

## Enclosure

### New Hampshire Area Designations For the 2010 SO<sub>2</sub> Primary National Ambient Air Quality Standard

#### Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), EPA must initially designate areas as either “unclassifiable”, “attainment”, or “nonattainment” for the 2010 1-hour sulfur dioxide (SO<sub>2</sub>) primary national ambient air quality standard (NAAQS). The CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to poor air quality in a nearby area that does not meet the NAAQS. Table 1 below identifies the portions of counties in New Hampshire in the Central New Hampshire area that EPA intends to designate “nonattainment” based on monitored violations.

**Table 1. Nonattainment Designation for New Hampshire**

Area	New Hampshire Recommended Designation of Areas/Counties	EPA’s Intended Designation of Areas/Counties
Central New Hampshire Hillsborough County (partial) Goffstown Merrimack County (partial) Allenstown Bow Chichester Concord Dunbarton Epsom Hooksett Loudon Pembroke Pittsfield Rockingham County (partial) Candia Deerfield Northwood	Nonattainment  Nonattainment          Nonattainment	Nonattainment  Nonattainment          Nonattainment

#### Background

On June 2, 2010, EPA revised the primary SO<sub>2</sub> NAAQS (75 FR 35520, June 22, 2010) by establishing a new 1-hour standard at a level of 75 parts per billion (ppb) which is attained when

the 3-year average of the 99<sup>th</sup> percentile of the daily maximum 1-hour average concentration at each monitor in an area does not exceed 75 ppb. EPA has determined that this is the level necessary to provide protection of public health with an adequate margin of safety, especially for children, the elderly and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO<sub>2</sub>. The Agency is revoking the two prior primary standards of 140 ppb evaluated over 24-hours, and 30 ppb evaluated over an entire year because the standards will not add additional public health protection given a 1-hour standard at 75 ppb. Accordingly, EPA is not designating areas in this process on the basis of either of these two prior primary standards. Similarly, the secondary standard for SO<sub>2</sub> has not been revised, so EPA is not designating areas in this process on the basis of the secondary standard.

### **EPA's SO<sub>2</sub> Designation Approach**

Section 107(d) of the CAA requires that not later than 1 year after promulgation of a new or revised NAAQS, state Governors must submit their recommendations for designations and boundaries to EPA. This deadline was in June, 2011. Section 107(d) also requires EPA to provide a notification to states of no less than 120-days prior to promulgating an initial area designation that is a modification of a state's recommendation. EPA has reviewed the State's recommendations and has notified the State Commissioner through letter signed by the Regional Administrator of any intended modifications. If a State or Tribe did not submit designation recommendations, EPA will promulgate the designations that it deems appropriate. If a state or Tribe disagrees with EPA's intended area designations, they have an opportunity to demonstrate why any proposed modification is inappropriate.

Designations guidance was issued by EPA through a March 24, 2011, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. This memorandum identifies factors EPA intends to evaluate in determining boundaries for areas designated nonattainment. These 5 factors include: 1) Air quality data; 2) Emissions and emissions-related data (location of sources and potential contribution to ambient SO<sub>2</sub> concentrations); 3) Meteorology (weather/transport patterns); 4) Geography/topography (mountain ranges or other air basin boundaries); and 5) Jurisdictional boundaries (e.g., counties, air districts, pre-existing nonattainment areas, reservations, metropolitan planning organization), among any other information deemed relevant to establishing appropriate area designations and boundaries for the 1-hour SO<sub>2</sub> NAAQS.

The March 24, 2011, memo recommended that area boundaries be defaulted to the county boundary unless additional provided information justifies a larger or smaller boundary than that of the county. EPA believes it is appropriate to evaluate each potential area on a case-by-case basis, and to recognize that area-specific analyses conducted by states, tribes and/or EPA may support a different boundary than a default county boundary.

In this TSD, EPA discusses its review and technical analysis of the recommendations submitted by the State for designations of the 1-hour SO<sub>2</sub> standard and any modifications from these recommendations.

