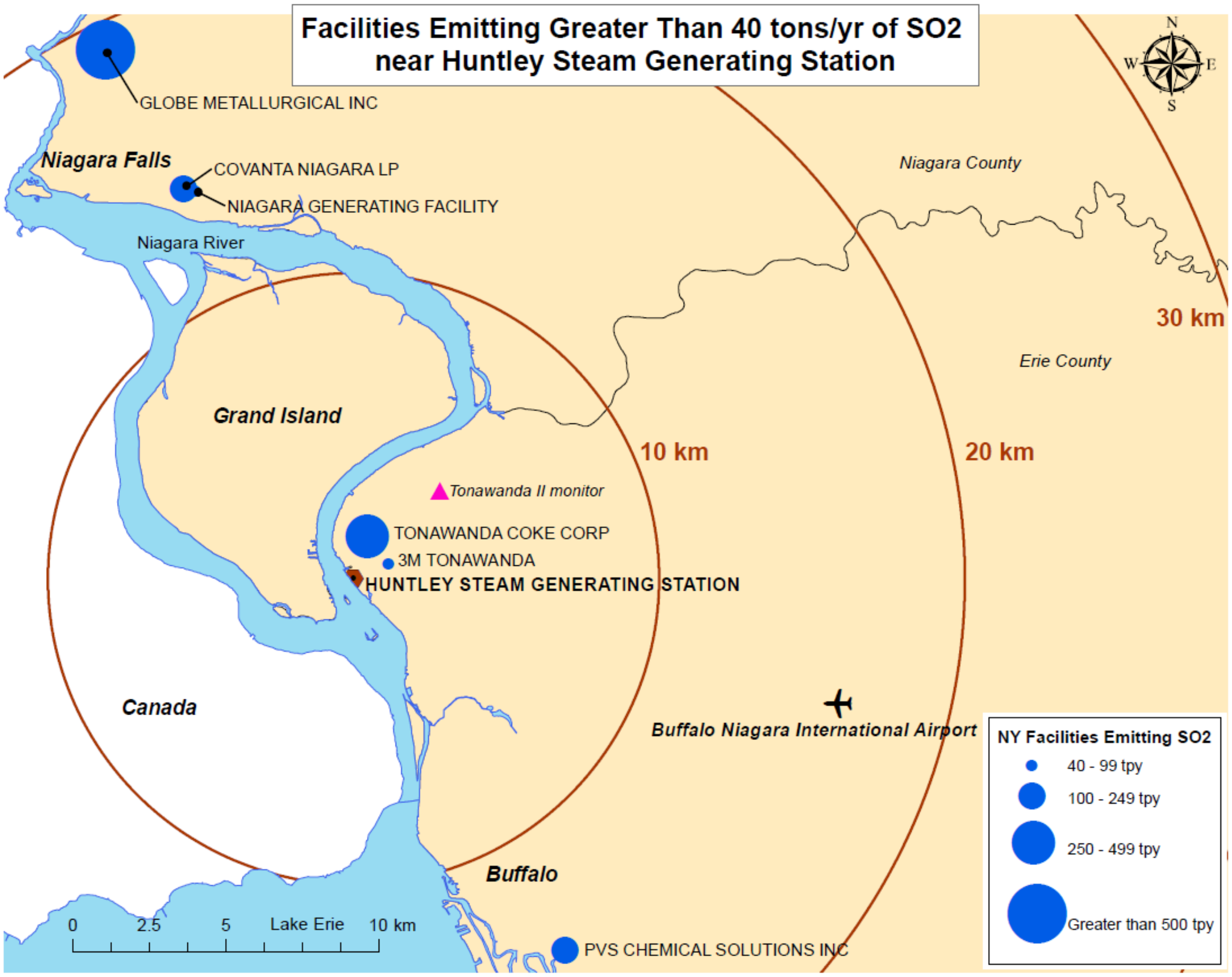
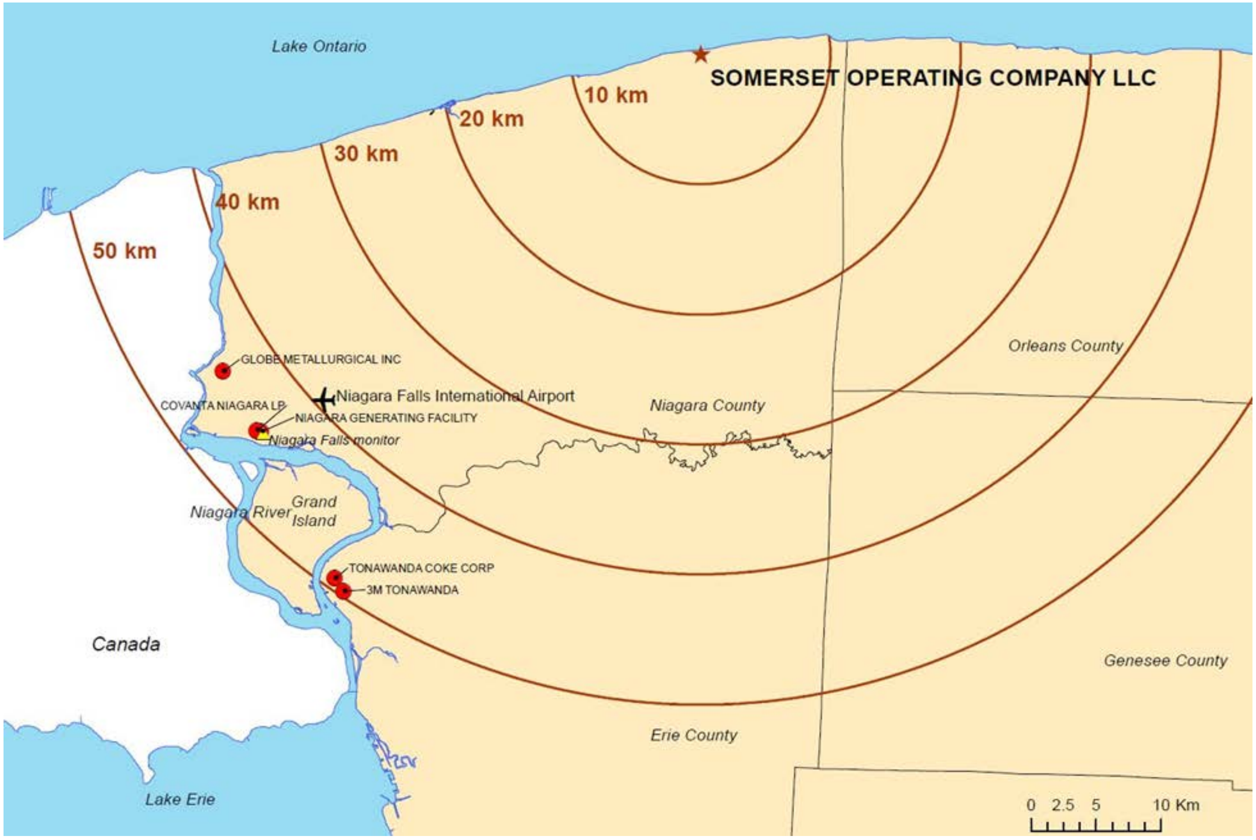


Table 7: SO_2 Emissions (tons): Niagara County Point Sources

Facility	2007	2008	2009	2010	2011	2012	2013	2014
Somerset (aka AES Somerset LLC)	4,261.62	3,937.74	5,076.81	7,618.01	10,024.21	5,653.36	5,722.67	4,817.21
Globe Metallurgical Inc		0.03	107.38	521.85	601.98	699.01	633.31	572.73
Niagara Generating Facility	544.30	925.70	451.80	1.55	0.00	7.22	48.92	244.03
Covanta Niagara LP	137.67	163.68	145.84	119.68	90.02	87.76	130.91	225.21
Model City Energy Facility	8.29	23.81	25.22	25.91	24.79	25.06	16.55	14.21
TAM Ceramics LLC	0.52	6.45	3.36	0.00	7.73	7.93	6.67	5.28
TN Gas Pipeline CO Comp. Stat. 230-C	0.23	0.14	0.03	0.02	0.00	0.32	4.34	4.31
Metaullics Systems Division of Pyrotek Inc		0.00	7.07		5.94	2.49	2.69	1.60
Dupont (aka Chemours)	0.23	0.22	0.71	0.79	0.03	0.02	0.02	0.19
GM (aka Delphi Thermal Systems)	0.00	0.08	0.00	0.00	0.08	0.09	0.10	0.10
Occidental Chemical Corp - Niagara Plant	0.00	0.01	0.01	0.00	0.00	0.00	0.40	0.07
Lockport Cogeneration Facility	21.32	0.39	0.36	0.00	0.03	0.07	0.02	0.05
Durez Niagara	0.00	0.00	0.20	0.00	0.00	0.03	0.03	0.03
Prestolite Electric NY Inc		0.02	0.02	0.62				0.03
Vandemark Chemical Inc	0.01	0.07	0.05	0.70	0.07	0.07	0.03	0.02
Washington Mills Electro Minerals	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Modern Landfill Inc	0.25	0.19	0.03	0.33	4.63	0.23	0.05	0.00
Fortistar North Tonawanda Inc	0.24	0.00	0.00	0.70	0.33	1.27	0.91	0.00
Goodyear Chem Plant	0.00	0.00	0.01					0.00
Total	4,974.71	5,058.54	5,818.91	8,290.17	10,759.85	6,484.94	6,567.63	5,885.08

Figure 3: Sources Emitting Greater Than 40 tons/year of SO_2 near Somerset



Airports also contribute to the total SO_2 emissions, and are accounted for in the non-road mobile inventory. The airport portion of the non-road inventory includes aircraft and ground support equipment. 2011 airport emissions are listed in Tables 8, 9 and 10. With the exception of Buffalo Niagara International Airport, which emitted 41.3797 tons of SO_2 in 2011, the emissions from airports is very small.

Table 8: Cattaraugus County Airports: 2011 Emissions Inventory

Airport	**SO_2 (tons)**
Cattaraugus County – Olean Airport	0.1900
Great Valley Airport	0.0511
Randolph Airport	0.0200
South Dayton Airport	0.0126
Giermek Executive Airport	0.0028
Olean General Heliport	0.0013
Hedge Hop Field Airport	0.0005
Reiss Game Farm Airport	0.0005
Berdick Field Airport	0.0004
Neverland Airport	0.0004
Ultralight Port Airport	0.0004
Campbell Field Airport	*
Total	**0.2800**

*No data available

Table 9: Erie County Airports: 2011 Emissions Inventory

Airport	SO_2 (tons)
Buffalo Niagara International Airport	41.3797
Buffalo Airfield	0.3817
Akron Airport	0.3763
Buffalo Lancaster Regional Airport	0.3123
Hamburg Inc Airport	0.0837
Clarence Aerodrome	0.0694
Heussler Hamburg Airport	0.0481
Gowanda Airport	0.0251
Potoczak Airport	0.0022
Bertrand Chaffee Hospital Heliport	0.0013
Buffalo General Hospital Heliport	0.0013
Erie County Medical Center Heliport	0.0013
Gibralter Heliport	0.0013
Mercy Hospital Heliport	0.0013
South Buffalo Mercy Hospital Heliport	0.0013
Tennessee Gas Nr 2 Heliport	0.0013
Women and Childrens Hospital Heliport	0.0013
Woodlawn Beach State Park Heliport	0.0013
Ciszak Airport	0.0007
Gentzke Aeronautical Park Airport	0.0007
High Acres Airport	0.0007
Merkle Airport	0.0007
TTT Air	0.0007
Donnelly's Airport	0.0006
Evans Airways Airport	0.0006
Hilltop Airport	0.0006
Knox Landing Airport	0.0006
Mesmer Airport	0.0006
Basher Field	0.0001
Treichler Farm Airport	0.0000
Total	**42.6966**

Table 10: Niagara County Airports: 2011 Emissions Inventory

Airport	SO_2 (tons)
Niagara Falls International Airport	1.5598
Royalton Airport	0.0420
North Buffalo Suburban Airport	0.0250
Hollands International Field Airport	0.0173
Best Western Red Jacket Inn Heliport	0.0013
Niagara Falls Memorial Parking Ramp Heliport	0.0013
Rainbow Air Heliport	0.0013
Ross Heliport	0.0013
St. Mary's Heliport	0.0013
Flying F Airport	0.0006
Smith Airport	0.0006
Hibbards Airport	0.0005
Pendleton Airpark	0.0005
Shear Airport	0.0005
Taylor Johnson Airport	0.0005
Bassett Field Airport	0.0000
Bent-Wing Airport	0.0000
Cambira Airport	*
Colonial Airport	*
Lockport Cambria Airport	*
Olcott Newfane Airport	*
Total	**1.6538**

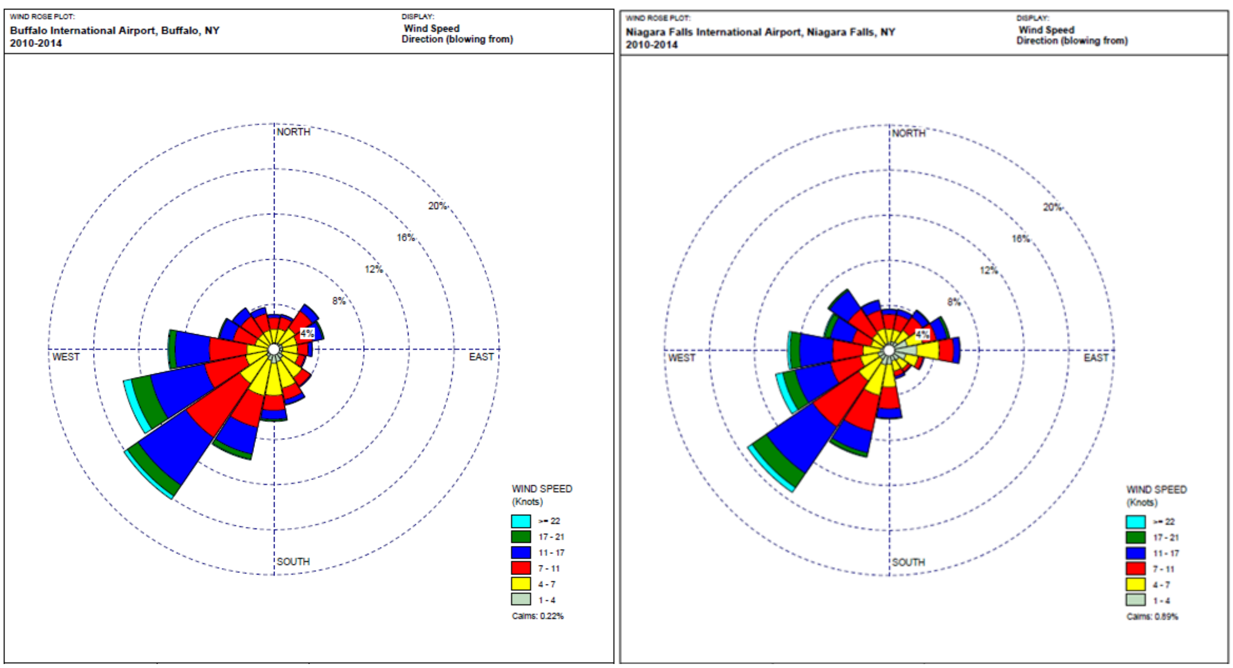
*No data available

Factor 3: Meteorology

Meteorological data for AERMOD were processed using the AERMET meteorological pre-processor along with AERMINUTE and AERSURFACE. Five years of meteorological data (2010-2014) from Buffalo Niagara International Airport were used to obtain the surface data, and upper air data from the same location were used to obtain the required vertical profiles. After 5 years of data were processed, both surface and upper air meteorological files were truncated to dates that fit the hourly emissions records (January 1, 2012 to December 31, 2014).

