I. PERMIT APPLCATIONS

1. App# 16-0117 - NHDES response to United States Environmental Agency (EPA) Order (Order) for Sierra Club's Title V Petition Number VI-2014-04.
2. App# 16-0128 - Eversource Energy request for a minor modification to incorporate Temporary Permit TP-0157 into Title V Permit TV-0053.

II. FACILITY DESCRIPTION

Public Service Company of New Hampshire dba Eversource Energy - Schiller Station is a wood and fossil fuel-fired electricity generating facility owned and operated by Eversource Energy (Eversource). The facility includes three utility boilers: one wood and fossil fuel-fired boiler (designated as emission unit SR5) and two fossil fuel-fired boilers (designated as emission units SR4 and SR6). The facility also includes a combustion turbine, an emergency generator, primary and secondary coal crushers, coal and wood handling systems, and various insignificant and exempt activities.

- Utility boilers SR4 and SR6 are equipped with the following air pollution control equipment:
  - Electrostatic precipitators to control the emissions of particulate matter;
  - Selective non-catalytic reduction (SNCR) systems to control nitrogen oxide (NOx) emissions. Eversource operates SNCR on units SR4 and SR6 as necessary to maintain compliance with NOx emission limits;
  - Dry sorbent injection (DSI) system to control acid gases namely, sulfur dioxide (SO_2) and hydrogen chloride (HCl);
  - Activated carbon injection (ACI) system to control mercury;
    - The DSI and ACI systems became operational on April 16, 2016 to comply with the federal rule 40 Code of Federal Regulations (CFR), Part 63, Subpart UUUUU *National Emission Standards for Hazardous Air Pollutants (NESHAP): Coal- and Oil-Fired Electric Utility Steam Generating Units* (also known as Mercury and Air Toxics Standards, or MATS). Temporary Permit TP-0157 issued on April 15, 2015, authorized the installation of DSI and ACI systems. The permit also granted a 1-yr extension to MATS original compliance date of April 16, 2015.
- Utility boiler SR5 is equipped with a baghouse to control the emissions of particulate matter and a SNCR to control NOx emissions. SR5 is also equipped with a limestone injection system for the control of acid gases while burning coal.
- Each boiler stack is equipped with a continuous emissions monitoring system (CEMS) and a continuous opacity monitoring system. SR4 and SR6 boiler stacks are also equipped with sorbent trap monitoring system (STMS) to monitor mercury emissions.

III. PROJECT DESCRIPTION

A. EPA Order

On April 14, 2014, the New Hampshire Department of Environmental Services NHDES issued a Proposed Title V Operating Permit (Proposed Permit) to Schiller Station and submitted the Proposed Permit to United States Environmental Protection Agency for its 45-day review period. NHDES did not receive a written objection to the Proposed Permit from the EPA within the 45-day review period and therefore issued the final Title V Operating Permit TV-0053[1] (existing Title V Permit) to Schiller Station on June 6, 2014. This permit expires on June 30, 2019. On July 24, 2014, the Sierra Club filed a petition with the EPA seeking its objection to the Proposed Title V Permit. On July 28, 2015, EPA issued an Order in response to Title V Petition VI-2014-04 (the Petition)[2]. Notice of this Order was published in the *Federal Register*[3] on September 1, 2015. The Order granted the petition on one issue, referenced as Claim A.2. Claim A.2 is in regard to the Petitioner's assertion that the sulfur dioxide limits in the Proposed Permit are insufficient to prevent Schiller Station from interfering with maintenance of the 2010 1-hour SO_2 National Ambient Air Quality Standard (NAAQS) in Maine. The Order provided the following direction to NHDES in regard to Claim A.2:

> "In responding to this order, NHDES is directed to explain, on the record for the Proposed Permit, either why no case-by-case analysis as described in NH Rule 616[4] is necessary based on its reasonable interpretation of that provision, or describe New Hampshire's case-by-case analysis and the result. If in performing the analysis, the state determines that different emission limits are necessary pursuant to NH Rule 616, then the state will need to undertake a permit revision and a new public process on that permit revision. As explained in Section II.B of this Order, even if the state does not determine that a change to the permit is necessary, the revisions to the permit record needed to respond to this order will still be considered a new proposed permit that is subject to the EPA's 45-day review period, as well as another petition opportunity if the EPA does not object during its 45-day review period. In considering how NH Rule 616 may apply in the case-specific facts presented by Schiller Station, the state should consider technical information presented in the Petition as well as other technical information the state may be aware of that informs its interpretation of NH Rule 616 as it applies to Schiller Station at this time. The information and rationale that NHDES relies upon in determining how NH Rule 616 applies to Schiller Station should be included in the permit record."