#### ***Definition of important terms used in this document:***

1) **Designated “nonattainment” area** – an area which EPA has determined, based on a state recommendation and/or on the technical analysis included in this document, has violated the

2010 SO<sub>2</sub> NAAQS, based on the most recent three years of air quality monitoring data, or contributes to a violation in a nearby area.

2) **Recommended nonattainment area** – an area a State or Tribe has recommended to EPA be designated as nonattainment.

3) **Violating monitor** – an ambient air monitor meeting all methods, quality assurance and citing criteria and requirements whose valid design value exceeds 75 ppb, as described in Appendix T of 40 CFR part 50.

4) **2010 SO<sub>2</sub> NAAQS - 75 ppb**, national ambient air quality standard for SO<sub>2</sub> promulgated in 2010. Based on the 3-year average of the 99<sup>th</sup> percentile of the annual distribution of daily maximum 1-hour average concentrations

5) **Design Value** – a statistic that describes the air quality status of a given area relative to the level of the NAAQS.

## Nonattainment Designations

### Technical analysis for Central New Hampshire Nonattainment Area

#### Introduction

This technical analysis for the Central New Hampshire nonattainment area analyzes the county with a monitor that violates the 2010 SO<sub>2</sub> NAAQS based on 2009-2011 data, and evaluates the risk of nearby cities and towns in different counties being above the standard. EPA has evaluated this area based on the weight of evidence of the factors recommended in the March 24, 2011 issued EPA guidance.

Figure 1 is a map of New Hampshire showing the locations of air quality monitors in the state with county boundaries. Figure 2 shows the cities and towns included in the Central New Hampshire nonattainment area.

In July 2011, Governor Lynch recommended that certain partial counties be designated as “nonattainment” for the 2010 SO<sub>2</sub> NAAQS based on monitored air quality data from 2008-2010 and through an analysis that included air quality data, emissions data, geography and topography, meteorology and transport patterns, and jurisdictional boundaries.

Based on EPA's technical analysis described below, EPA is intending to designate 14 cities and towns in 3 different counties in New Hampshire as nonattainment for the 2010 SO<sub>2</sub> NAAQS as part of the Central New Hampshire nonattainment area, based upon currently available information. These cities and towns are listed above in Table 1.

#### Detailed Assessment

##### *Air Quality Data*

This factor considers the SO<sub>2</sub> air quality monitoring data, including the design values (in ppb) calculated for all air quality monitors in the Central New Hampshire area and the surrounding area based on data for the 2009-2011 period.

Governor Lynch's recommendation was based on data from Federal Reference Method monitors located in the state. See letter from Governor Lynch to Curt Spalding, EPA Region 1 Administrator, dated July 6, 2011.

The 2011 SO<sub>2</sub> NAAQS design values for counties in the Central New Hampshire and surrounding area are shown in Table 2.

**Table 2. Air Quality Data in New Hampshire**

County	Monitor Name	Monitor Air Quality System ID	Monitor Location	SO <sub>2</sub> Design Value, 2009 - 2011 (ppb)
<b>Merrimack</b>	<b>Pembroke Exchange St</b>	<b>330131006</b>	<b>Pembroke</b>	<b>221</b>
Hillsborough	Manchester	330110020	Manchester	56
Rockingham	Portsmouth	330150014	Portsmouth	41

Monitor in Bold has the highest 2009-2011 design value in the state.

Merrimack County shows a violation of the 2010 SO<sub>2</sub> NAAQS. Therefore, some area in this county and possibly additional areas in surrounding counties must be designated nonattainment. The absence of a violating monitor alone is not a sufficient reason to eliminate nearby counties as candidates for inclusion in a nonattainment status. Each area has been evaluated based on the weight of evidence of the five factors and other relevant information.