An analysis was undertaken to estimate the degree to which the impacts of Huntley and other nearby SO_2 sources are reflected in the measurements from the Tonawanda II monitor. Five-years of hourly wind data from Buffalo Niagara International Airport and Niagara Falls International Airport were used to create wind roses. The two wind roses are very similar at both locations with winds from the southwest quadrant being strongly dominant.

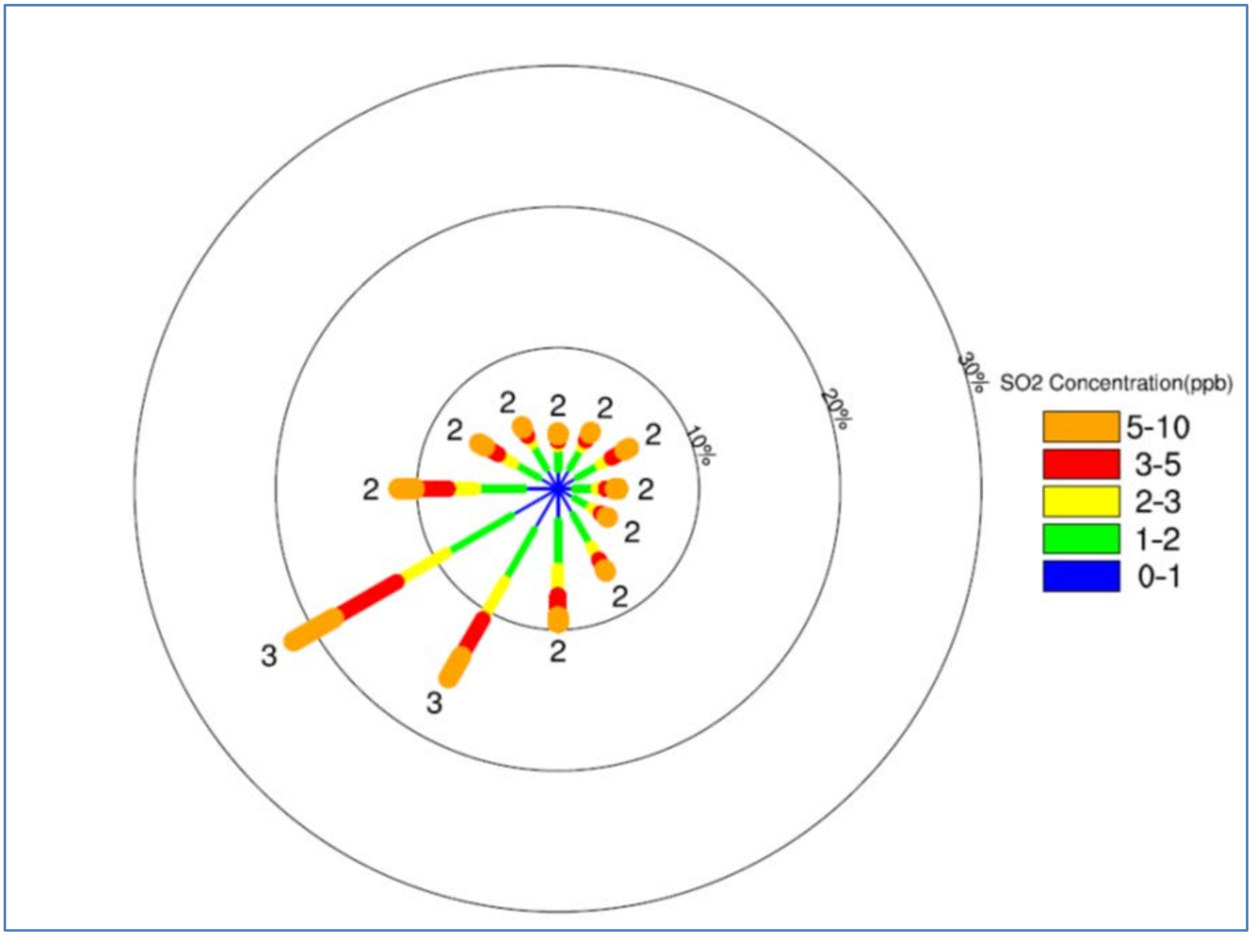
Figure 4: Wind Roses from Buffalo Niagara International Airport and Niagara Falls International Airport



The similarity between the wind roses from the two locations, as well as the generally flat terrain in the area, give confidence that the winds in the Tonawanda area follow a similar pattern.

A pollution rose was created using a combination of hourly SO_2 concentrations from the Tonawanda II monitor and hourly winds from the Buffalo Niagara International Airport.

Figure 5: SO_2 Pollution Wind Rose for Tonawanda II Monitor



This rose shows a strong influence from Huntley and nearby SO_2 sources on the SO_2 levels at the ambient monitor site. Huntley and the other nearby significant SO_2 sources are located to the southwest and south-southwest of the monitor site at a distance of 2-5 km.

Average SO_2 concentrations at the monitor when winds are from the southwest or south-southwest are over 3 ppb. By comparison, average SO_2 concentrations for winds from all quadrants other than southwest are near or below 2 ppb. When winds are from the south-southwest (195° to 225°), higher SO_2 concentrations correlate with higher wind speeds. This provides additional evidence that the impacts of the nearby sources are reflected in the monitor data. The stronger winds give the SO_2 plumes less time to disperse before they arrive at the monitor site, resulting in higher impacts.

For Somerset, five years of meteorological data (2010-2014) from Niagara Falls International Airport were used to obtain the surface data, and upper air data from

Buffalo Niagara International Airport were used to obtain the required morning sounding profiles. After 5 years of data were processed, both surface and upper air meteorological files were truncated to dates that fit the hourly emissions records (January 1, 2011 to December 31, 2013). Winds are predominantly from the southwest.

The hourly SO_2 data from the Niagara Falls monitor for the period 2010 – 2012 was processed to obtain 3-year averages of the 99th percentile concentrations by season and hour-of-day pursuant to EPA's 2011 Memorandum by Tyler Fox entitled "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard". The processed data were included in AERMOD in order to add background values to calculated SO_2 impacts. Note that the Niagara Falls monitor discontinued measuring SO_2 beyond 2012 making this period the most recent SO_2 background data for our modeling analysis. The more urban setting of the monitor as compared to the facility as well as the data being a year older when trends have been coming down for SO_2 makes this a conservative choice of a representative background data. The location of the ambient monitor relative to Somerset Station is shown in Figure 3.

DEC determined that it was not necessary to include any nearby sources in Somerset's modeling analysis because the nearest facility emitting greater than 40 tons/year is located more than 40 km from Somerset. Additionally, the background monitor selected is conservative and reflects the contributions of the nearby sources to the ambient SO_2 concentrations.

A complete discussion of meteorology can be found in the modeling reports for Huntley and Somerset included in this report as Appendix A and Appendix B respectively.

Factor 4: Geography and Topography

The Niagara Frontier is most commonly referred to as the land bordering the eastern Niagara River and southern shores of Lake Erie and Lake Ontario and is part of the region known as Western New York State. The Niagara Frontier also forms the eastern part of the Great Lakes North Coast, while its southeastern boundary forms what is known as ski country.

There are no mountain ranges or other air basin boundaries that have a distinguishable effect on the Niagara Frontier.

Factor 5: Jurisdictional Boundaries

The United States Office of Management and Budget (OMB) delineates metropolitan and micropolitan statistical areas according to published standards that are applied to Census Bureau data. The general concept of a metropolitan or micropolitan statistical area is that of a core area containing a substantial population nucleus, together with adjacent communities having a high degree of economic and social integration with that core. Currently delineated metropolitan statistical areas (MSAs) and micropolitan statistical areas (mSAs) are based on application of 2010 standards (which appeared in the Federal Register on June 2010) to 2010 Census and 2006-2010 American Community Survey data. Current MSA and mSA delineations were announced by OMB effective February 2013.

Adjacent MSAs and mSAs may become the components of a set of complementary areas called Combined Statistical Areas (CSAs). Historically, EPA has used the CSA as the starting point for consideration when developing designation recommendations. For purposes of this revised designation recommendation, DEC is evaluating the Buffalo-Cheektowaga, NY CSA, which is comprised of the Buffalo-Cheektowaga-Niagara Falls, NY MSA (Erie and Niagara Counties) and the Olean, NY mSA (Cattaraugus County).

Recommendations

DEC recommends that the Buffalo-Cheektowaga, NY CSA (Cattaraugus, Erie and Niagara Counties) be designated “attainment” for the 1-hour SO_2 NAAQS because:

1. design values calculated from actual monitoring data demonstrate that all monitors in both Erie and Niagara counties, as well as the next closest monitors located in Chautauqua, Monroe and Steuben counties, are well below the NAAQS of 75 ppb and trending downward, and

2. dispersion modeling performed to assess the attainment status of the area around Huntley and Somerset, in the context of EPA’s 1-hour SO_2 Data Requirements Rule, demonstrates that Huntley and Somerset do not cause or contribute to a violation of the 1-hour SO_2 NAAQS.

APPENDIX A: Air Quality Modeling for Huntley Generating Station

Air Quality Modeling
for
Huntley Generating Station

Prepared by Impact Assessment and Meteorology Section
New York State Department of Environmental Conservation

July 2015

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this document is to present the results of the modeling performed to assess the attainment status of the area around Huntley Generating Station (Huntley) in the context of the 1-hour SO_2 Data Requirements Rule (DRR).

The air dispersion modeling methodology that was followed is based on policies and procedures contained in the USEPA Guideline on Air Quality Models (40 CFR Appendix W) and the New York State Department of Environmental Conservation's (NYSDEC) Air Quality Modeling Procedures as outlined in DAR-10 / NYSDEC Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis, modified by the SO_2 NAAQS Designations Modeling Technical Assistance Document (Modeling TAD) where applicable.

The steps taken to conduct the air-dispersion modeling analyses are summarized below:

- Compile information on the parameters and characteristics for Huntley;
- Obtain and prepare hourly emissions data for HGS for the period 2012-2014;
- Develop a comprehensive receptor grid to capture the maximum offsite impacts from the main stack;
- Process three years of meteorological data (as available from a local, representative meteorological station) using the meteorological pre-processor AERMET along with AERMINUTE and AERSURFACE;
- Obtain and prepare appropriate SO_2 background data from the nearest representative monitor;
- Complete an ambient air quality modeling analysis using USEPA's regulatory dispersion model, AERMOD (version 14134);
- Summarize the results in tabular format and compare the results with the 1-hour SO_2 ambient air quality standard.

The next section provides a description of the facility and the emissions included in the modeling. Model selection and the methodology used in the modeling are described in Section 3. The modeling results are presented in Section 4.

2.0 FACILITY DESCRIPTION

The Huntley Power Station is located on the shore of the Niagara River in the Town of Tonawanda, Erie County, NY. The electrical generating facility consists of two pulverized coal, dry-bottom, tangential-fired boilers that primarily fire sub-bituminous coal and can produce up to 400 megawatts of electricity. The boilers fire distillate oil during various startup modes. Boilers 67 and 68 have a maximum heat input of 1836 MMBtu/hr each and exhaust combustion gases through a common stack. Steam from each boiler is used to power a dedicated steam turbine-generator set that is capable of generating 200 megawatts of electricity. Combustion Engineering manufactured unit 67 in 1957 and unit 68 in 1958. Units 67 and 68 are tangentially fired dual furnace boilers, where there are two separate fire boxes and a common primary steam header for each boiler. For each boiler one furnace produces the superheated steam while the other furnace creates reheat steam. Both units use fabric filters to control particulate emissions, dry sorbent injection to control acid gases, selective noncatalytic reduction (SNCR) to control nitrogen oxide emissions, and activated carbon injection to control mercury emissions. Each emission control system is used as needed to meet the appropriate emission limits.

