Appendix A

Rationale for New Hampshire's 1-Hour Sulfur Dioxide Attainment Areas

1. Summary

In July 2011, pursuant to Section 107(d)(1)(A) of the Clean Air Act (CAA), New Hampshire presented the EPA with a recommendation for designation of a portion of the state to the 2010 Sulfur Dioxide (SO_2) National Ambient Air Quality Standard. As a result of that correspondence, 13 New Hampshire towns and one city located within three contiguous counties were designated the Central New Hampshire Nonattainment Area[1] (Figure 1). In the final rule, EPA stated that it intended "...to address is separate future actions the designations for all other areas for which the agency is not yet prepared to issue designations..."[2] In New Hampshire this includes seven counties (Belknap, Carroll, Cheshire, Coos, Grafton, Strafford and Sullivan) and three partial counties (Merrimack, Hillsborough and Rockingham). These areas were evaluated on the basis of known SO_2 point sources as well as National Emissions Inventory (NEI) data for other emission sources. Additionally, per the Data Requirements Rule[2], air quality was characterized by modeling two sources in Rockingham county as well as from SO_2 monitoring at three locations, two in Rockingham County and one in nearby Eliot, Maine. The information provided below describes the rationale for New Hampshire's designation recommendations.

2. Central New Hampshire Nonattainment Area

Nonattainment areas are defined in the CAA as areas that do not meet the National Ambient Air Quality Standard (NAAQS) or that contribute to nearby areas that do not meet the NAAQS. New Hampshire's designated nonattainment area, consisting of three partial counties (Figure 1), was proposed by the New Hampshire Department of Environmental Services (NHDES) based on the most recent three-year period of quality assured data, 2008 through 2010, in accordance with EPA guidance. Based on this data, one portion of New Hampshire, adjacent to the monitoring station located in the town of Pembroke, was not meeting the revised one-hour SO_2 NAAQS. In addition, partial data collected in Concord demonstrated the potential for also exceeding the SO_2 NAAQS. Ordinarily, the "presumptive norm" for nonattainment designations in such instances is the boundary of the county where the monitor resides. However, due to the location of a large SO_2 emitting point source in proximity to the borders of three contiguous counties, NHDES exercised the flexibility allowed in the EPA guidance to refine nonattainment boundaries more realistically on the basis of weight-of-evidence analysis, including geography and topography, and meteorology and transport patterns.

3. Designation Proposals for Currently Undesignated Portions of New Hampshire

To determine the applicable designation, NHDES examined emissions data for SO_2 sources in seven full counties and three partial counties for the years 2011 through 2015. This included reports from permitted emissions sources and data from the National Emission Inventory (NEI). Additionally, in accordance with the Data Requirements Rule[3], two nearby emission sources that have the potential to