The largest emitter of SO<sub>2</sub> emissions in New Hampshire is within a few miles of the Pembroke Exchange St monitor. This emitter is identified as Public Service of New Hampshire's Merrimack Station in Bow, New Hampshire. Wind frequency diagrams based on meteorological data gathered at Merrimack Station during 1994 and wind frequency data from the years 2000-2004 obtained at a nearby airport (Concord) shows the prevailing wind direction is from the northwest. Merrimack Station is northwest of the Pembroke Exchange St monitor.

***Emissions and Emissions-Related Data***

Evidence of SO<sub>2</sub> emissions sources in the vicinity of a violating monitor is an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county level emission data for SO<sub>2</sub> and any growth in SO<sub>2</sub> emitting activities since the date represented by the emissions data.

## Emissions

EPA recognizes that there may be important new information on emissions levels for the period after 2008, and would consider more recent information if available. New Hampshire did not provide updated emissions information, therefore EPA relied on the 2008 National Emissions Inventory (NEI) emissions data (NEI08V15).

Table 3 shows total emissions of SO<sub>2</sub> (given in tons per year) for violating and potentially contributing counties in and around the Central New Hampshire nonattainment area, including sources emitting greater than 100 tons per year of SO<sub>2</sub> according to the 2008 NEI. The counties that are partially included in the Central New Hampshire nonattainment area for the 2010 SO<sub>2</sub> NAAQS are shown in **bold**.

**Table 3: Sources with SO<sub>2</sub> greater than 100 tons in 2008**

<b>County</b>	<b>City/Town</b>	<b>Facility Name</b>	<b>SO<sub>2</sub> Emissions (2008 in tpy)</b>	<b>Total County SO<sub>2</sub> Emissions (tons per year)</b>
<b>Merrimack</b>	Bow	PSNH - Merrimack Station	31,307.4	99%
<b>Rockingham</b>	Portsmouth	PSNH - Schiller Station	4,988.4	88%
<b>Rockingham</b>	Newington	PSNH - Newington Station	590.0	10%
Strafford	Rochester	Turnkey Recycling & Environmental Enterp	150.2	67%
<b>Hillsborough</b>	Bennington	Monadnock Paper Mills, Inc	132.9	58%

## Emissions Controls

The emissions data used by EPA in this technical analysis and provided in Table 3 represent emissions levels taking into account any control strategies implemented on the listed stationary sources up to and including the year 2008. EPA is aware SO<sub>2</sub> controls have been installed at Merrimack Station. The facility is required by state statute to have the wet scrubber operational no later than July 1, 2013. Once fully operational, the wet scrubber should significantly reduce SO<sub>2</sub> emissions from Merrimack Station.

### *Meteorology (weather/transport patterns)*

Evidence of source-receptor relationships between specific emissions sources and high SO<sub>2</sub> values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered recent hourly or sub-hourly meteorological data from the site nearest to the violating monitor to determine which wind vectors were associated with 1-hour SO<sub>2</sub> exceedances. For the proposed nonattainment area, the meteorological data used in this analysis were based on data at the Pembroke monitor. The monitor is approximately 0.75 miles southeast of PSNH-Merrimack Station.

Figure 3 shows a map of the monitor location with meteorological data and large SO<sub>2</sub> sources, in the area. Figure 4 shows the wind direction associated with exceedances at the Pembroke

monitor during 2009-2011. Most of the exceedances occur when the wind is from the Northwest. As shown in Figure 3, a wind from out of the Northwest would carry the plume from PSNH-Merrimack over the Pembroke monitor.

On July 6, 2011, New Hampshire submitted its analysis of wind patterns depicting SO<sub>2</sub> emissions from Merrimack Station having a large effect on the violating monitor. The state submitted two wind roses, one using meteorological data gathered at Merrimack Station in 1994 and five years (2000-2004) worth of meteorological data from a nearby airport (Concord Municipal). Both wind roses show the wind is predominantly from the Northwest. The Pembroke monitor is southeast of Merrimack Station.