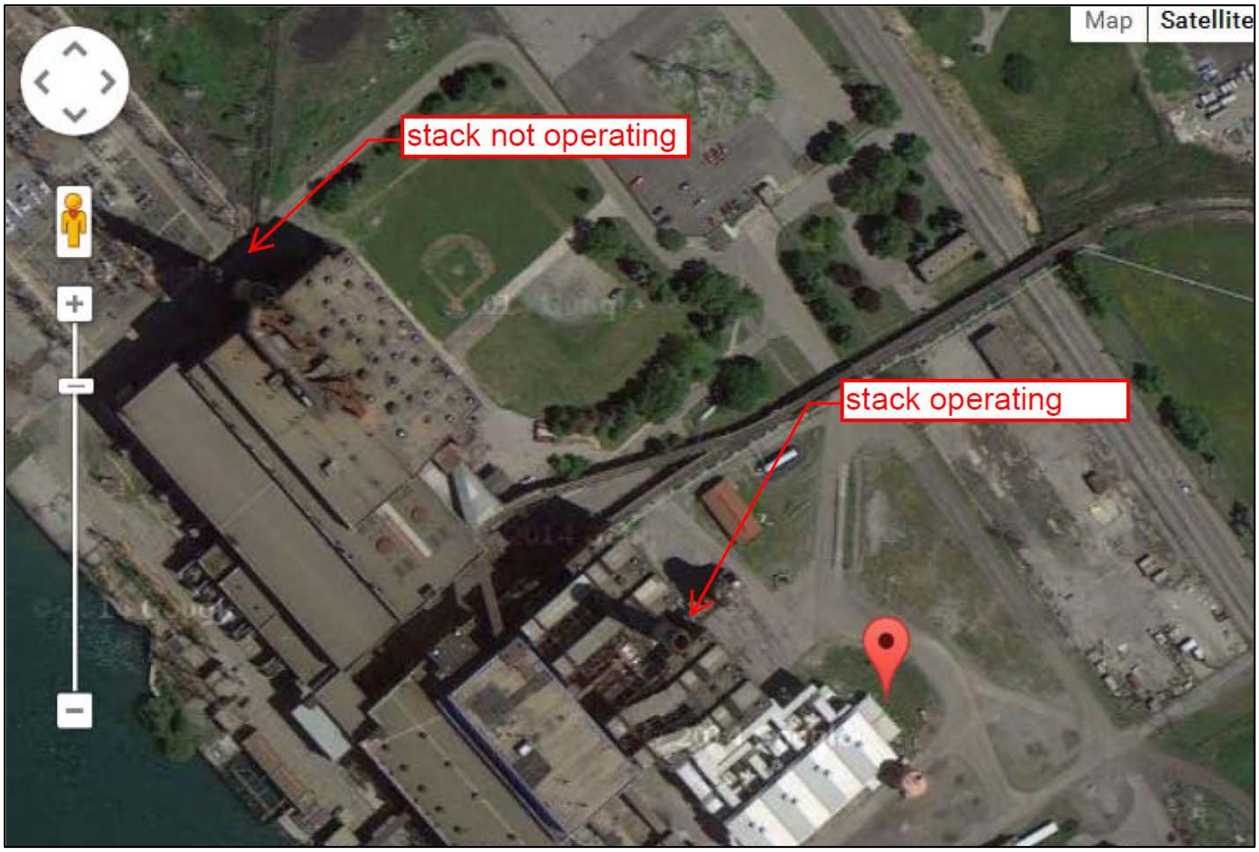
2.1 FACILITY LOCATION

Huntley Generating Station is located approximately 10.5 km north-northwest of Buffalo, NY. The plant is on the east bank of the Niagara River, adjacent to the southern end of Grand Island. Figure 2-1 displays an aerial image of the area around Huntley Generating Station, with the facility's property outlined in yellow. Figure 2-2 is a photo of the facility, showing the operating stack on the left. The other stack in the photo is no longer in use. The Universal Transverse Mercator (UTM83) coordinates of the operational stack are approximately 668784.63E, 4759614.9N (Zone 17). The base elevation of the stack is 174.9 m.

Figure 2-1: Aerial Photograph of Huntley Generating Station

Figure 2-2: Photograph of Huntley Generating Station

Figure 2.3 – Detailed Aerial View



2.2 SOURCE PARAMETERS AND EMISSION RATES

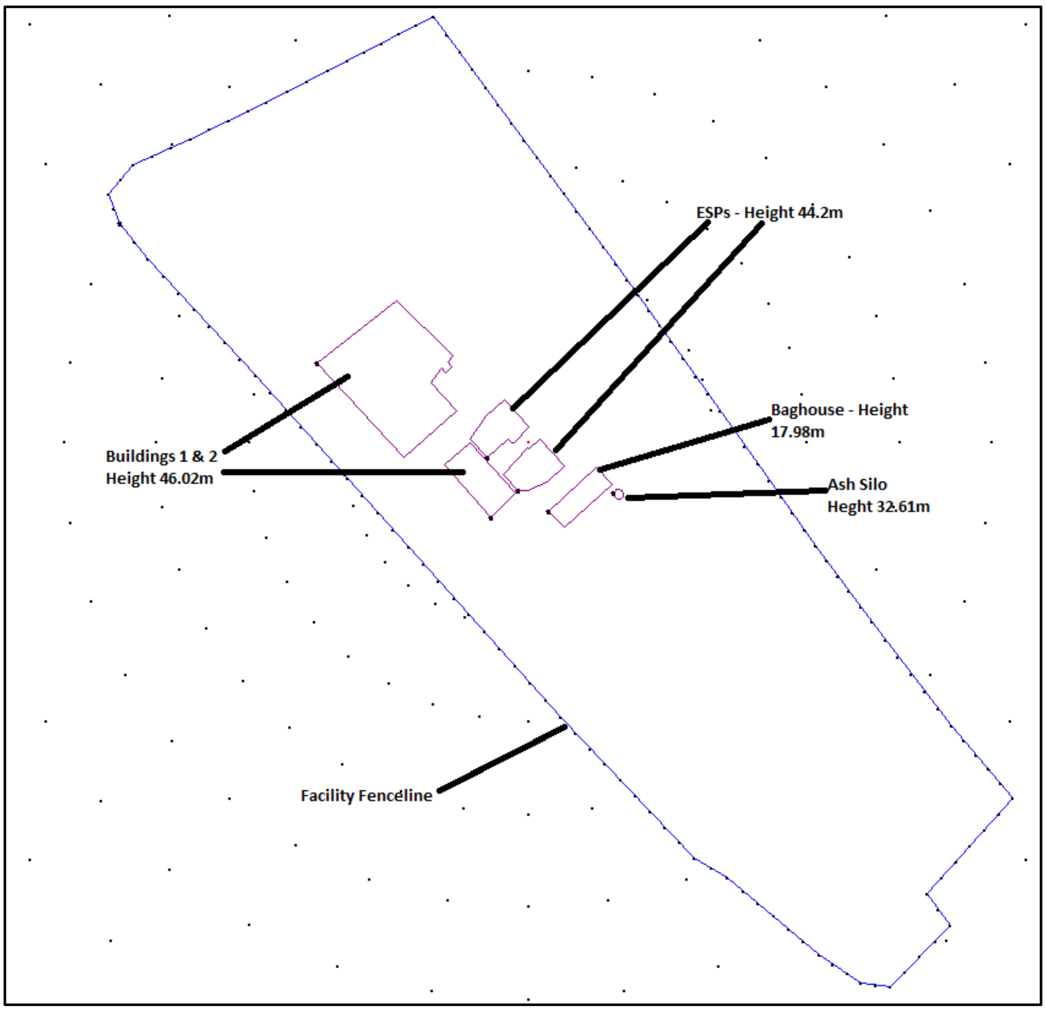
Source parameters and emission rates for the two boilers at the facility were obtained from Roger Caiazza of the Environmental Energy Alliance of New York.

The hourly values of SO_2 emission rates, stack flow rates and stack temperature for 2012-2014 were received in three excel files and subsequently converted into units and file format appropriate for AERMOD use. The stack height is 106.7 m, and the exit diameter of the stack is 5.72 m.

2.3 BUILDINGS and FENCELINE

Building height information was obtained from Patrick Yough, Environmental Manager at NRG. The building footprints used for downwash calculations, as well as the fenceline, are based on the Google Earth image of the facility. BPIP-Prime was run to prepare the building files needed for AERMOD run.

Figure 2-4: Building Layout and Fenceline used for Analysis



3.0 AIR DISPERSION MODELING ANALYSIS

The Modeling TAD describes two types of modeling: using the allowable emission rate along with 5-years of meteorological data and GEP stack height, or, as a refinement, 3-years of actual hourly emissions data along with 3-years of concurrent meteorological data, using the true stack height regardless of GEP. For this modeling analysis, the second option was exercised. Actual hourly emissions data obtained from the facility were matched with 3 years of concurrent surface and upper-air meteorological data from Buffalo Niagara International Airport to run AERMOD version 14134.

3.1 METEOROLOGICAL DATA

Meteorological data for AERMOD were processed using the AERMET (version 14134) meteorological pre-processor along with AERMINUTE (version 14337) and AERSURFACE (version 13016). Five years of meteorological data (2010-2014) from the Buffalo Niagara International Airport were used to obtain the surface data, and upper air data from the same location were used to obtain the required vertical profiles. After 5 years of data were processed, both surface and upper air meteorological files were truncated to dates that fit the hourly emissions records (1/1/2012 to 12/31/2014).

Prior to processing the meteorological data with AERMET, the land-use within 1 km of the meteorological tower at Buffalo Niagara International Airport was analyzed using the AERSURFACE pre-processor. AERSURFACE uses land cover data from the National Land Cover Data (NLCD) 1992 database to determine three key surface parameters needed for modeling: surface roughness albedo, and the Bowen ratio. For this modeling, the 1-km radius circular area centered at the meteorological station site was divided into 12 equal 30-degree sectors. For the Bowen ratio calculations, the land use values can be linked to three categories of surface moisture corresponding to average, wet, and dry conditions – depending on the site and meteorological data period. For this site and data period, the “average” surface moisture option was applied.

The AERSURFACE results are used as input into the AERMET meteorological data processor. Additionally, 1-minute ASOS wind data, collected at the Buffalo airport meteorological tower, were processed using the AERMINUTE pre-processor for AERMET. Figure 3-1 presents a wind rose for the 3 years of meteorological data processed for the modeling analysis. Figure 3-2 shows the relative locations of Huntley Generating Station, the meteorological data collection site, and the ambient background monitor (see Section 3.3) used in the modeling.

Figure 3-1: Wind Rose for Buffalo Niagara International Airport

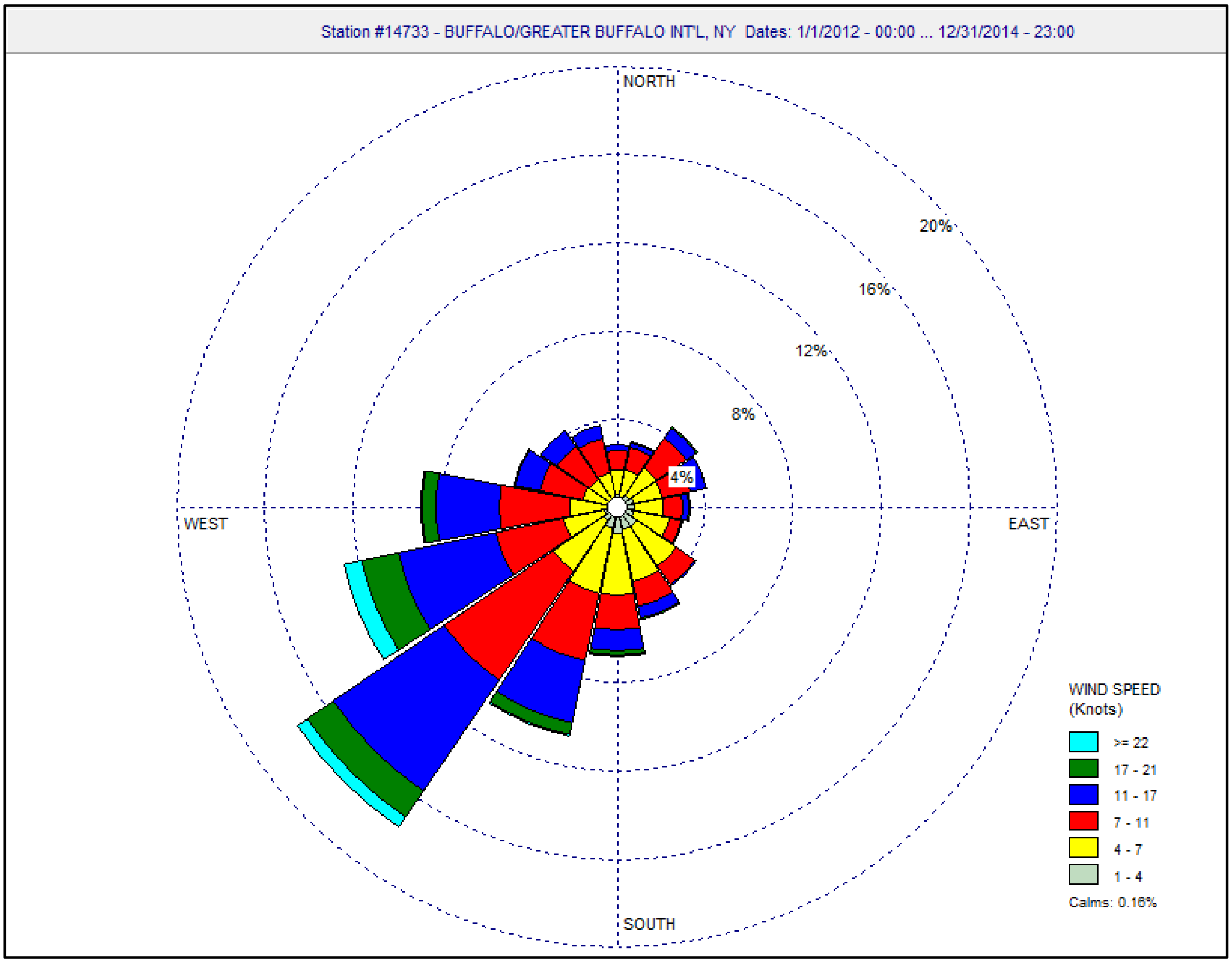
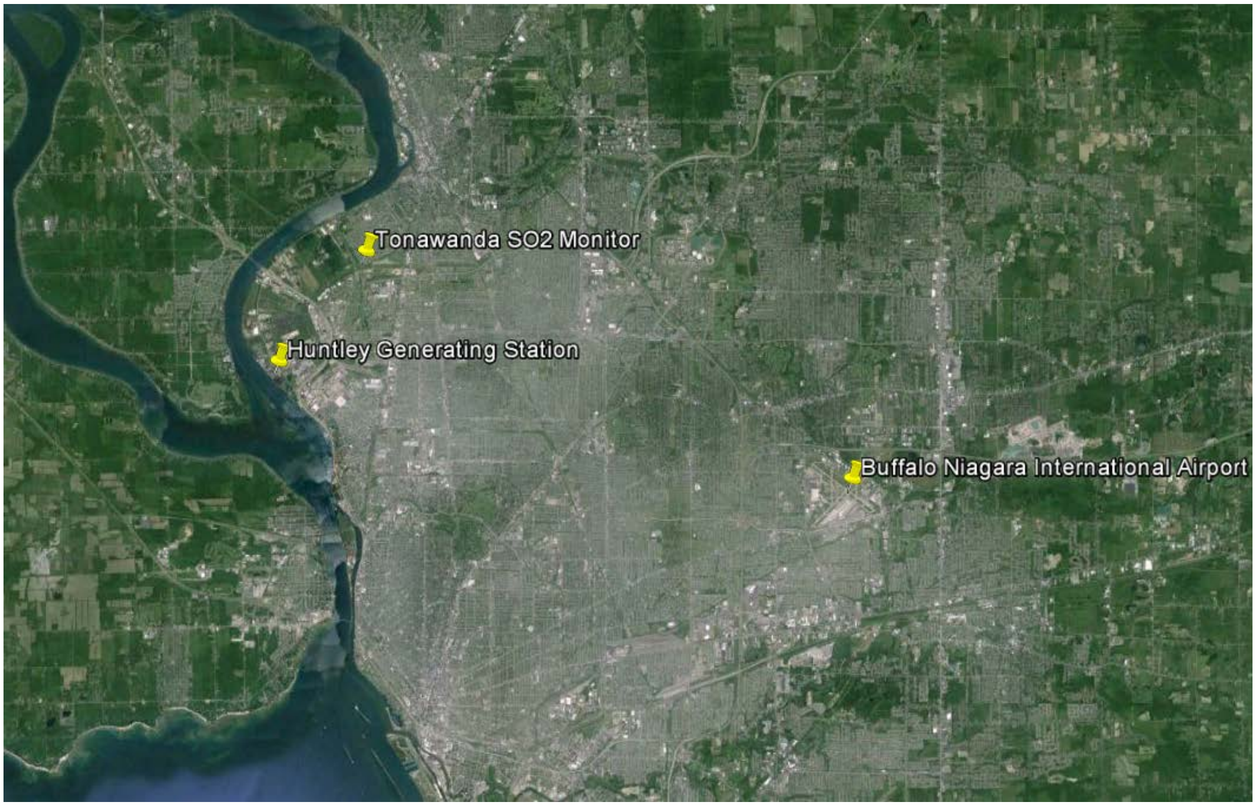