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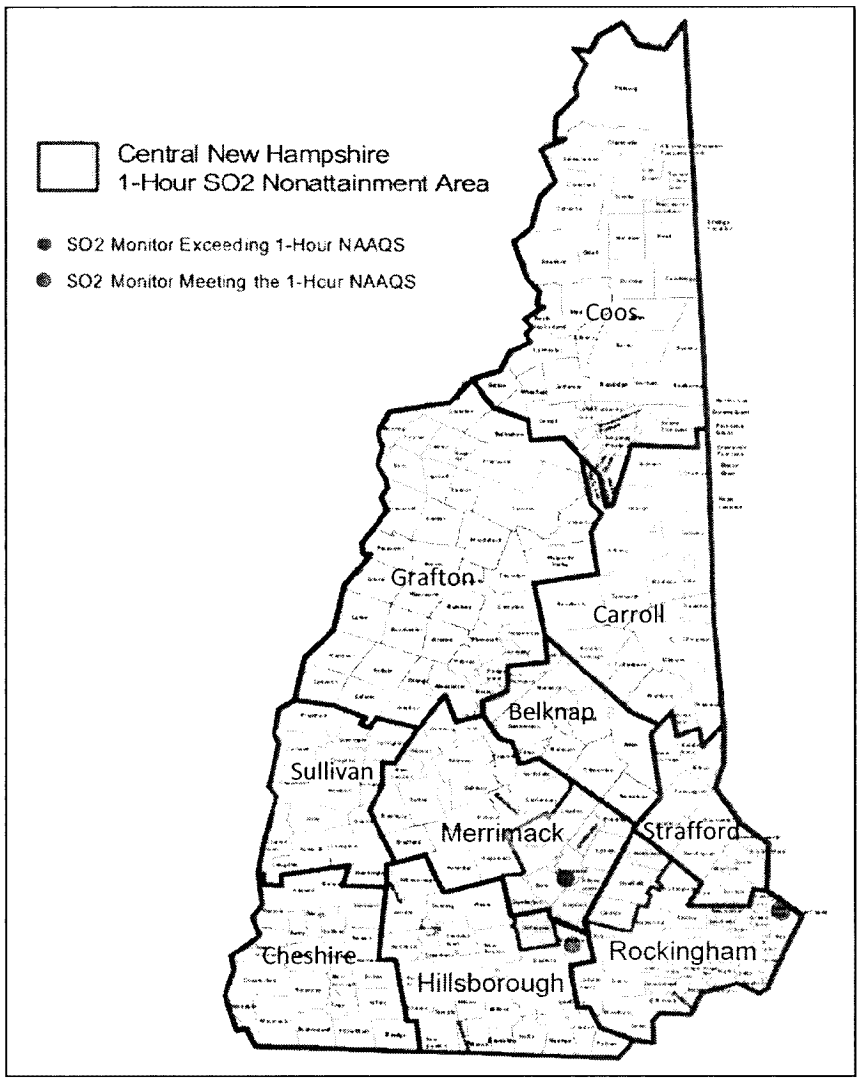
[1] 78 FR 47191

[2] 40 CFR Part 51 Subpart BB Data Requirements for Characterizing Air Quality for the Primary SO_2 [80 FR 51052]

[3] Ibid.

emit >2,000 tons of SO_2 per year were identified as requiring further analysis by NHDES in a letter to EPA dated January 5, 2016. In its response received March 17, 2016, the EPA concurred with NHDES that these two sources Public Service of New Hampshire dba Eversource Energy (Eversource Energy) Schiller and Newington Stations - required further characterization.

Figure 1. Central New Hampshire 1-hour SO_2 Nonattainment area.



3.1. County SO_2 Emissions

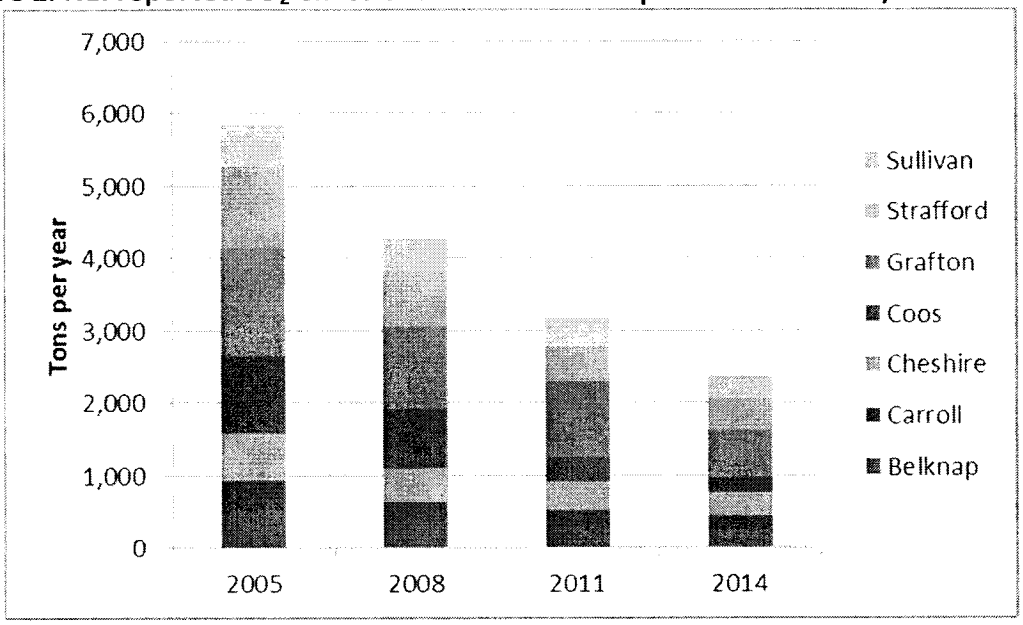
Seven of New Hampshire's ten counties (Belknap, Carroll, Cheshire, Coos, Grafton, Strafford, Sullivan), were not previously designated as nonattainment for the 1-hour 2010 SO_2 NAAQS because they did not contain monitors that demonstrated violations of the standard or an air dispersion modeling analysis with impacts above the NAAQS . These counties also do not have SO_2 emitting sources with emissions above 2,000 tons per year (tpy) (Table 1). These seven full counties, as well as the portions of three other counties that were not included in the Central New Hampshire Nonattainment Area, are reviewed for designation recommendations in the following sections.