EPA compared the wind roses submitted by New Hampshire and to meteorological data from the Concord, NH Airport for the period from 2006 to 2011. The distribution of wind directions is consistent with that shown in the wind rose provided by New Hampshire.

The wind roses also demonstrate the low probability that emissions from other sources with SO<sub>2</sub> emissions above 100 tpy will contribute to the Central New Hampshire nonattainment area. As shown in Figure 3, three of these sources are east of the nonattainment area and at least 10 miles away. The other source is 20 miles west of the nonattainment area. Given the dominant wind direction is from the northeast, the emissions from the three facilities east of the nonattainment area will have more effect on the Portsmouth monitor than the Pembroke monitor and the Portsmouth monitor's design value is less than the standard.

#### ***Geography/topography (mountain ranges or other air basin boundaries)***

Merrimack Station and the Pembroke monitor are located in a river valley surrounded by rolling hills which reach 1000 feet above sea level. These hills are approximately 10 miles from Merrimack Station. Coupled with stable plume heights of 800 and 1000 feet from the two coal-fired units at Merrimack Station, New Hampshire used the terrain data to determine the boundaries for Central New Hampshire nonattainment area. EPA concurs with the state's findings.

#### ***Jurisdictional boundaries***

As explained above, the Central New Hampshire nonattainment area is based on city and town boundaries instead of entire counties and does not limit the nonattainment area to Merrimack County where the violating monitor is located.

#### ***Other Relevant Information***

EPA did not receive additional information relevant to establishing a nonattainment area boundary for this area.

## **Conclusion**

After considering the factors described above, EPA intends to find that it is appropriate to include the cities and towns in Table 1 in the Central New Hampshire Area as the nonattainment area for the 2010 SO<sub>2</sub> NAAQS.

The air quality monitor in Pembroke in the Central New Hampshire Area shows a violation of the 2010 SO<sub>2</sub> NAAQS, based on 2009-2011 air quality data. Based on the consideration of all the relevant and available information, as described above, EPA believes that the boundaries described herein encompass the entire area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the 2010 SO<sub>2</sub> NAAQS.