Figure 3-2: Locations of Facility, SO_2 Monitor, and Weather Station



3.2 RECEPTOR GRID

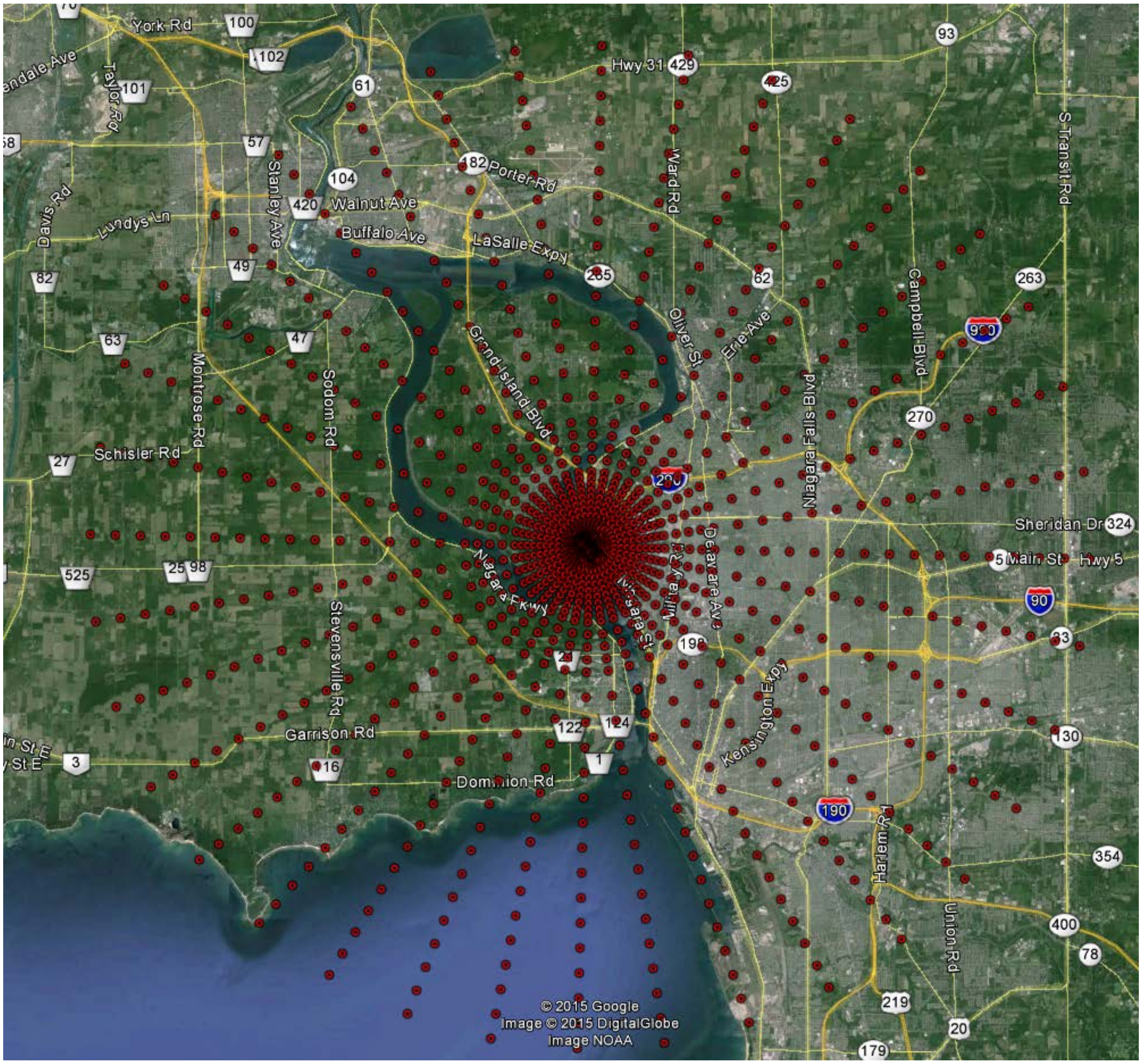
A comprehensive polar receptor grid extending to 20 km from the Huntley Generating Station was used in the AERMOD modeling to assess maximum ground-level SO2 concentrations. The receptor grid consisted of the following receptor spacing:

- 100 m spacing extending from the source to 2 km;
- 250 m spacing extending from 2 km to 5 km;
- 500 m spacing extending from 5 km to 10 km; and
- 1000 m spacing extending from 10 km to 20 km

Receptors were placed on 36 radials 10 degrees apart and the grid was centered on the emission source. Receptors within the Huntley fenceline were eliminated and special receptors were placed along the fenceline at every 25 m. This grid contained a total of 1369 receptors.

The base elevation and hill scale parameters for all receptors were assigned using AERMAP (version 11103) based on data obtained from the National Elevation Dataset website. The receptor grid used in modeling is shown in Figure 3-3 below.

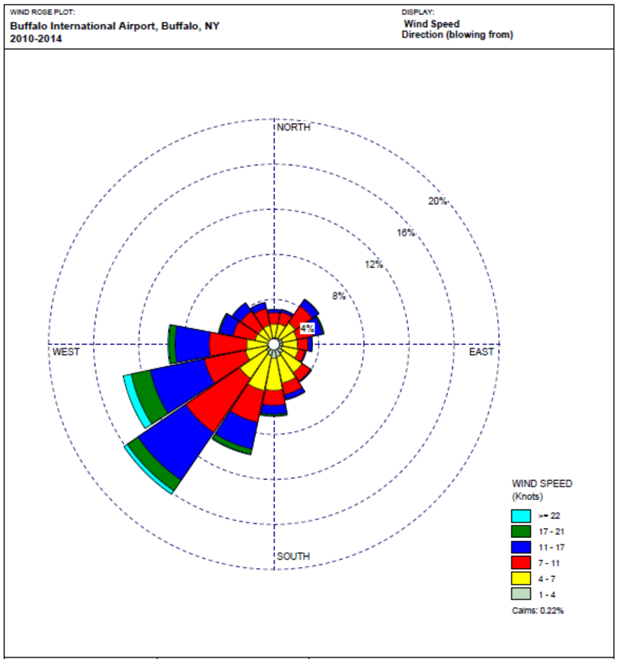
Figure 3-3



3.3 AMBIENT BACKGROUND DATA

An analysis was undertaken to estimate the degree to which the impacts of Huntley and other nearby SO_2 sources are reflected in the measurements from the Tonawanda II (also known as Tonawanda – Brookside Terrace) ambient air monitoring station. Five-years of hourly wind data from Buffalo-Niagara International Airport and Niagara Falls International Airport were used to create wind roses. The two wind roses are very similar (Fig. 3-4) -- at both locations, winds from the southwest quadrant are strongly dominant. The similarity between the wind roses from the two locations, as well as the generally flat terrain in the area, give confidence that the winds in the Tonawanda area follow a similar pattern. A pollution rose (Fig. 3-5) was created using a combination of hourly SO_2 concentrations from the Tonawanda II monitor and hourly winds from the Buffalo-Niagara International Airport. This rose shows a strong influence from Huntley and nearby SO_2 sources on the SO_2 levels at the ambient monitor site. Huntley and the other nearby significant SO_2 sources are located to the southwest and south-southwest of the monitor site at a distance of 2-5 km (map, Fig. 3-7). Average SO_2 concentrations at the monitor when winds are from the southwest or south-southwest are over 3 ppb. By comparison, average SO_2 concentrations for winds from all quadrants other than southwest are near or below 2 ppb. Table 3-1 shows that when winds are from the south-southwest (195° to 225°), higher SO_2 concentrations correlate with higher wind speeds. This provides additional evidence that the impacts of the nearby sources are reflected in the monitor data. The stronger winds give the SO_2 plumes less time to disperse before they arrive at the monitor site, resulting in higher impacts.

Fig. 3-4: Wind Roses from Buffalo and Niagara Falls airports



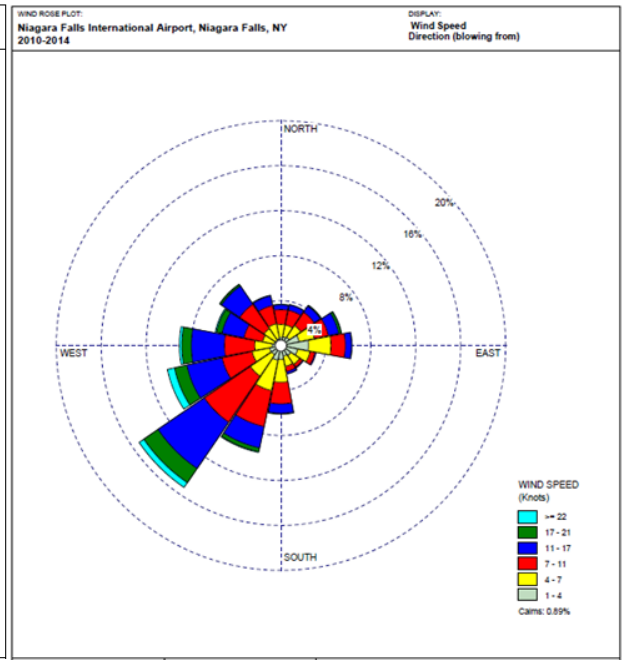
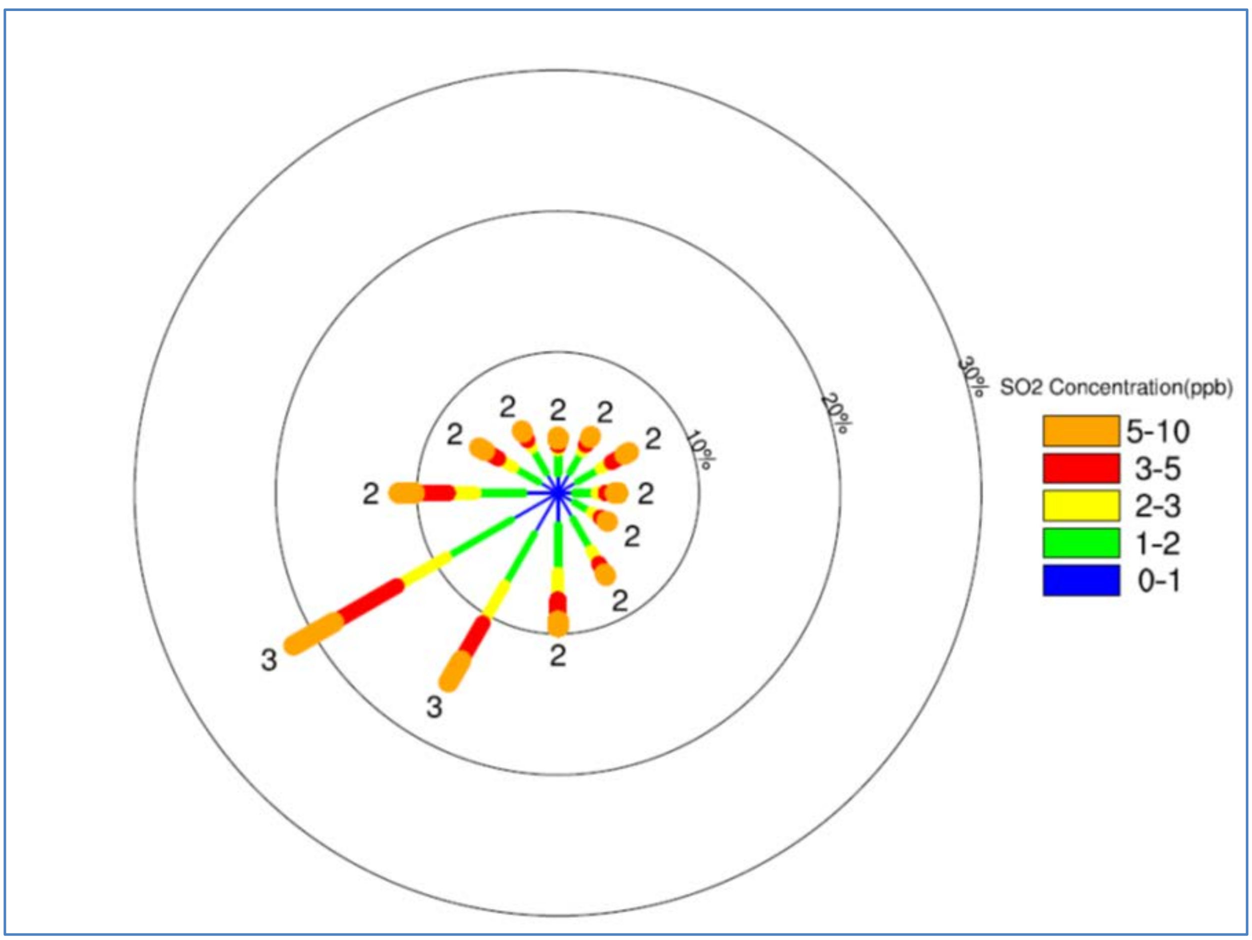


Fig. 3-5: SO_2 pollution rose for Tonawanda II monitor site (Buffalo airport winds)



Labels indicate rounded average SO_2 concentration for the indicated wind direction. Color bars indicate the frequency of the indicated concentration for that wind direction.