Table 1. SO_2 Sources (>10 tpy or largest emission source) in Counties Proposed Attainment/Unclassifiable – (Actual SO_2 Emissions in TPY)

County/Source	2011	2012	2013	2014	2015
Belknap/Tilton School	1	0	0	3	12
Cheshire/Keene State College	33	34	31	33	34
Coos/Burgess Biopower	-	-	2	12	15
Coos/Fraser Paper	127	5	29	29	26
Grafton/Dartmouth College	309	250	242	246	241
Grafton/North Country Environmental Services	66	40	43	33	50
Grafton/Unifirst Corporation	12	12	12	11	12
Hillsborough/Monadnock Paper Mill	141	152	156	148	80
Hillsborough/Four Hills Landfill	13	20	14	11	4
Hillsborough/Anheuser Busch, Inc.	5.6	5.5	3.8	3.1	4.6
Merrimack/Merrimack County Nursing Home	4.1	4.4	4.2	5.5	5.5
Sullivan/APC Paper Company	153	38	30	14	2

Data from the NEI indicates that SO_2 emissions have been declining statewide in recent years. According to this data, New Hampshire's SO_2 emissions have decreased by over 45 percent from 2008 to 2014 (see Figure 2). When compared with NEI data of 2005, emissions of SO_2 have declined by 60 percent.

Figure 2. NEI reported SO_2 emissions in Counties Proposed Attainment/Unclassifiable



3.2. Counties Recommended for Attainment/Unclassifiable Areas

Six full counties and portions of two other counties do not contain: (a) a violating monitor; (b) point sources that emit more than 2,000 pounds per year; or (c) have been modeled in accordance with the Data Requirements Rule[4]. The full counties include Belknap, Carroll, Cheshire, Coos, Grafton and Sullivan, and the partial counties include Hillsborough and Merrimack.

3.2.1. Belknap, Carroll, Cheshire, Coos, Grafton and Sullivan Counties

NHDES emission records for permitted sources and NEI data (which includes non-permitted and non-point emission sources) indicates that SO_2 emissions have been declining statewide. According to this data, SO_2 emissions have decreased by over 45 percent from 2008 to 2014 (see Figure 2). When compared with NEI data of 2005, emissions of SO_2 have declined by 60 percent. Emissions in the six full counties of Belknap, Carroll, Cheshire, Coos, Grafton and Sullivan are all consistent with the statewide trend of declining SO_2 emissions.

As presented in Table 1, there are no permitted SO_2 emission sources in these counties that exceed 2,000 tpy. The largest of these permitted SO_2 emission sources is Dartmouth College's in Grafton County which operates three boilers on site. The largest of these burned over 1 million gallons of No. 6 fuel having 1% sulfur content in 2015. Dartmouth College's SO_2 emissions should be appreciably reduced by July 2018 in accordance with the New Hampshire fuel oil sulfur content requirements. Because these counties do not contain large SO_2 emission sources and have low overall SO_2 emissions, there is low risk of 1-hour SO_2 NAAQS violations. There are no active SO_2 monitors located in these counties.