- On October 23, 2015, in its initial response to the Order, NHDES notified EPA of its intent to use an air dispersion modeling analysis for a case-by-case analysis of Schiller Station's emissions.

B. 2010 1-hour NAAQS SO_2 Data Requirements Rule (DRR)

On June 22, 2010, EPA established a new 1-hour SO_2 standard at a level of 75 parts per billion (ppb), based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations[5]. On August 21, 2015, EPA promulgated the Sulfur Dioxide Data Requirements Rule (DRR)[6]. The DRR applies to any air agency in whose jurisdiction is located one or more applicable sources of SO_2 emissions that have annual actual SO_2 emissions of 2,000 tons or more; or in whose jurisdiction is located one or more sources of SO_2 emissions that have been identified by the air agency or by the EPA Regional Administrator as requiring further air quality characterization. For each source area subject to requirements for air quality characterization, the air agency may choose to characterize peak 1-hour SO_2 concentrations in such areas through ambient air quality monitoring or air quality modeling.

On January 5, 2016, NHDES submitted to EPA-Region 1 a list of sources in New Hampshire that have been identified as requiring further air quality characterization[7]. The list includes Eversource Energy - Schiller and Newington

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[1] Title V Permit renewal application #11-0134, received by DES on September 30, 2011.

[2] https://www.epa.gov/sites/production/files/2015-08/documents/schiller_response2014.pdf

[3] See 80 FR 52752

[4] NH Administrative Rule Env-A 616, *Interstate Air Quality Impacts*, approved as part of New Hampshire's State Implementation Plan on September 14, 1992.

[5] See 75 FR 35520

[6] https://www.gpo.gov/fdsys/pkg/FR-2015-08-21/pdf/2015-20367.pdf

[7] https://www.epa.gov/sites/production/files/2016-06/documents/nh.pdf

Stations. Pursuant to the DRR, states can choose to perform area characterizations around the specified sources using either ambient air quality monitoring or air dispersion modeling. NHDES chose to characterize 1-hr SO_2 concentrations in the vicinity of Schiller and Newington Stations using air quality modeling. In accordance with the Code of Federal Regulations (CFR), §40 CFR 51.1203(d), NHDES chose to model allowable emission limits that provide for SO_2 attainment. On March 23, 2016, NHDES notified EPA-Region 1 of its selected air quality characterization pathway (i.e., modeling) under the DRR[8].

C. NHDES Response to EPA Order and DRR

In streamlining the above obligations under Title V Permitting and the DRR, NHDES used air quality dispersion modeling analysis to:

1. Conduct a case-by-case analysis of Schiller Station's emissions as per Env-A 616 and the EPA Order; and
2. Fulfill its obligations under the DRR, specifically as per the option in 40 CFR 51.1204, *Enforceable Emissions Limits Providing for Attainment*.

IV. MODELING ANALYSIS

A timeline of the air dispersion modeling protocol/report submissions and associated DES permitting actions is documented below:

November 12, 2015	In an effort to support NHDES' response to EPA Order regarding the issuance of TV-0053 and also DRR, Eversource submitted a modeling protocol (prepared by Exponent, Inc.) to NHDES. Exponent proposed the use of the adjusted surface friction velocity modeling technique (ADJ_U*) for the air quality modeling demonstration.
November 13, 2015	NHDES submitted the modeling protocol for EPA's review.
December 8, 2015	NHDES received comments on the draft modeling protocol from EPA.
March 18, 2016	NHDES requested concurrence from EPA-Region 1 Office and the EPA Model Clearinghouse on the use of the beta adjusted surface friction velocity (ADJ_U*) modeling technique for Schiller's modeling analysis.
March 21, 2016	Eversource submitted an updated modeling protocol to address the Title V Petition modeling and also to evaluate 1-hour SO_2 concentrations in and around the seacoast region of New Hampshire as required under the DRR. This protocol was prepared in close consultation with NHDES staff.
March 23, 2016	NHDES submitted the updated modeling protocol to EPA.
May 2, 2016	EPA approved the updated modeling protocol and the use of ADJ_U* option in the Schiller Station modeling analysis[9].
June 17, 2016	Eversource submitted the air quality modeling report. This report was forwarded to EPA on June 22, 2016.
October 6, 2016	Eversource submitted an updated modeling report to address final comments from EPA and NHDES.
November 10, 2016	Air dispersion modeling and associated analysis has demonstrated that more stringent SO_2 emission limits are necessary to demonstrate compliance with the 1-hr SO_2 NAAQS. Modeling results are documented in NHDES modeling memo dated November 8, 2016. NHDES prepared a revised draft Title V Permit that included a new modeling-based SO_2 emission limitation of 0.77 lb/MMBtu, averaged on a boiler