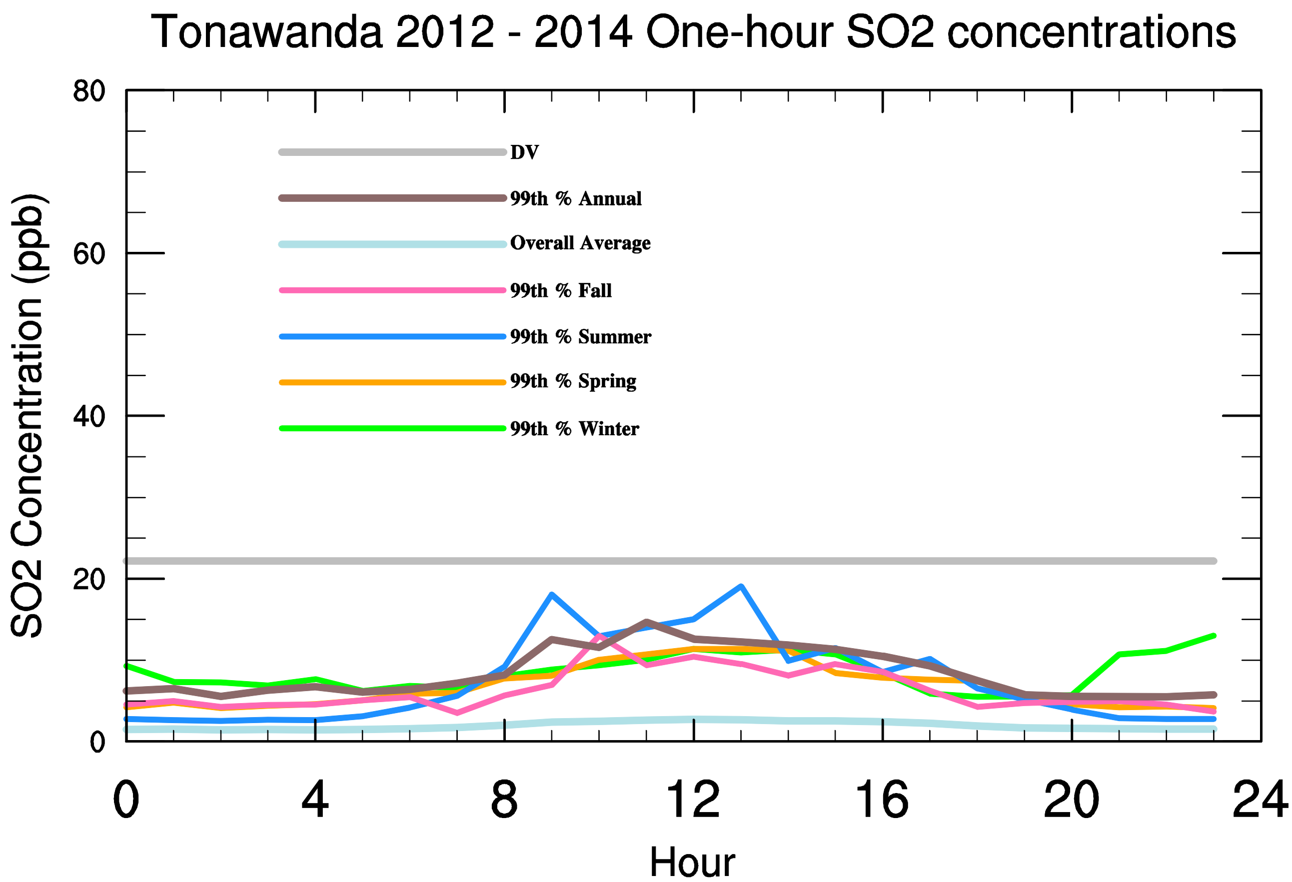
Table 3-1: Tonawanda 2012-2014 SO_2 concentration as a function of wind speed and direction

SO_2 Concentration		Wind Direction (degree)											
		0	30	60	90	120	150	180	210	240	270	300	330
Wind Speed Knots	0-1	1.76	1.35	1.77	1.65	1.67	2.47	1.48	1.8	1.53	1.59	2	1.45
	1-4	1.68	1.42	1.56	1.44	1.35	1.41	1.61	1.83	2.55	1.94	1.87	1.48
	4-7	2.38	1.54	2.22	2.12	1.94	1.8	2.12	2.76	2.96	2.24	2.16	1.68
	7-11	3.01	1.85	2.53	2.73	2.7	1.57	2.14	3.97	3.23	2.55	1.82	1.52
	11-17	2.93	1.3	1.5				2.55	4.49	2.85	2.9		

Since the monitor data already to a large degree reflect the contributions of Huntley and nearby sources to the SO_2 concentration, it was not necessary to include emissions from sources other than Huntley in the modeling. All of the available monitor data was used in calculating the seasonal/hourly background values, including the time periods when the nearby sources were impacting the monitor. As such, the modeled concentrations, which include seasonal/hourly 99th percentile background, can be expected to be highly conservative.

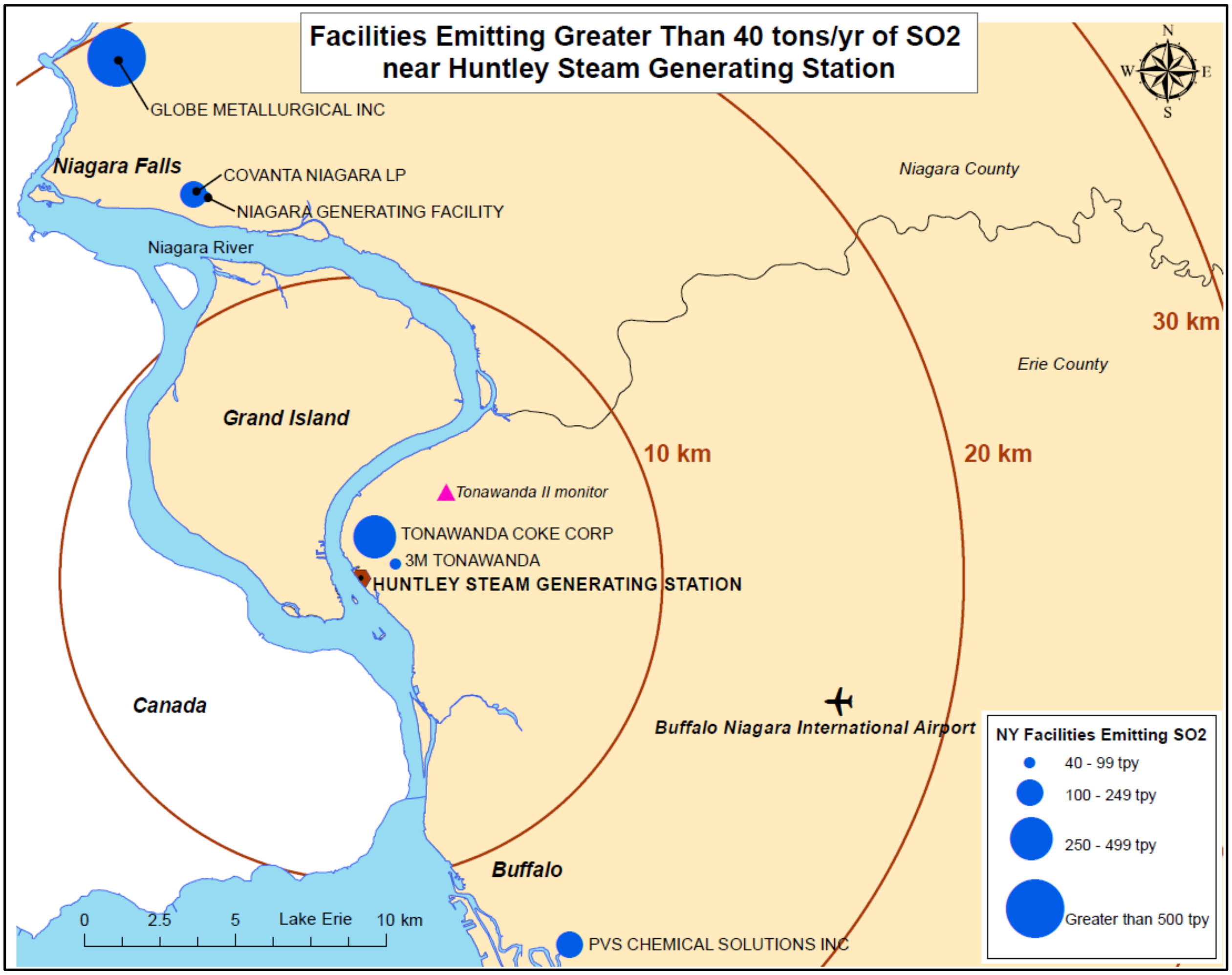
The hourly SO_2 data from the Tonawanda II monitor for the period 2012 - 2014 were processed to obtain 3-year averages of the 99th percentile concentrations by season and hour-of-day. These calculations were made according to the method specified in EPA’s 2011 Memorandum by Tyler Fox, “Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard”. Missing data were treated conservatively by using the first-highest value (rather than the second-highest) for season/hour combinations with less than 82.2% data completeness. The processed data (shown in figure 3-6) were included in the AERMOD input file in order to add background values to calculated SO_2 impacts.

Figure 3-6:



The design value, depicted here by the gray line, is the mathematically determined pollutant concentration at a particular site that is used for comparison to the National Ambient Air Quality Standard (NAAQS) in order to assure attainment. The design value may be calculated based on ambient measurements observed at a local monitor over a three year period, or on model estimates.

Figure 3-7: Map of Monitor Location relative to SO_2 Sources



4.0 MODELING RESULTS

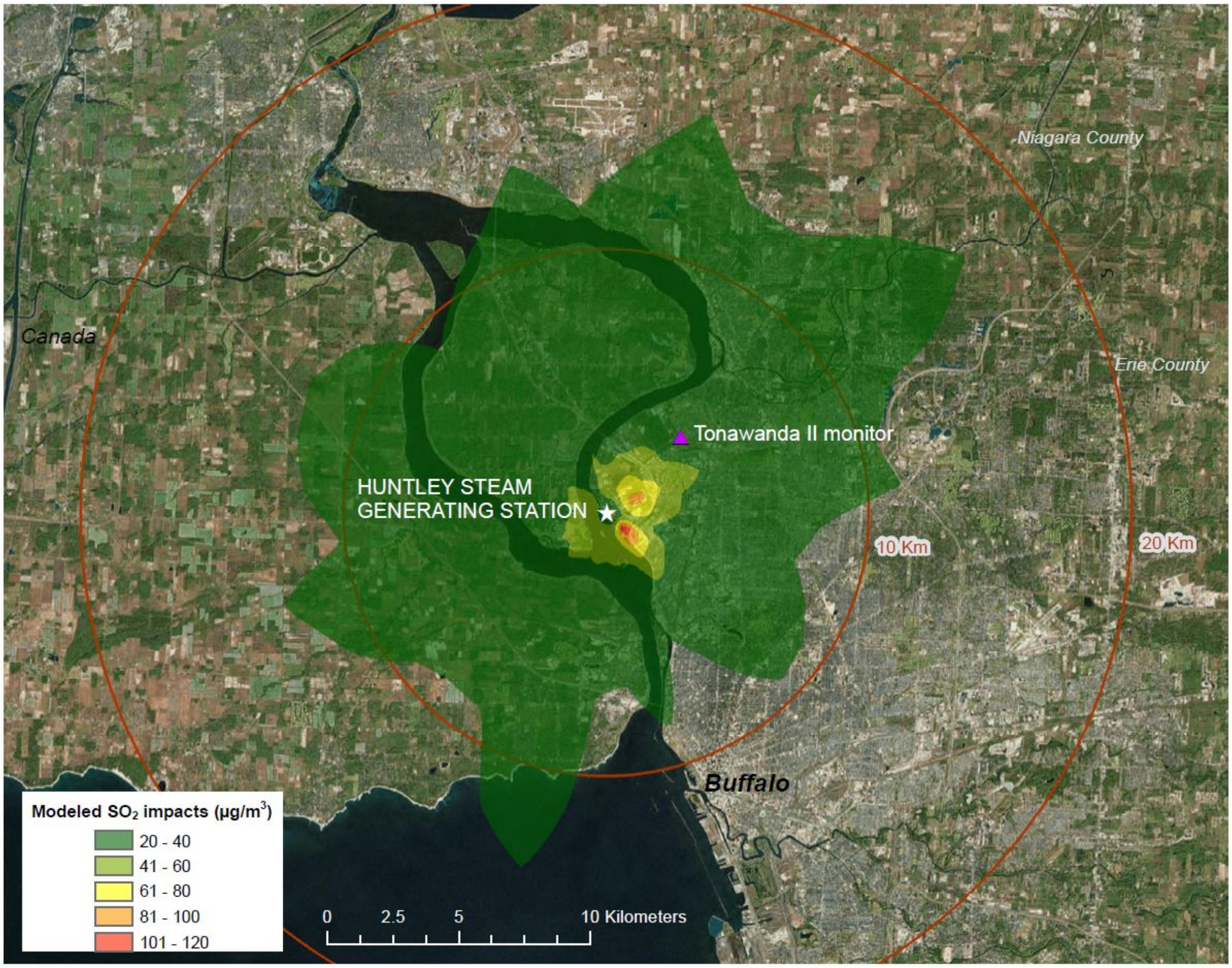
Table 4-1 shows AERMOD calculated impacts that include seasonally-based hourly background concentrations.