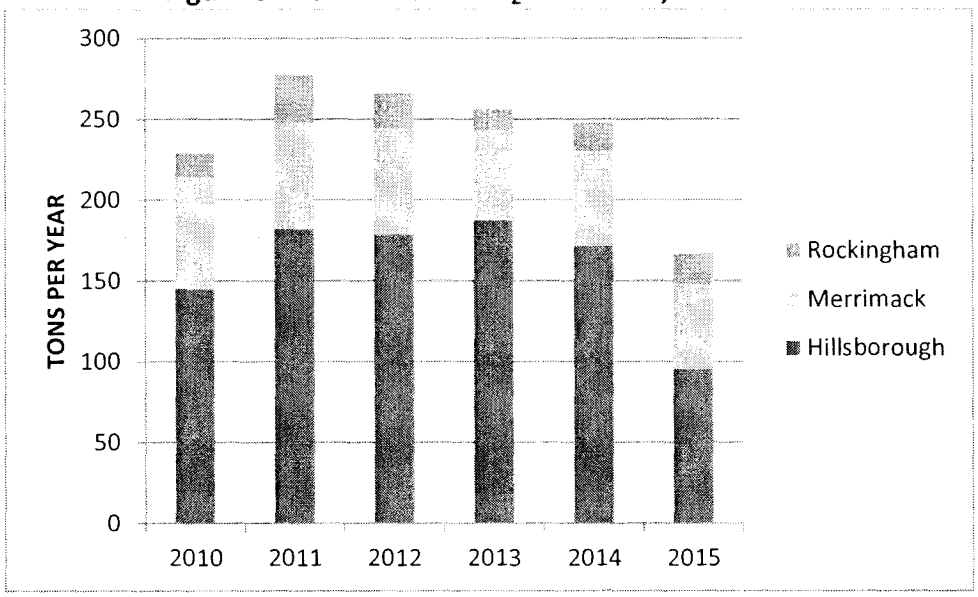
Belknap, Carroll, Cheshire, Coos, Grafton and Sullivan Counties
Recommendation: Attainment/Unclassifiable

3.2.2. Hillsborough, Merrimack and Rockingham Counties

Figure 3 shows the sum of SO_2 emissions from Title V facilities located within three counties (Hillsborough, Merrimack and Rockingham) where a portion of the county was designated as part of the Central New Hampshire Nonattainment Area. Each county is estimated to emit less than 200 tons per year of SO_2, not counting emissions from three power plants – Eversource Energy's Merrimack, Schiller and Newington Stations, and Wheelabrator Concord Company LP, a municipal solid waste incinerator. Eversource Merrimack Station and Wheelabrator Concord are located within the Central New Hampshire Nonattainment Area which is addressed by means of the New Hampshire State Implementation Plan. Eversource Energy Schiller and Newington Stations are located in an undesignated portion of Rockingham County and are discussed further in section 3.3.

[4] 40 CFR Part 51 Subpart BB Data Requirements for Characterizing Air Quality for the Primary SO_2 [80 FR 51052]

Figure 3. Title V source SO_2 emissions, 2010-2015



3.2.3. Undesignated Portions of Hillsborough County

The undesignated portions of Hillsborough County have one active monitor that indicates that the 1-hour SO_2 standard is currently being met (Table 3). Another monitor located in the City of Manchester was discontinued in 2012, but was demonstrating attainment with the 1-hour SO_2 standard at that time. There are no sources within the partial county of Hillsborough that emit over 2,000 tons of SO_2 per year. The largest emission source is Monadnock Paper Mill in Bennington that, in 2015, reported 80 tons of SO_2 emitted (Table 4).

Table 3. 99th Percentile SO_2 Values for Monitoring Locations in Hillsborough County

Site ID	Location in Hillsborough	2009	2010	2011	2012	2013	2014	2015
33-011-0020	Pearl Street, Manchester	60	58	51	18	-	-	-
33-011-5001	Miller State Park, Peterborough	--	--	10	4	5	5	3

Table 4. SO_2 Sources (>10 tpy or largest emission source) in Counties Proposed Attainment/Unclassifiable (Actual SO_2 Emissions in TPY)

County/Source	2011	2012	2013	2014	2015
Hillsborough/Monadnock Paper Mill	141	152	156	148	80
Hillsborough/Four Hills Landfill	13	20	14	11	4
Hillsborough/Anheuser Busch, Inc.	5.6	5.5	3.8	3.1	4.6
Merrimack/Merrimack County Nursing Home	4.1	4.4	4.2	5.5	5.5

Based on the lack of large emission sources and demographics for Hillsborough County, the undesignated 29 towns and one city are being proposed "attainment/unclassifiable."