[8] https://www.epa.gov/sites/production/files/2016-07/documents/new_hampshire_source_characterization.pdf
[9] https://cfpub.epa.gov/oarweb/MCHISRS/index.cfm?fuseaction=main.resultdetails&recnum=16-I-01

	operating day basis, for SR4 & SR6. NHDES issued a public notice that summarized NHDES review and changes to existing Title V Permit[10]. The notice invited comments on the draft Title V Permit. The notice specified December 14, 2016 as the closing date for the comment period. As per the request of Eversource, the comment period was extended until December 19, 2016. A public hearing was conducted at the Portsmouth City Library on December 14, 2016. During the public comment period, NHDES received comments from Sierra Club and Eversource Energy.
February 3, 2017	NHDES conducted an updated air dispersion modeling analysis in response to public comments. The main differences between the October 2016 and February 2017 modeling analyses are summarized below: 1. AERMET version 16216 and AERMOD version 16216r were used in the updated modeling (where as the October 2016 modeling used AERMET/AERMOD version 15181, as specified in the March 2016 protocol). AERMOD version 16216r[11] corrected bugs in the formulation of ADJ_U*. Therefore it became necessary to re-do the modeling with the corrected update of the AERMOD modeling system. See e-mails dated January 4, 2017 and January 18, 2017 from EPA to NHDES regarding revisions to the AERMOD Modeling System version 16216 in **Attachment C**. 2. The October 2016 modeling analysis used five years (2010-2014) of meteorological data[12] for the Title V Petition modeling and three years (2012-2014) of meteorological data for DRR modeling. In the updated modeling analysis, DES used five years of meteorological data (2010-2014) for DRR modeling also. This is consistent with Section 5.4 of the August 2016 *SO_2 NAAQS Designations Modeling Technical Assistance Document*[13] (TAD). The TAD specifically states that when using allowable emissions (as in this case), the modeling exercise is no longer attempting to mimic an air quality monitor but becomes more like modeling for purposes of preparing a State Implementation Plan (SIP) or evaluating a Prevention of Significant Deterioration/Nonattainment New Source Review application.
February 10, 2017	NHDES updated EPA of the changes in methodology regarding the 1-hr SO_2 air dispersion modeling for Eversource Schiller Station. Please see the correspondence in **Attachment B.**

- NHDES response to comments received during the public comment period of November 10 - December 19, 2016 is provided in **Attachment A**.

[10] http://www.des.nh.gov/calendar/documents/20161110-eversource-schiller-station.pdf
[11] https://www3.epa.gov/ttn/scram/models/aermod/aermod_readme.txt
[12] Meteorological data from Pease Air Force Base (Portsmouth), NH
[13] https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf

V. MODELING RESULTS

In the air dispersion modeling analysis, the following emission rates/fuel sulfur limitations were used:

Emissions Unit	Modeled Emissions Rates
Schiller Station	
Schiller Unit 4	0.962 lb SO_2/MMBtu (coal or oil) with DSI
Schiller Unit 5	0.12 lb SO_2/MMBtu (coal)
Schiller Unit 6	0.962 lb SO_2/MMBtu (coal or oil) with DSI
Newington Station	
Utility boiler NT1	No. 6 fuel oil with maximum sulfur content of 1.0%
Auxiliary Boilers 1 and 2 (NTAB1 & NTAB2)	No. 2 fuel oil with maximum sulfur content of 0.20%

Notes:

1. SR5 boiler is permitted to use coal and biomass. Eversource has not combusted coal in SR5 since December 2006. However, worst-case permitted emission rates for coal (see Table 5, Item 11 of the Title V Permit) were used in the modeling analysis.
2. Fuel oil sulfur limits for Newington Station were established in Temporary Permit TP-0197[14], which was issued on December 22, 2016.

Modeling results are summarized below:

Analysis	4th High Max. Daily 1-hr SO_2 ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Schiller at 100% Load	195.9	196
Schiller at 75% Load	179.0	
Schiller at 50% Load	164.4	

Notes:

1. Modeling results include the interactive sources[15] and the background air quality data (2012-2014 monitored 1-hr SO_2 data) from the Pierce Island Monitor.
2. Modeling results reflect AERMET version 16216 and AERMOD version 16216r.
3. Modeling used five years of meteorological data (2010-2014).

[14] http://www4.des.state.nh.us/OneStopPub/Air/330150005416-0183TypePermit.pdf

[15] Interactive sources include: Green View Technologies, Newington Station, National Gypsum, Essential Power Newington, University of New Hampshire and Turnkey Landfill in New Hampshire and Wheelabrator North Andover facility in Massachusetts.