Table 4-1: Modeled 3-year Average Impacts

Pollutant	Averaging period	4th highest concentration, Huntley contribution	4^{th} highest concentration, including background	SO2 NAAQS (ppb)
SO_2	1 hour	44.1 ppb (115.5 μg/m^3)	54.3 ppb (142.3 μg/m^3)	75

Figure 4-1 shows the nearby impacts of the facility (not including background) on the 1-hour SO_2 design value over the 2012-2014 period in µg/m3. The maximum impact is located at the southeastern boundary of the facility's property.

Figure 4-1: Modeled Impact of Huntley on 1-hour SO_2 Design Value



5.0 CONCLUSIONS

The modeling performed demonstrates that Huntley Generating Station does not cause or contribute to a violation of the 1-hour SO_2 NAAQS. Therefore, an attainment designation for the area around the station is recommended.

APPENDIX B: Air Quality Modeling for Somerset Station

Air Quality Modeling for Somerset Station

Prepared by Impact Assessment and Meteorology Section
New York State Department of Environmental Conservation

July 2015

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this document is to present the results of the modeling performed to assess the attainments status of the area around Somerset Station in the context of the 1-hour SO_2 Data Requirements Rule (DRR).

The air dispersion modeling methodology that was followed is based on policies and procedures contained in the USEPA Guideline on Air Quality Models (40 CFR Appendix W) and the New York State Department of Environmental Conservation's (NYSDEC) Air Quality Modeling Procedures as outlined in DAR-10 / NYSDEC Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis, modified by the SO_2 NAAQS Designations Modeling Technical Assistance Document (Modeling TAD) where applicable.

The steps taken to conduct the air-dispersion modeling analyses are summarized below:

- Compile information on the parameters and characteristics for Somerset Unit 1;
- Obtain and prepare hourly emissions data for Somerset Unit 1 for the period 2011-2013;
- Develop a comprehensive receptor grid to capture the maximum offsite impacts from the main stack;
- Process five years of meteorological data (as available from a local, representative meteorological station) using the meteorological pre-processor AERMET along with AERMINUTE and AERSURFACE;
- Obtain and prepare appropriate SO_2 background data from the nearest representative monitor;
- Complete an ambient air quality modeling analysis using USEPA's regulatory dispersion model, AERMOD (version 14134);
- Summarize the results in tabular format and compare the results with the 1-hour SO_2 ambient air quality standard.

The next section provides a description of the facility and the emissions included in the modeling. Model selection and the methodology used in the modeling are described in Section 3. The modeling results are presented in Section 4, and references are provided in Section 5.

2. FACILITY DESCRIPTION

Somerset Generating Station, located in Somerset, NY, is a 675 megawatt (MW) electric generating facility. The primary fuels combusted by the main boiler are bituminous coal and petroleum coke (petcoke). The coal may contain a latex dust suppressant as supplied. Associated with the boiler is a coal handling system (unloading and conveying coal and petroleum coke, etc.), a No. 2 fuel oil system (tanks and piping) which is used for startup and flame stabilization, a limestone handling system (unloading and conveying, etc.), and other miscellaneous sources and activities related to the operation of an electric generating station. The station also includes two oil fired boilers that are used for start-up of the main boiler and one diesel-fired emergency electric generator.

2.1 FACILITY LOCATION

Somerset Generating Station is located approximately 35 miles north-northeast of Buffalo, NY and 50 miles west-northwest of Rochester, NY. The plant is on the south shore of Lake Ontario. Figure 2-1 displays an aerial image of the area around Somerset Generating Station. Universal Transverse Mercator (UTM83) coordinates of the center of the plant are approximately 694200E, 4803100N (Zone 17). The base elevation of the main stack is 292 feet (89 m). Figure 2-2 shows a closer areal look at the facility and buildings layout. Both photos were provided to us by Environmental Resources Management (ERM).

Figure 2-1 Aerial Photograph of Somerset Generating Station

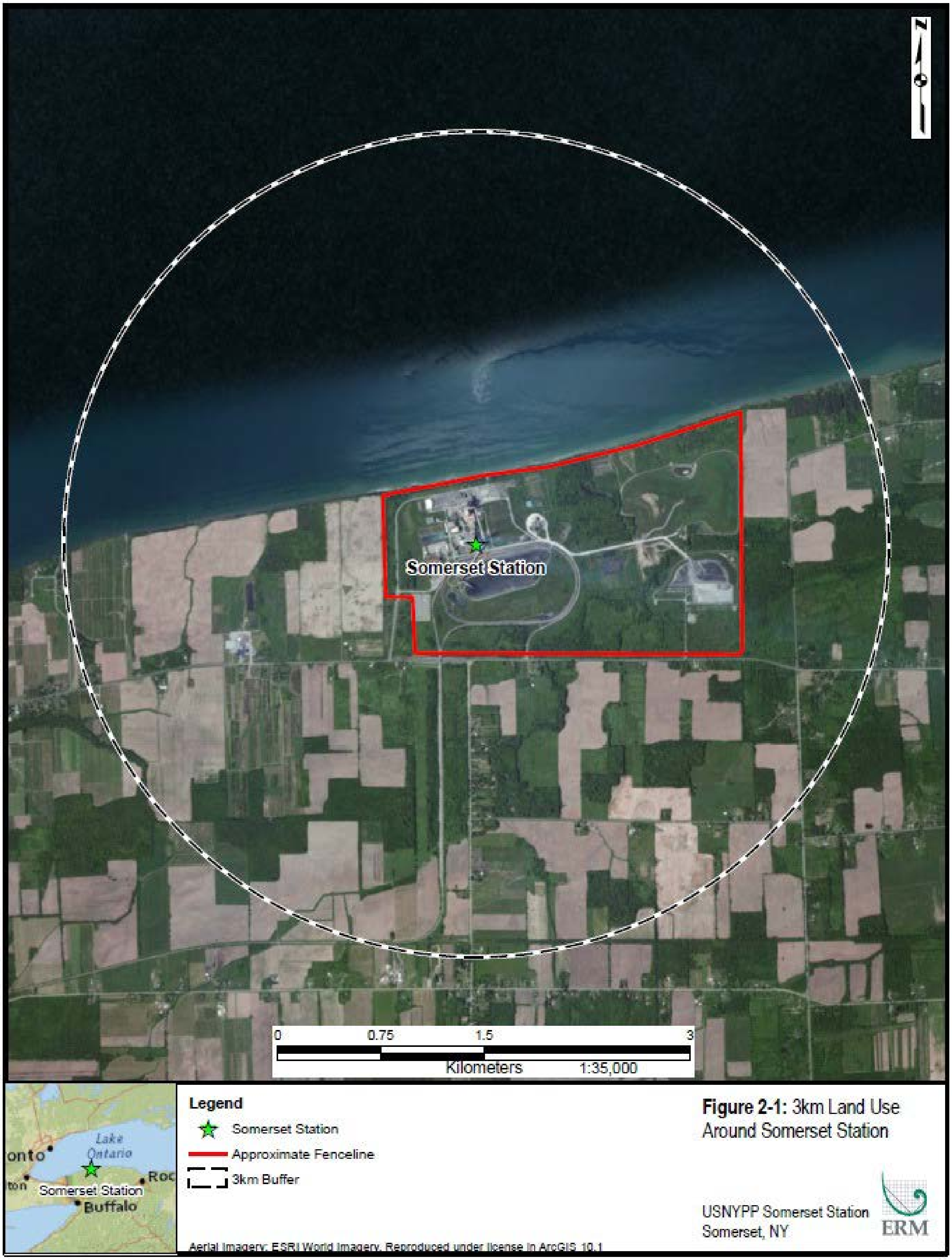
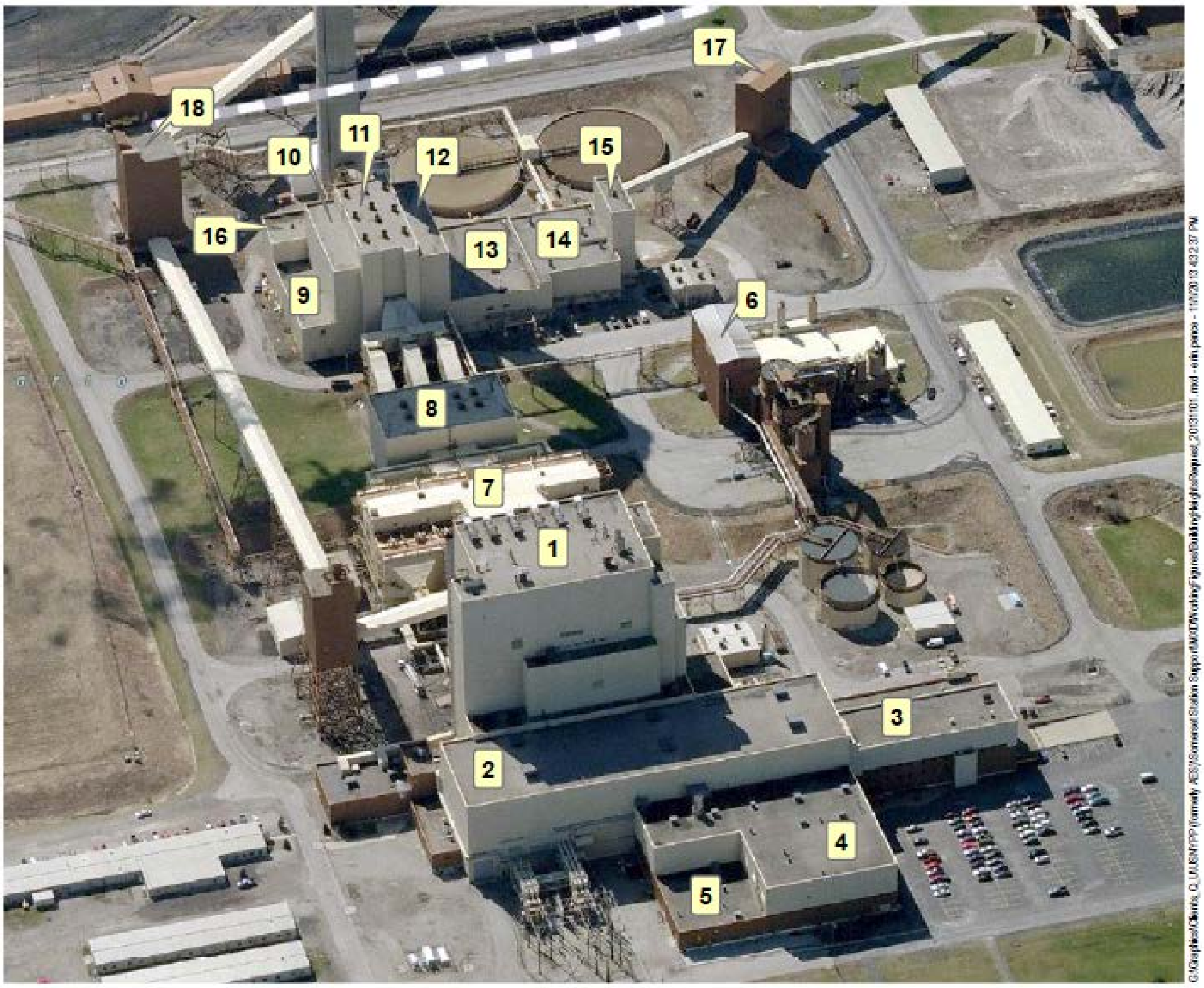


Figure 2-2 Somerset Buildings Layout - Areal View; Building key: 1-Boiler buiding; 2-Turbine building; 3-Administation building; 4-Water prep; 5-Water treatment; 6-EPRI; 7-ESP; 8-ID fan; 9-16 tiers of FDD building; 17-LCRH; 18-CCH



2.2 SOURCE PARAMETERS AND EMISSION RATES

Source parameters and emission rates for the Main boiler at the facility (Unit 1) were obtained from John Marabella, Environmental Director at the Upstate New York Power Producers. The hourly values of SO_2 emission rates, stack flow rates and stack temperature for 2011-2013 were received in three excel files and subsequently converted into units and file format appropriate for AERMOD use. For hours where the provided files contained missing data (N/A values) numbers were substituted with following criteria:

1) If all three variables (SO_2 emission rate, stack flow and temperature) were 'N/A' it was assumed the unit did not operate and all three were replaced by zeros.
2) If any of the three variables was measured (not 'N/A') it was assumed that only the CEM instrument was off and all three were replaced with the most conservative (maximum) value measured over the three years (SO_2 emission of 6010.46 lb/hr and corresponding flow rate of 108679.2 kscfh and T=123.3F

For quality assessment purposes, the hourly emissions data were reviewed and compared to Clean Air Market Data (CAMD). The Somerset Unit 1 stack height is 186.84 m and the stack exit diameter is 8.129 m.

There are four additional sources of SO_2 emissions at Somerset: two oil-fired auxiliary boilers and one diesel-fueled emergency engine. In accordance with the facility's Title V permit, the auxiliary boilers do not operate when the main boiler is online and therefore can be excluded from cumulative modeling with the Unit 1 boiler. The emergency generator testing can also be excluded from the modeling based on USEPA guidance provided in the 1 March 2011 memorandum "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard" for intermittent sources such as emergency generators. As noted in the clarification letter this interim guidance can be extended to 1-hour SO_2 applications. Therefore, both auxiliary boilers and emergency generators were excluded from this modeling.