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Figure 1

# New Hampshire

## SO2 Monitors (2008-2010)

- SO2 Monitor Exceeding 1-Hour NAAQS
- SO2 Monitor Meeting the 1-Hour NAAQS

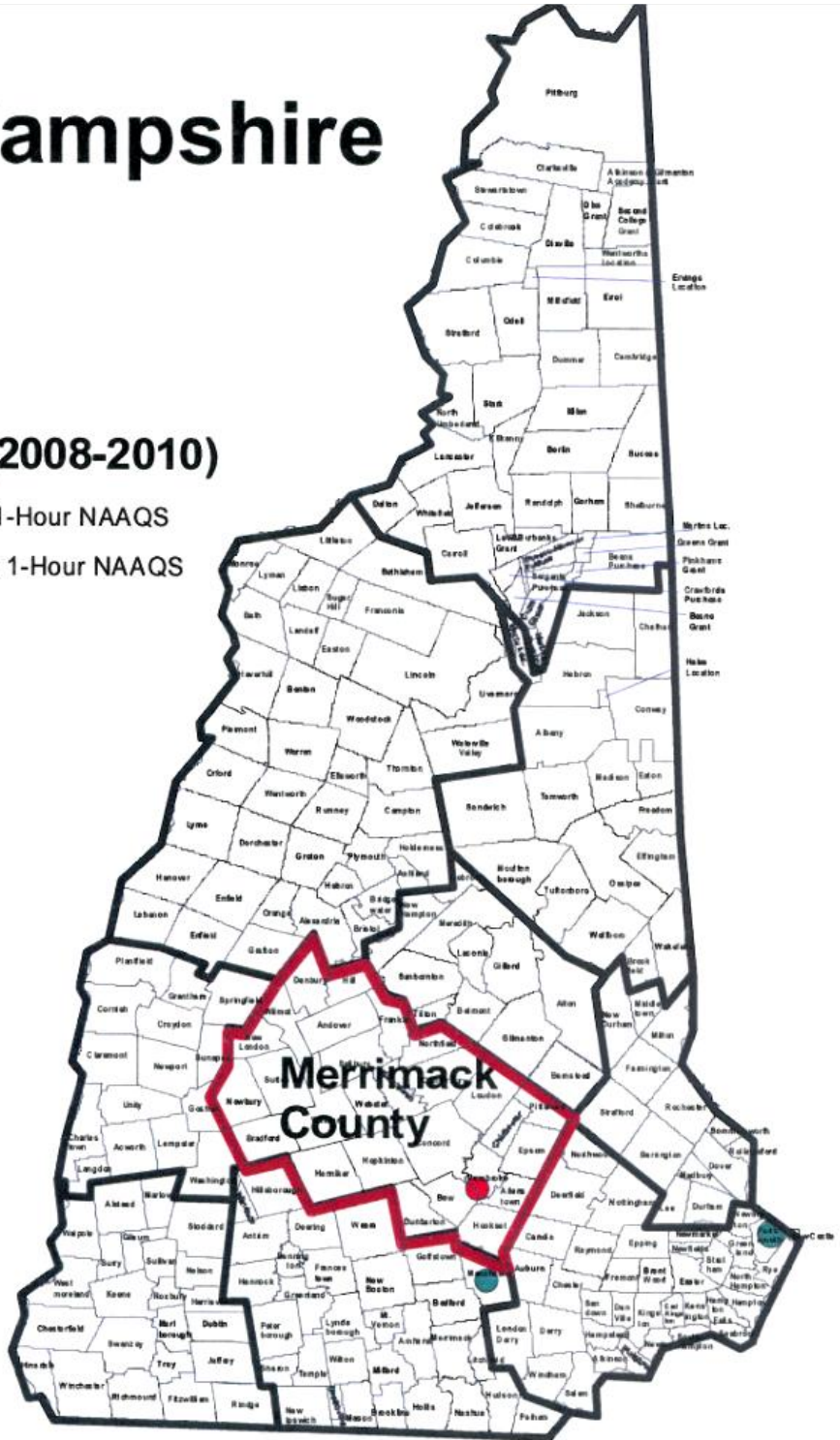




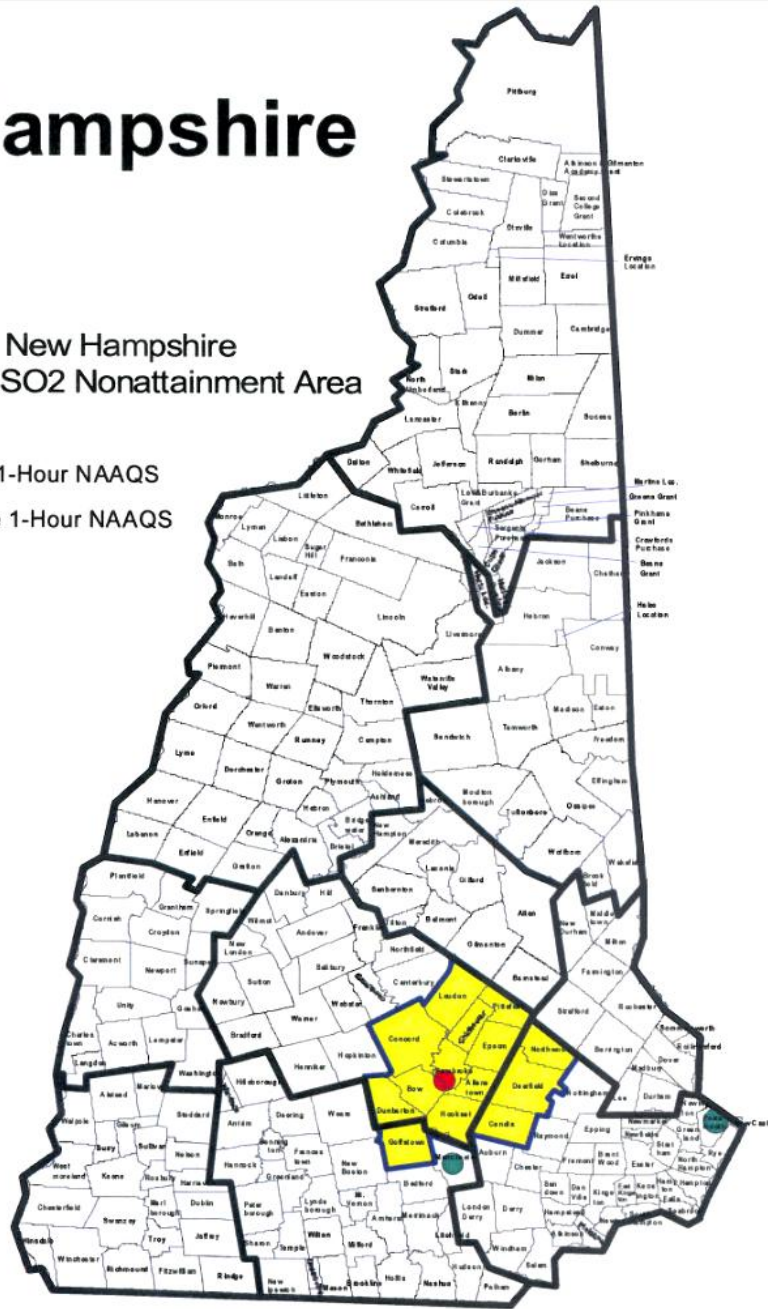
Figure 2