VI. CALCULATION OF 24-HR CALENDAR DAY AVERAGE EMISSION LIMIT FOR SO_2

Air dispersion modeling has demonstrated that an hourly SO_2 emission rate of 0.962 lb/MMBtu for SR4 and SR6 is compliant with the 1-hour SO_2 NAAQS. Eversource requested that an emission limit to comply with the 1-hour SO_2 NAAQS be established on a 24-hour calendar day average basis to account for hourly load variations and potential short-term maintenance issues with the DSI system. Specifically, if a DSI system operational upset occurred (e.g., sorbent product plugging in the injection lances) for a period lasting a number of minutes, the hourly SO_2 emission rate could be impacted. As such, Eversource requested that the SO_2 emission limit be based on a calendar day average to allow sufficient time to perform DSI system maintenance and make control device adjustments in response to hourly operations variability.

A. EPA Guidance

EPA's April 23, 2014 *Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions*[16] (EPA guidance) provides a procedure for establishing longer-term averaging times for SO_2 emission limits (up to a 30-day rolling averaging time). The procedure involves:

1. Conducting an air dispersion modeling analysis to determine the "critical emission value", which refers to the hourly emission rate that the air quality model predicts would result in the 5-year average of the annual 99th percentile of daily maximum hourly SO_2 concentrations at the level of the 1-hr NAAQS, given representative meteorological data for the area; and
2. Determining the percentage by which the critical emission value should be adjusted downward to determine the value of the longer term average limit that would be comparably stringent. This step determines the "adjustment factor" to be applied to the critical emission value.

EPA's recommended procedure for determining longer term averaging times, including calculating the adjustment factor between the 1-hour critical emission value and the equivalent longer term average emission limit, is provided in Appendices B and C of the April 2014 guidance. Appendix C of the EPA guidance (*Example Determination of Longer Term Average Emission Limit*) presents example calculations in which the longer term average limit is calculated by applying an adjustment factor to the critical emission value, and the adjustment factor is derived from statistical analysis of a set of data that reflect the emissions variability that the controlled source is expected to exhibit. The adjustment factor analysis in these example calculations compares the set of emission values averaged over the longer averaging time against the set of 1-hour emission values from which the longer term averages were derived. The EPA guidance states:

> "Insofar as the goal of the analyses is to identify a longer-term average limit that requires a comparable degree of control particularly at times of greatest emissions as would be required by the 1-hour limit that would otherwise be set, the EPA would expect the analyses to compare the corresponding longer-term average and 1-hour values among times of greatest emissions. Indeed, the example calculations in Appendix C reflect a comparison of 99th percentile values of the sets of 30-day averages and 1-hour averages. Given this focus on the upper end of the distribution of longer term averages and 1-hour averages, focusing on only a fraction of the total data set, <u>states would need to assure that an adequately robust data set is available to support the necessary analysis.</u> <u>The EPA anticipates that data sets reflecting hourly data for at least 3 to 5 years of stable operation</u> (i.e., without changes that significantly alter emissions variability) would be needed to obtain a suitably reliable analysis. Fortunately, such data sets are widely available for EGUs, as required by 40 CFR part 75 and reported to the EPA".

[16] https://www.epa.gov/sites/production/files/2016-06/documents/20140423guidance_nonattainment_sip.pdf

B. Adjustment factor analysis

The dry sorbent injection system for controlling acid gas emissions from Schiller boilers SR4 and SR6 became operational in April 2016. Based on limited operational data, it is unknown how the DSI systems would affect the future variability of controlled SO_2 emissions from SR4 and SR6. After examining the limited record of historical operations data at Schiller Station, NHDES opted to use historical data from a representative coal-fired electric generating station (namely Gallagher Station in Indiana). This approach is consistent with the examples provided in Appendices B and C of the EPA guidance document. Gallagher Station has many similarities with Schiller Station in that it contains two dry bottom wall-fired boilers fueled with pulverized bituminous coal, with each unit equipped with DSI controls for acid gases and discharging through a dedicated stack. The following table provides a comparison of Schiller and Gallagher Stations:

Comparison of Schiller and Gallagher Stations		
Description	Schiller Station, NH (ORISPL - 2367)	Duke Energy - Gallagher Generating Station, Indiana[17] (ORISPL - 1008)
Emission unit description	Dry bottom, wall-fired boiler	Dry bottom, wall-fired boiler
Design capacity	574 MMBtu/hr	1,390 MMBtu/hr
Type of fuel	Bituminous coal (pulverized) & residual oil	Bituminous coal (pulverized)
Date installed	SR4 - 1952 SR6 - 1957	Unit 2 - 1958 Unit 4 - 1965
Control device for acid gases	Dry sorbent injection operational since April 16, 2016	Dry sorbent injection operational since November 2010