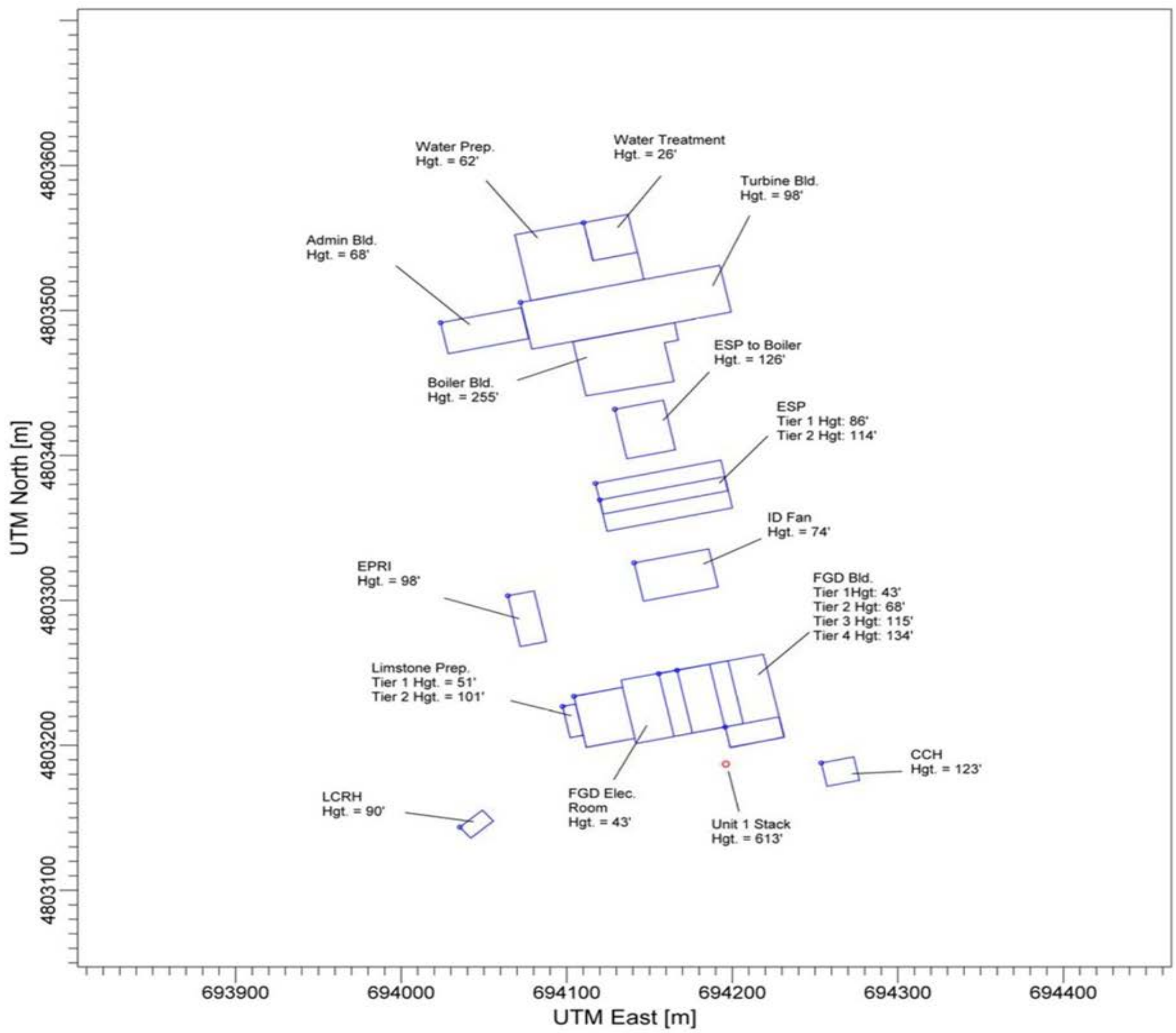
2.3 BUILDINGS and FENCELINE

Building information was obtained from a BPIP-Prime input file received from John Marabella. The building locations were verified based on Google Earth image of the facility as was the fenceline. BPIP-Prime was re-run to prepare the building files for AERMOD run. Structures included in Somerset BPIP-Prime run and GEP analysis are shown in Figure 2-3.

Figure 2-3 Structures Included in Somerset GEP Analysis

PROJECT TITLE:

Structures Included in Somerset GEP Analysis



COMMENTS:	SOURCES: **1**	COMPANY NAME: **ERM**	
	RECEPTORS: **14130**	MODELER: **R. Hamel**	ERM
		SCALE: 1:4,153 0 ▬ 0.1 km	
		DATE: **1/12/2014**	PROJECT NO.:

3.0 AIR DISPERSION MODELING ANALYSIS

The Modeling TAD describes two types of modeling: using the allowable emission rate along with 5 years of meteorological data and GEP stack height, or, as a refinement, 3 years of actual hourly emissions data along with 3 years of concurrent meteorological data along with the true stack height regardless of GEP. In this modeling analysis, AERMOD version 14134 was run for the following two scenarios:

- Three years of hourly emissions data obtained from the facility (as described in Section 2.2) were matched with 3 years of concurrent meteorological data from Niagara Falls/Buffalo airports and modeled with the actual stack height (186.84m).
- A fixed emission rate based on a permit limit to comply with the Mercury and Air Toxics Standards (MATS) was modeled with 5 years of meteorological data and the GEP stack height of 170.36m. Modeling parameters and emission rates for Unit 1 stack were obtained from 26 April 2011 effective Title V permit (9-2938-00003/00002). This included the SO_2 emission rate of 1,256 lb/hr, stack exhaust temperature of 405.15K and exit velocity 16.11m/s.

3.1 METEOROLOGICAL DATA

Meteorological data for AERMOD were processed using the AERMET (version 14134) meteorological pre-processor along with AERMINUTE (version 14337) and AERSURFACE (version 13016). Five years of meteorological data (2010-2014) from the Niagara Falls International Airport were used to obtain the surface data, and upper air data from Buffalo-Niagara International Airport were used to obtain the required morning sounding profiles. After 5 years of data were processed, both surface and upper air meteorological files were truncated to dates that fit the hourly emissions records (1/1/2011 to 12/31/2013).

Prior to processing the meteorological data with AERMET, the land-use within 1 km of the meteorological tower at Niagara Falls International Airport was analyzed using the AERSURFACE pre-processor. AERSURFACE uses land cover data from the National Land Cover Data (NLCD) 1992 database to determine three key surface parameters needed for modeling: surface roughness, albedo and the Bowen ratio. For this modeling, the 1-km radius circular area centered at the meteorological station site was divided into 12 equal 30-degree sectors. For the Bowen ratio calculations, the land use values can be linked to three categories of surface moisture corresponding to average, wet, and dry conditions – depending on the site and meteorological data period. For this site and data period, the “average” surface moisture option was applied.

The AERSURFACE results are used as input into the AERMET meteorological data processor. Additionally, 1-minute ASOS wind data, collected at the Niagara Falls meteorological tower, were processed using the AERMINUTE pre-processor for AERMET. Figure 3-1 presents a wind rose for the 3 years of meteorological data processed for the modeling analysis. Figure 3-2 shows the relative locations of Somerset Generating Station, the meteorological data collection site, and the ambient background monitor (see Section 3.3) used in the modeling.

Figure 3-1 Wind rose for Niagara Falls International Airport (2011-2013)

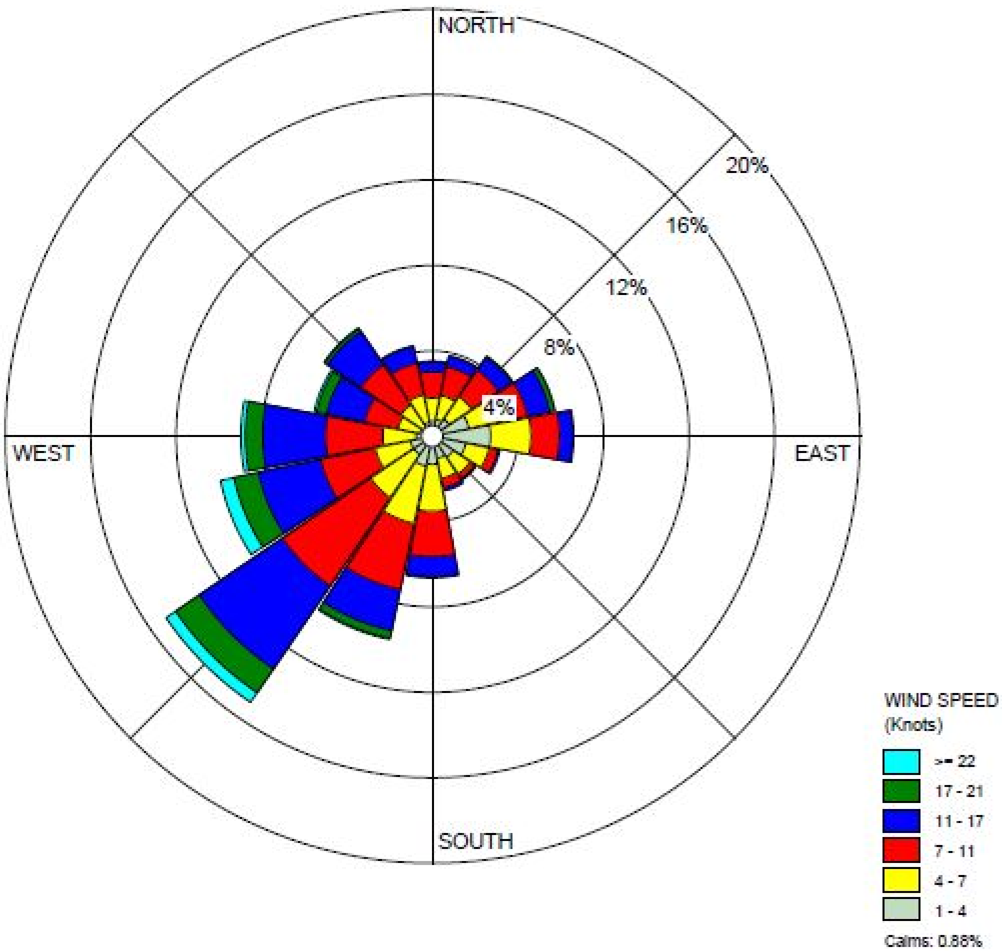


Figure 3-2 Relative Locations of Somerset Generating Station, Niagara Falls International Airport, and SO_2 Ambient Monitor

3.2 RECEPTOR GRID

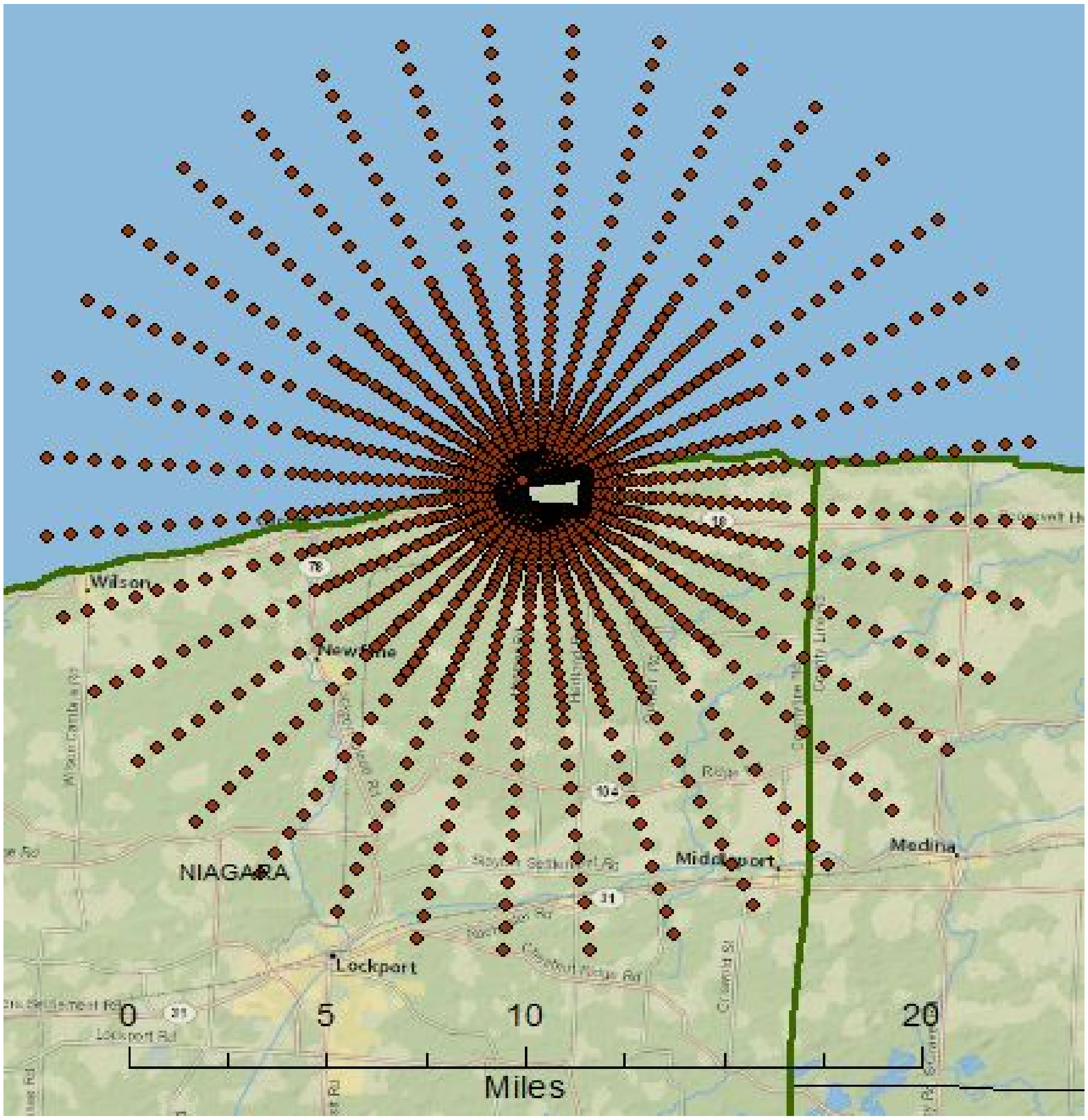
A comprehensive polar receptor grid, extending to 20 km from the Somerset Generating Station was used in the AERMOD modeling to assess maximum ground-level SO_2 concentrations. The receptor grid consisted of the following receptor spacing:

- 100 m spacing extending from the source to 2 km;
- 250 m spacing extending from 2 km to 5 km;
- 500 m spacing extending from 5 km to 10 km; and
- 1000 m spacing extending from 10 km to 20 km

Receptors were placed on 36 radials 10 degrees apart and the grid was centered on the Unit1 emission source. Receptors within the Somerset fenceline were eliminated and special receptors were placed along the fence line at every 50 m. This grid contained a total of 1723 receptors.