Undesignated Portions of Hillsborough County
Recommendation: Attainment/Unclassifiable

3.2.4. Undesignated Portions of Merrimack County

The undesignated portion of Merrimack County includes sixteen towns and one city and do not contain any sources that emit more than 2,000 tons per year. The largest source outside of the nonattainment area is the Merrimack County Nursing Home that emits <10 tons per year (Table 4). There are no SO_2 monitors located in the undesignated portion of Merrimack County.

Based on the lack of large emission sources and demographics for Merrimack County, the undesignated 17 towns are being proposed "attainment/unclassifiable."

Undesignated Portions of Merrimack County
Recommendation: Attainment/Unclassifiable

3.3 Counties Recommended for Attainment Areas

Three towns in Rockingham County are included in the Central New Hampshire Nonattainment Area (Candia, Deerfield and Northwood). The remaining portion of Rockingham County and the full Strafford County are currently undesignated. There are two active SO_2 monitors in Rockingham County, but none in Strafford County. Additional SO_2 monitoring took place in nearby Eliot, Maine and while monitoring did not last long enough to calculate a 1-hour SO_2 design value, there was no indication of 1-hour SO_2 exceedances or nonattainment.

Table 5. 99th Percentile SO_2 Values for Monitoring Locations in Rockingham County

Site ID	Location in Hillsborough	2009	2010	2011	2012	2013	2014	2015
33-015-0014	Peirce Island, Portsmouth	42	45	37	21	31	32	23
33-015-0018	Pillsbury Rd, Londonderry	--	--	23	5	5	5	6

The undesignated portion of Rockingham County contains two SO_2 emission sources that have the potential to emit >2,000 tons of SO_2 per year. These are Eversource Energy's Schiller and Newington Stations. These two sources were identified to EPA by NHDES as needing further characterization in accordance with the Data Requirements Rule in a letter dated January 5, 2016. In its response received March 17, 2016, the EPA concurred that these two sources required further analysis under the Data Requirements Rule. In addition, there are two permitted SO_2 emission sources located in Strafford County, Turnkey Landfill and the University of New Hampshire (Table 6). Emissions from these two facilities combined ranged from 46 to 75 tpy over the past 6 years.

Table 6. SO_2 Sources (>10 tpy or largest emission source) in Counties Proposed Attainment (Actual SO_2 Emissions in TPY)

County/Source	2011	2012	2013	2014	2015
Rockingham/Eversource Newington Station*	308	102	331	316	295
Rockingham/Eversource Schiller Station*	1708	738	1428	1243	857
Rockingham/National Gypsum Company	13	14	15	16	17
Strafford/Turnkey Recycling	33	37	32	56	30
Strafford/University of NH	13	11	13	19	16

*These sources were modeled in compliance with the Data Requirements Rule, and will have SO_2 limiting requirements included in pending air permits. See section 3.2.2.

Because of the two Rockingham County power plants that have the potential to emit over 2,000 tons of SO_2 per year, NHDES required dispersion modeling for these facilities, consistent with the Data Requirements Rule and an EPA approved modeling protocol. This modeling covered a region that included Rockingham and Strafford Counties. Modeling was conducted with federally enforceable, permitted SO_2 emissions for Newington and Schiller Stations. A summary of the modeling as well as the Air Quality Modeling Report by Exponent, Inc. are provided as Appendix B.

In brief, Schiller Station and Newington Stations were modeled for the three years 2010-2014 along with the selected background sources using the current version of AERMOD (v15181). The modeling included using allowable emissions for Schiller and Newington Stations and the three most recent calendar years of meteorological data (2012-2014) to establish the area attainment designation in the vicinity of Schiller Station with respect to the 1-hour NAAQS for SO_2.

In addition, 1-hour SO_2 background values for 2012-2014 were added in AERMOD as a function of season and hour of day. The three-year averaged, 4th high, maximum daily, one-hour SO_2 predicted concentrations at all receptors for Schiller Station at 100%, 75%, and 50% loads are in compliance with the NAAQS value of 75 parts per billion (ppb) as shown in Table 7.