To obtain the 24-hr to 1-hr adjustment ratios, NHDES relied on an analysis of Gallagher Station's emissions data performed by staff at EPA's Clean Air Markets Division (CAMD). The results of CAMD's analysis are shown below:

Gallagher Station, Adjustment Ratios for SO_2				
Gallagher Station	2012 to 2015		2012 to 2016	
	Mass Basis	Rate Basis	Mass Basis	Rate Basis
Unit 2	0.8806	0.8636	0.8818	0.8637
Unit 4	0.8437	0.9106	0.8564	0.9083

Notes:

1. Adjustment ratios in this case reflect the ratio of the 99th percentile 24-hr calendar day value to the 99th percentile 1-hr value.
2. 2016 data are preliminary.
3. Mass basis = lb/hr and rate basis = lb/MMBtu

Since there is a relatively short historical record for Schiller SR4 and SR6 that reflects the DSI controls, there is not sufficient information to judge whether Gallagher Unit 2 or 4 is more representative of the Schiller units. Therefore, the most conservative approach is to use the lower (i.e. more stringent) of the two Gallagher Unit values. CAMD's results show that when using the lower of the two values, the mass-based adjustment ratios and the rate-based adjustment ratios yield the same result for 2012 to 2016. That is, 0.8637 (Unit 2, rate basis) is

[17] http://permits.air.idem.in.gov/37119f.pdf

equivalent to 0.8564 (Unit 4, mass basis) when rounded to two decimal places. These results demonstrate that in the case of Gallagher Station, a rate-based adjustment ratio can have comparable stringency to a mass-based ratio.

C. Calculation of Permit Limit

0.962 lb/MMBtu (hourly critical emission value) x 0.8636 (adjustment factor*) = 0.83 lb/MMBtu (boiler operating day avg.)

(* 0.8636 is the lower (i.e., more stringent) of the two rate-based adjustment ratios for Gallagher Units 2 and 4 for 2012-2015)

Please see NHDES modeling memo dated February 3, 2017 that summarizes the modeling results and the analysis of Gallagher Station's emissions data to develop the adjustment ratios.

D. Comparable Stringency (1-hr vs. 24-hr average limits)

EPA guidance requires that the longer term average limit be set at a level that is comparably stringent to the otherwise applicable 1-hour limit. The 24-hr calendar day average limit of 0.83 lb/MMBtu for SR4 and SR6 reflects a **downward adjustment** of 14% as compared to the hourly critical emission value**.** The "adjusted" longer term limit provides flexibility to accommodate emissions variability in that it allows occasional emission spikes above the critical emission value. However, the adjusted limit also requires emissions to be lower for most of the averaging period than they would be required to be with a 1-hour emission limit. The procedure followed by NHDES in deriving the 24-hour average limit for SR4 and SR6 is therefore consistent with EPA guidance and protective of the 2010 SO_2 NAAQS based on modeling.

E. DRR - Allowable Limits that Provide for Attainment

Per 40 CFR §51.1203(d), for each area identified as requiring air quality characterization with respect to 1-hr SO_2 NAAQS, modeling analysis may be based on <u>federally enforceable</u> allowable emission limitations. Per Env-A 101.79 "Federally enforceable" means all limitations and conditions which are enforceable by the administrator, including those requirements developed pursuant to 40 CFR Parts 60 and 61, <u>requirements within the state implementation plan</u>, permit requirements established pursuant to 40 CFR 52.21 or under regulations approved pursuant to 40 CFR 51, Subpart I including operating permits issued under an EPA approved program that is incorporated into the SIP and expressly requires adherence to any permit issued under such program. NHDES developed modeling-based SO_2 emission limits through the case-by-case analysis as per Env-A 616, which is part of New Hampshire's State Implementation Plan. Therefore the SO_2 emission limitations established under Env-A 616 also satisfy the requirement under 40 CFR 51.1203(d)(2) that the allowable emission limits (that provide for attainment) used in the DRR modeling analysis be federally-enforceable.

F. Summary

To satisfy the requirements of Env-A 616 and 40 CFR 51.1204, NHDES is proposing to establish the following SO_2 emission limitation in the revised Title V Permit for SR4 and SR6:

"SO_2 emissions from each unit shall be limited to 0.83 lb/MMBtu of heat input, based on a boiler operating day average basis."