The base elevation and hill scale parameters for all receptors were assigned using AERMAP (version 11103) based on data obtained from the National Elevation Dataset website. The receptor grid used in modeling is shown in Figure 3-3.

Figure 3-3 Receptors used in the Somerset Air Dispersion Modeling analysis



3.3 AMBIENT BACKGROUND DATA

The hourly SO_2 data from the Niagara Falls monitor for the period 2010 – 2012 was processed to obtain 3-year averages of the 99th percentile concentrations by season and hour-of-day following EPA's 2011 Memorandum by Tyler Fox "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard". The processed data (shown in Figure 3-4) were included in AERMOD in order to add background values to calculated SO_2 impacts. Note that the Niagara Falls monitor discontinued measuring SO_2 beyond 2012 making this period the most recent SO_2 background data for our modeling analysis. The more urban setting of the monitor as compared to the facility as well as the data being a year older when trends have been coming down for SO_2 makes this a conservative choice of a representative background data.

Figure 3-4 Niagara Falls One-hour SO2 concentrations for 2010-2012 period. The design value, depicted here by the gray line (DV), is the mathematically determined pollutant concentration at a particular site that is used for comparison to the National Ambient Air Quality Standard (NAAQS) in order to assure attainment. The design value may be calculated based on ambient measurements observed at a local monitor over a three year period, or on model estimates.

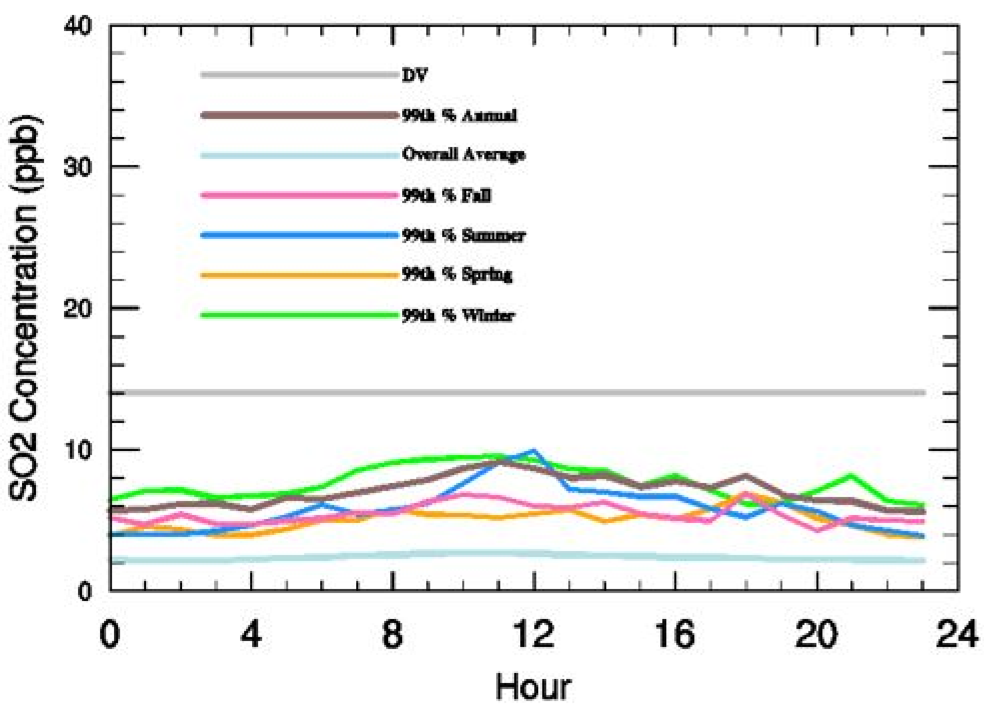
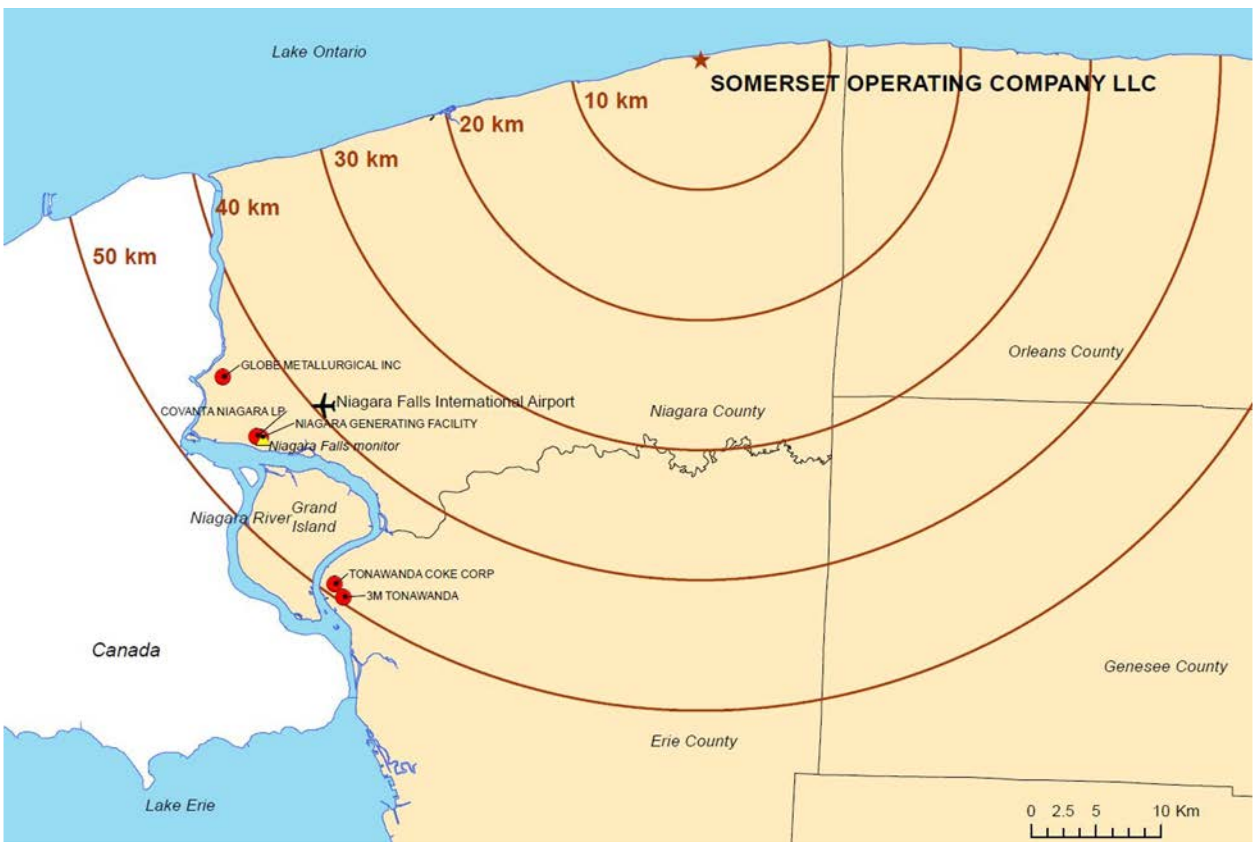


Figure 3-5 shows a map with relative locations of Somerset Generating Station, the Niagara Falls SO_2 monitor as well as any Title V facilities emitting more than 40 tons/year of SO_2 within a 50 km radius of Somerset Station. We determined that it was not necessary to include any nearby sources in our modeling analysis since the nearest facility emitting greater than 40 tons/year is located more than 40 km from Somerset Station. In addition, the background monitor selected is conservative and reflects the contributions of the nearby sources to the ambient SO_2 concentrations.

Figure 3-5 Niagara Falls Monitor Location Relative to Sources Emitting more than 40 tons/yr of SO2 within 50 km radius of Somerset Generating Station.



4.0 MODELING RESULTS

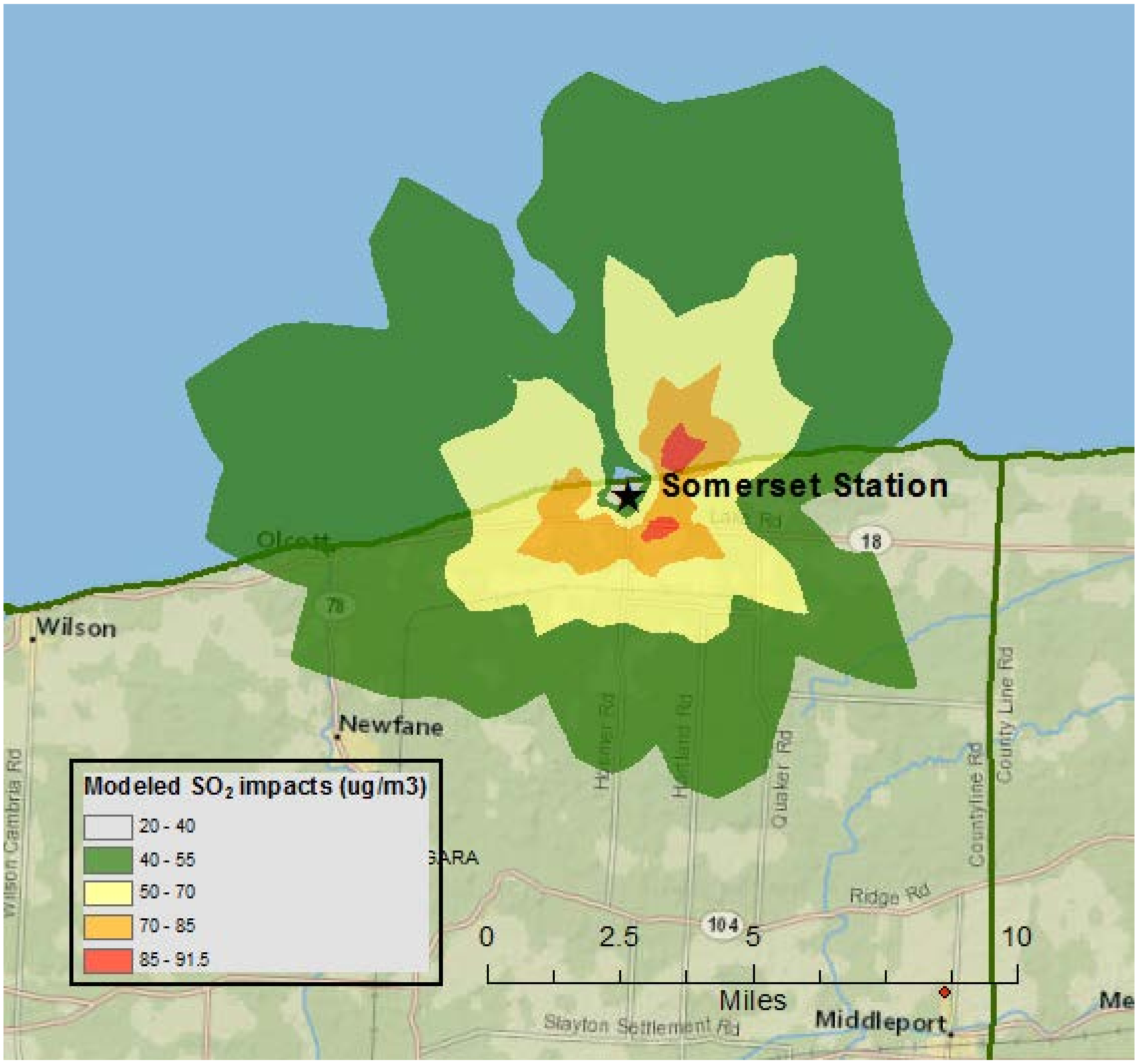
Table 4-1 shows AERMOD calculated impacts for the scenarios including hourly emission values and seasonally-based hourly background concentrations. These results were calculated with the actual stack height and downwash option in AERMOD.

Table 4-1 Modeled 3-year Average Impacts

Pollutant	Averaging period	4th highest concentration, Somerset contribution	4th highest concentration, including background	SO_2 NAAQS
SO_2	1 hour	35.0 ppb (91.9 μg/m^3)	42.6 ppb (111.7 μg/m^3)	75 ppb (196 μg/m^3)

Figure 4-1 shows the nearby impacts of the facility (not including background) on the 1-hour SO_2 design value over the 2011-2013 period in μg/m3. The highest impacts occur just northeast and southeast of the facility's property.

Figure 4-1 Modeled Impact of Somerset Station 1-hour SO_2 over 2011-2013.



AERMOD was also applied with single emission value (based on the MATS emission limit), GEP stack height and 5 years of meteorological data to determine the future potential maximum impacts from the Somerset Station. The resulting maximum model-predicted 1-hour SO_2 impact of Somerset Unit 1 was 34.2 µg/m^3 (13.0 ppb). Even with the ambient background concentration added to the Unit 1 impacts, the total concentrations are well under 50% of the NAAQS.

5.0 CONCLUSIONS

The modeling performed demonstrates that Somerset Generating Station does not cause or contribute to a violation of the 1-hour SO_2 NAAQS. Therefore, an attainment designation for the area around the station is recommended.

6.0 REFERENCES

New York State Department of Environmental Conservation: DAR -10 / NYSDEC Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis, May, 2006

U.S. Environmental Protection Agency: (USEPA 2011) USEPA memo entitled “Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard”, USEPA, Office of Air Quality Planning and Standards, Raleigh, NC. 1 March 2011.

U.S. Environmental Protection Agency: (USEPA 2009) AERMOD Implementation Guide, AERMOD Implementation Workgroup. 19 March 2009.

U.S. Environmental Protection Agency: (USEPA 2005) Guideline on Air Quality Models (GAQM, 40CFR Appendix W), November, 2005