Table 7. Data Requirements Rule Modeling: 3-yr Average 4th-High Maximum Daily 1-hour SO_2 Predicted Concentrations[5]

Pollutant and Averaging Period	Schiller Station Load	Schiller Station Contribution (ppb)	Newington Station Contribution (ppb)	Modeled Background Contribution (ppb)	Monitored Background Contribution (ppb)	Total Concentration (ppb)	NAAQS (ppb)
SO_2 1-hour	100%	48.9	22.8	0.0	3.1	74.8	75
	75%	47.6	17.7	0.0	2.3	67.6	
	50%	58.5	0.3	0.0	3.1	61.9	

[5] Concentrations were converted from $\mu g/m^3$ in the modeling report to ppb.

New Hampshire is in the process of preparing a temporary permit for Newington Station that imposes fuel sulfur limitations for its utility boiler and two auxiliary boilers, and revising the Title V permit for Schiller station, establishing emissions limitations for its fossil-fuel fired boilers. Both permits will receive a public hearing in December 2016. When these permits are final, they will be forwarded to EPA as a supplement to New Hampshire's designation letter and rationale.

Modeling and monitoring in the region demonstrate attainment with the 1-hour SO_2 NAAQS.

Strafford County and Undesignated Portions of Rockingham County
Recommendation: Attainment

4. **SO_2 Monitoring Data**

The form of the 2010 SO_2 NAAQS is the 99th percentile of the one hour daily maximum concentration averaged over three years (Table 8). New Hampshire's air monitoring system includes three monitors located outside of the Central New Hampshire Nonattainment Area and two from within from which the following data was recorded. This information is provided here as demonstrative that the designated nonattainment area is well defined.

Table 8: SO_2 Annual 99th Percentile ($P_{0.99}$) and Design Values (ppb): 2013 -2015

Location	Site ID	2013	2014	2015	Design Value	Current Designation
Concord	33-013-1007	9	10	7	8	Nonattainment
Londonderry	33-015-0018	5	5	6	6	Unclassified
Pembroke	33-013-1006	17	26	17	20	Nonattainment
Peterborough	33-011-5001	5	5	3	5	Unclassified
Portsmouth	33-015-0014	31	32	23	29	Unclassified
Data from AQS AMP450 Quick Look Report						

5. **New Hampshire Rules Controlling SO_2 Emissions**

Chief among the state control measures for attainment of the 2010 SO_2 NAAQS is RSA 125-O, *Multiple Pollutant Reduction Program*, which states "substantial additional reductions in emissions of SO_2, NOx, mercury, and CO_2 must be required of New Hampshire's existing fossil fuel burning steam electric power plants."[6]

New Hampshire regulations provide for the permitting and enforcement of emission limits for all sources of SO_2 across the state:

- RSA 125-C:11, provides for a statewide permit program.
- RSA 125-C:15, I, authorizes the agency to issue orders to correct violations.
- RSA 125-C:15, II, authorizes the agency to obtain injunctive relief to prevent violations.
- RSA 125-C:15, I-b, authorizes the agency to impose fines for violations of statutes and rules.

[6] RSA CHAPTER 125-O Multiple Pollutant Reduction Program, eff. July 1, 2002

Provisions contained in New Hampshire's SIP are also relevant to the SO_2 nonattainment area control strategy. These include, but are not limited to, the following administrative rules:

- Env-A 600: Statewide Permit System
  - Env-A 607: Temporary Permits
  - Env-A 608: State Permits to Operate
  - Env-A 618: Nonattainment New Source Review
- Env-A 800: Testing and Monitoring Procedures
- Env-A 900: Owner or Operator Recordkeeping and Reporting Obligations
- Env-A 1600: Fuel Specifications[7]
- Env-A 2300: Mitigation of Regional Haze[8]