<u>Change in SO_2 emissions as a result of the new emission limit</u>

Potential to emit SO_2 from SR4 & SR6 (combined) based on existing permit limit
= 2.4 lb/MMBtu x 574 MMBtu/hr x 8,760 hours per year x 1 ton/2,000 lbs x 2 = 12,068 tpy

Potential to emit SO_2 from SR4 & SR6 (combined) based on new permit limit
= 0.83 lb/MMBtu x 574 MMBtu/hr x 8,760 hours per year x 1 ton/2,000 lbs x 2 = 4,173 tpy

Reduction in combined allowable emissions from SR4 & SR6 = 12,068 - 4,173 = 7,895 tpy

VII. CHANGES FROM PREVIOUS PERMIT (i.e., TV-0053 issued on June 6, 2014)

1. SR5 stack height is listed as 227 feet in the existing Title V Permit. Current modeling analysis used the actual stack height of 231 feet. Table 2 - *Stack Criteria* of the Title V Operating Permit was updated to reflect this.

2. The existing Title V Operating Permit includes a SO_2 emission limit of 2.4 lb/MMBtu for utility boilers SR4 and SR6. This limit is replaced with a more stringent limit of 0.83 lb/MMBtu. Compliance with the emission limit is determined using the SO_2 CEMS. Table 5, Item 6 *Sulfur Dioxide Emission Standard* was updated as follows:

TV-0053 Table 5 - Federally Enforceable Operational and Emission Limitations			
Item #	**Requirement**	**Applicable Unit**	**Regulatory Basis**
6.	<u>*Sulfur Dioxide Emission Standard*</u> SO_2 emissions from each unit shall be limited to 0.83 lb/MMBtu of heat input based on a boiler operating day average[18].	SR4 & SR6	Env-A 616.01 & 40 CFR 51.1204

3. Table 7 *Monitoring/Testing Requirements* was updated by adding Item 2.e as follows:

TV-0053 Table 7 - Monitoring/Testing Requirements					
Item #	**Parameter**	**Method of Compliance**	**Frequency**	**Applicable Unit**	**Regulatory Basis**
2.	SO_2	e.) For each boiler, compliance with the SO_2 emission limitation in Table 5, Item 6 must be determined by dividing the total amount of SO_2 emissions emitted during each boiler operating day by the total gross boiler heat input for that same day. 1.) SO_2 mass emission rate (lb/hr) and boiler heat input rate (MMBtu/hr) shall be calculated using 40 CFR75, Appendix F, Eqs. F-1 and F-15, respectively. 2.) Diluent capping (i.e., 5% CO_2) may be applied to the heat input rate for any hours where the measured CO_2 concentration is less than 5% following the procedures in 40 CFR 75 Appendix F Section 3.3.4.1. 3.) If SO_2 emissions data or gross heat input data is unavailable for a specific period of time during any boiler operating day, neither the amount of SO_2 emissions nor the amount of gross heat input for that specific period of time shall be used in calculating compliance with the SO_2 emissions limit.	For each boiler operating day	SR4 & SR6	40 CFR 70.6(a)(3)

Note: The above SO_2 emission limit compliance demonstration methodology was recommended by EPA-Region 1.

[18] Boiler operating day means a 24-hour period that begins at midnight and ends the following midnight during which any fuel is combusted at any time in the boiler. It is not necessary for the fuel to be combusted the entire 24-hour period

4. SR5 is subject to 40 CFR 63 Subpart DDDDD *National Emission Standards for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters* (Boiler MACT). TV-0053 contains all applicable Boiler MACT requirements, including *Affirmative Defense for Violation of Emission Standards During Malfunction* (Table 5, Item 24). On November 15, 2015, EPA finalized revisions[19] to the Boiler MACT. In this action, EPA removed the Affirmative Defense provision (§63.7501) from the final rule in light of the US Court of Appeals for the District of Columbia Circuit decision vacating the provision in the Portland Cement Rule[20]. The Affirmative Defense provision was therefore removed from the Title V Permit, which resulted in the renumbering of permit conditions in Table 5.

5. Table 10, Item 30 - Typographical errors in the 40 CFR 75 regulatory citations were corrected.

6. SR4 and SR6 boilers became subject to 40 CFR 63 Subpart UUUUU *Mercury and Air Toxics Standards* (MATS) on April 16, 2016. The revised Title V permit includes the applicable requirements from the MATS rule, including emission limits from MATS Table 2 (filterable PM, HCl and Hg), work practice standards from MATS Table 3 and multiple performance testing options from MATS Table 5, as requested by Eversource.