# New Hampshire

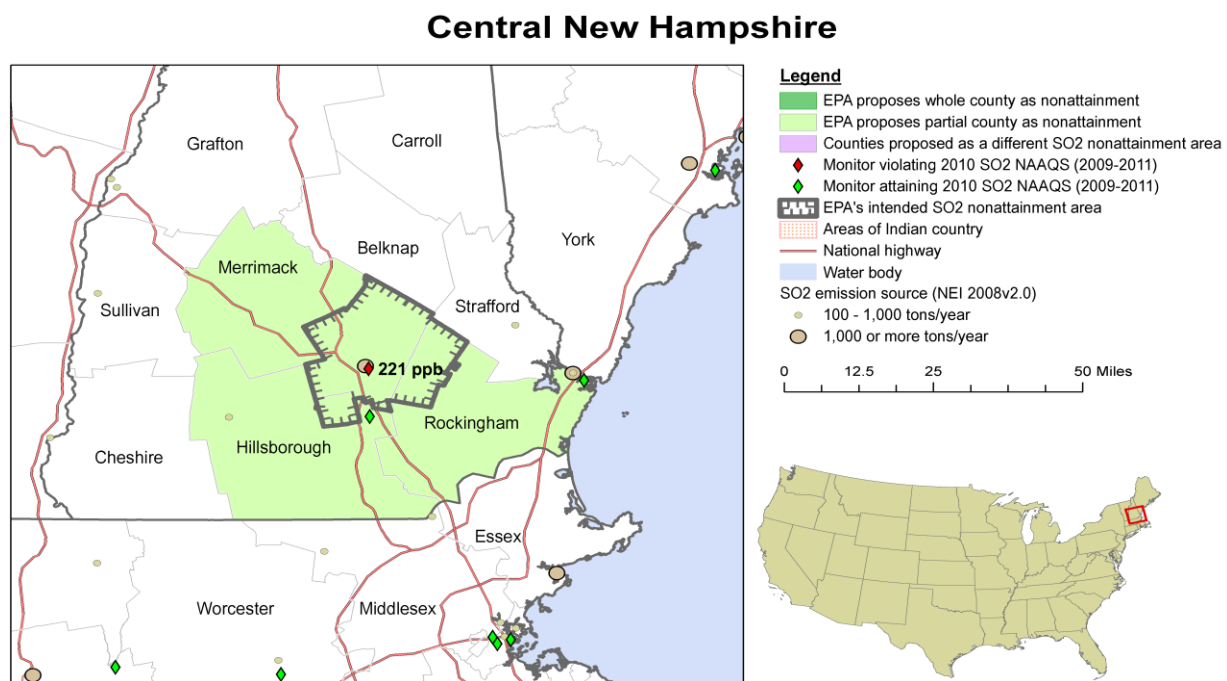


Central New Hampshire  
1-Hour SO<sub>2</sub> Nonattainment Area

- SO<sub>2</sub> Monitor Exceeding 1-Hour NAAQS
- SO<sub>2</sub> Monitor Meeting the 1-Hour NAAQS

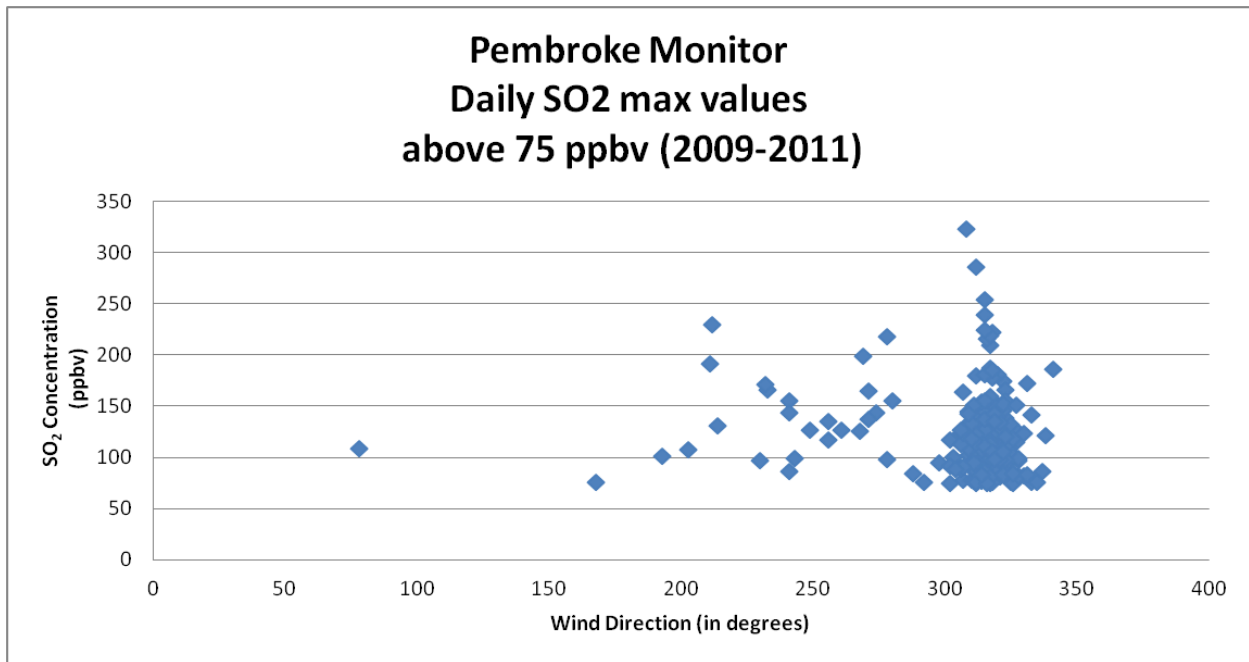


**Figure 3:**  
**Map of the Central New Hampshire nonattainment area including location of sources with emissions greater than 100 tpy (based on 2008 data from NEI) and ambient monitors.**



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Figure 4



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