6. SO_2 Infrastructure SIP

New Hampshire submitted a "Certification of State Implementation Plan Adequacy Regarding Clean Air Act Section 110(a)(1) and (2) for the 2010 Primary 1-Hour Sulfur Dioxide NAAQS" or infrastructure SIP, on September 13, 2013. The EPA, in a Notice of Proposed Rulemaking (NPR) published July 17, 2015 [80 FR 42446], proposed approval of all but the following elements: prevention of significant deterioration programs, parts (C)(ii) and (J)(iii), and interstate pollution, part (D)(ii), which were conditionally approved. Another element, (D)(i)(II), contribute to nonattainment/interference with maintenance of NAAQS, was deemed "No Submittal." New Hampshire deliberately omitted this last element, referred to as the "good neighbor SIP," pending the outcome of the appeal of the *EME Homer City Generation, L.P. v. EPA* court decision. However, the EPA received a response to the above-reference NPR that argued the EPA must "disapprove the SIP submittal for the 2010 SO_2 NAAQS, because New Hampshire did not include a submittal to satisfy section 110(a)(2)(D)(i)(I)(the so-called "Good Neighbor" provision)."[9] The EPA has indicated that it will take final action on that submittal at a future date. NHDES will submit an iSIP amendment addressing the "good neighbor" elements in 2017. As already noted, EPA has proposed approval of most elements respective to the state's ability to meet and maintain the 2010 SO_2 NAAQS in the July 2015 NPR.

7. Low Sulfur Fuel

In accordance with RSA CHAPTER 125-C:10-d, fuel sold in New Hampshire, beginning July 2018, may not exceed the following sulfur content: No. 2 oil – 0.0015 percent, No. 4 oil – 0.25 percent, and Nos. 5 or 6 oil – 0.5 percent. This will have a large impact on sulfur dioxide emissions from area and non-EGU point sources.

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[7] In accordance with RSA CHAPTER 125-C:10-d, fuel sold in New Hampshire, beginning July 2018, may not exceed the following sulfur content: No. 2 oil – 0.0015 percent, No. 4 oil – 0.25 percent, and Nos. 5 or 6 oil – 0.5 percent. This limit will be adopted into Env-A 1600: Fuel Specifications and submitted into the SIP.

[8] NH adopted revisions to Env-A 2300: Mitigation of Regional Haze, effective on 8/22/2012 [77 FR 50602].

[9] Federal Register | Air Plan Approval; NH; Infrastructure State Implementation Plan Requirements for Ozone, Lead, and Nitrogen Dioxide

8. Conclusion

In its first round of designations, the EPA in concurrence with New Hampshire recommendations, designated three partial counties (Rockingham, Hillsborough, and Merrimack) comprising thirteen towns and one city the Central New Hampshire Nonattainment Area.[10] NHDES presents in this document evidence that six full counties (Belknap, Carroll, Cheshire, Coos, Grafton, Sullivan) and two partial counties (Hillsborough and Merrimack) should be designated attainment/unclassifiable. Evidence is further presented to support designation of one full county (Strafford) and one partial county (Rockingham) as attainment for the 1-hour SO_2 NAAQS.

[10] https://www3.epa.gov/airquality/sulfurdioxide/designations/region1r.html

Geographic Area	NH's Recommended Designation of Areas/Counties	EPA's Designation of Areas/Counties[11]
New Hampshire –		
Belknap County	Attainment/Unclassifiable	Unclassifiable
Carroll County		
Cheshire County		
Coos County		
Grafton County		
Hillsborough County (part)		
Amherst, Antrim, Bedford, Bennington, Brookline, Deering, Francestown, Greenfield, Greenville, Hancock, Hillsborough, Hollis, Hudson, Litchfield, Lyndeborough, Manchester, Mason, Merrimack, Milford, Mont Vernon, Nashua, New Boston, New Ipswich, Pelham, Peterborough, Sharon, Temple, Weare, Wilton, Windsor		
Merrimack County (part)		
Andover, Boscawen, Bradford, Canterbury, Danbury, Franklin, Henniker, Hill, Hopkinton, New London, Newbury, Northfield, Salisbury, Sutton, Warner, Webster, Wilmot		
Sullivan County		
Rockingham County (part)	Attainment	Unclassifiable
Atkinson, Auburn, Brentwood, Chester, Danville, Derry, East Kingston, Epping, Exeter, Fremont, Greenland, Hampstead, Hampton, Hampton Falls, Kensington, Kingston, Londonderry, New Castle, Newfields, Newington, Newmarket, Newton, North Hampton, Nottingham, Plaistow, Portsmouth, Raymond, Rye, Salem, Sandown, Seabrook, South Hampton, Stratham, Windham		
Strafford County		

[11] 78 FR 47191