7. Streamlining applicable requirements: NHDES streamlined multiple requirements that apply to the same emission unit. The most stringent limit is included in the permit.

   i. Table 5, Item 7 of the existing permit includes a PM limit of 0.10 lb/MMBtu (basis: State Permits to Operate PO-B-1629 & PO-B-1631). As of April 16, 2016, SR4 and SR6 are subject to a MATS PM limit of 0.030 lb/MMBtu. In the revised Title V Permit, the SIP-based limit of 0.10 lb/MMBtu is replaced with the more stringent MATS limit of 0.030 lb/MMBtu. Also note that the MATS limit is more stringent than the PM limit from Env-A 2003.01(b), *Particulate Emission Standards for Fuel Burning Devices Installed on or before May 13, 1970.*

   ii. Table 7, Item 36 of the existing Title V Permit requires Eversource to conduct stack testing for filterable PM, PM_{10} and condensable PM once every 5 years. MATS stack testing requirements (included in Table 7, Items 61 & 62 of the revised permit) for filterable PM are more stringent in that they require quarterly testing for three years followed by once every 3 year testing for low emitting EGUs or quarterly testing if an EGU does not qualify as a low emitting EGU. Therefore, Table 7, Item 36 is revised as follows:

TV-0053 Table 7 - Monitoring/Testing Requirements					
Item #	**Parameter**	**Method of Compliance**	**Frequency**	**Applicable Unit**	**Regulatory Basis**
36.	Filterable PM & PM_{10}	Conduct stack testing using the following methods: a.) Test methods specified in Table 5 to Subpart UUUUU for filterable PM;	As specified in Items 61 & 62 of Table 7	SR4 & SR6	40 CFR 63 Subpart UUUUU
		b.) EPA Method 201A for PM_{10} and Method 202 for condensable PM.	Every 5 years (within 20 calendar quarters) and upon request by DES and/or EPA		40 CFR 70.6 (a)(3)(i)(B)

[19] https://www3.epa.gov/airquality/combustion/actions.html
[20] *NRDC* v. *EPA*, 749 F. 3d at 1063-64 (D.C. Cir. 2014)

8. Since the issuance of the existing Title V permit on June 6, 2014, NHDES has adopted changes to Env-A 900 *Owner or Operator Recordkeeping and Reporting Obligations*. The amended rule became effective on July 18, 2015[21]. Specifically, Env-A 907.02 no longer requires Title V sources to report and pay emission-based fees for insignificant activities. Section IV *Insignificant Activities Identification*, Section VIII *Applicable Requirements* Table 9 Recordkeeping Requirements, Item 4 and Table 10 Reporting Requirements, Items 3 and 4 of the existing Title V permit were updated to reflect the current rule.

9. Revised Title V permit requires Eversource to maintain records of coal chloride content (Table 9, Items 6 & 10).

10. Table 7 *Monitoring/Testing Requirements* was updated by adding monitoring requirements for the dry sorbent and activated carbon injection systems. Table 7, Items 67 and 68 require the facility to continuously monitor DSI and ACI system air blower pressure. Normal operating ranges were taken from the air pollution control equipment plan submitted by Eversource on January 15, 2016 and subsequently updated on August 2, 2016.

VIII. REVIEW OF REGULATIONS

A. NH Regulations

1. Env-A 616 *Interstate Air Quality Impacts* - Applicable

   In response to the EPA Order, NHDES conducted a case-by-case review of Schiller Station through the use of air dispersion modeling analysis and determined that additional SO_2 emission limits are necessary to demonstrate compliance with the 1-hr SO_2 NAAQS. Therefore, the existing Title V Operating Permit TV-0053 was revised to include a new SO_2 emission limitation of 0.83 lb/MMBtu (calculated as boiler operating day avg.) for SR4 & SR6.

2. Env-A 609.19(a)(1) & (f) *Permit Reopenings for Cause* - Applicable

   i. Env-A 609.19(a)(1) - Since the issuance of Title V Permit on June 4, 2014, SR4 and SR6 became subject to the MATS rule. The revised Title V Permit includes all applicable MATS requirements.

   ii. Env-A 609.19(f) - NHDES reopened the Title V Operating Permit TV-0053 in response of EPA Order for Title V Petition VI-2014-04.

3. Env-A 614.01(d) *Citizens Petitions To The EPA* - Applicable

4. Env-A 622.02 *Public Notice* - Applicable

[21] http://www.des.nh.gov/organization/commissioner/legal/rules/documents/env-a900.pdf

B. Federal Regulations

1. NSPS Subpart OOO *Standards of Performance for Nonmetallic Mineral Processing Plants* - Not applicable

   Each DSI system is equipped with a Simpactor FGT Series mill (Model 6C-30). The manufacturer specified capacity range for each mill is 2 - 8 tons per hour for Trona and SBC depending on the material size coming in and material size desired. Even at the high end of the range (i.e., 8 tons per hour), cumulative capacity is 16 tons per hour which is below the Subpart OOO applicability threshold of 25 tons per hour (40 CFR 60.670(c)(1)).

2. 40 CFR 63 Subpart UUUUU *National Emission Standards for Hazardous Air Pollutants (NESHAP): Coal- and Oil-Fired Electric Utility Steam Generating Units* (also known as Mercury and Air Toxics Standards, or MATS) - Applicable to SR4 & SR6.

   i. SR4 and SR4 are considered existing coal-fired EGUs, as they were installed prior to May 3, 2011. SR4 and SR6 are in the subcategory of coal-fired EGUs designed for coal with a heating value greater than or equal to 8,300 Btu/lb. Both units do not have a bypass stack. Applicable emission limits from MATS Table 2 are as follows:

      - PM - 0.030 lb/MMBtu
      - HCl - 0.0020 lb/MMBtu
      - Hg - 1.2 lb/TBtu

   ii. SR4 & SR6 are also subject to work practice standards specified in Table 3 to Subpart UUUUU. Specifically, SR4 & SR6 are subject to startup/shutdown work practices and initial and periodic boiler tune-up requirements.

      - Eversource is using paragraph 1 of startup definition found in §63.10042.
      - SR4 and SR6 boiler tune-ups were conducted on October 6, 2016 and September 8, 2016, respectively.

   iii. As required by 40 CFR §§63.9(h) & 63.10030(e), Eversource submitted a Notice of Compliance Status for both the units on December 5, 2016.

   iv. As specified in Table 5 to Subpart UUUUU, MATS rule provides multiple options to demonstrate compliance with the emission limits. Under the MATS rule, a source can demonstrate compliance with the emission limits through the use of either CEMS or stack tests. The following table summarizes compliance options available under MATS and the method selected by Eversource:

Compliance Demonstration Methods for Existing Coal-fired EGUs		
Pollutant	**Compliance Options Available Under MATS**	**Monitoring Method Selected by Eversource**
Filterable PM	Stack testing or continuous monitoring using either continuous emissions monitoring system (CEMS) or continuous parametric monitoring system (CPMS)	Eversource is currently demonstrating compliance with the PM limit using stack testing. Initial performance test was conducted on March 17, 2016.
HCl	Stack testing or CEMS. If the EGU uses wet or dry flue gas desulfurization technology, a second alternative to HCl CEMS may be applied by installing and operating a SO_2 CEMS in accordance with 40 CFR 75 to demonstrate compliance with the alternate SO_2 emissions limit[22]	Eversource is currently demonstrating compliance with the HCl limit using stack testing. Initial performance test was conducted on March 15-16, 2016.
Hg	Hg sorbent trap monitoring system or Hg CEMS	Eversource has installed and is currently operating a sorbent trap monitoring system to demonstrate continuous compliance with the Hg emission limit. SR4 STMS was certified on January 21, 2016 SR6 STMS was certified on January 26, 2016

Eversource requested flexibility in the Title V Permit to be able to switch to another compliance option, i.e., CEMS. Therefore, the Title V Permit includes the monitoring methods currently used by Eversource (i.e., stack testing for PM and HCl and sorbent trap monitoring system for Hg) as well as the alternative compliance option of CEMS for PM, HCl and Hg. The Permit also includes monitoring, recordkeeping and reporting requirements associated with each compliance option.

v. Eversource selected stack testing option to demonstrate compliance with the HCl emission limit. The permit requires Eversource to maintain the calendar day average sorbent injection rate (in lb/hr) at or above the injection rate observed during the most recent compliance test demonstrating compliance with HCl emission limit.

- For a given chloride content, when an EGU operates at lower loads, sorbent injection rate may be multiplied by the load fraction to determine the required injection rate. Load fraction means, the actual heat input of a boiler divided by heat input during the performance test that established the minimum sorbent injection rate, expressed as a fraction (*e.g.*, for 50 percent load the load fraction is 0.5).
- If the chloride content of the coal blend increases before the next compliance stack test, sorbent rate may be increased based on DSI system performance equations provided by the manufacturer. The increased sorbent injection rate must be confirmed during the next compliance test.

[22] For sources using this option, the applicable SO_2 emission limit is 0.20 lb/MMBtu.

Attachment A
(NHDES Response to Comments)

Background

The air dispersion modeling and associated analysis has demonstrated that more stringent SO_2 emission limits are necessary to demonstrate compliance with the 1-hr SO_2 NAAQS. NHDES prepared a revised draft Title V Permit and issued a public notice on November 10, 2016 that summarized NHDES review and changes to existing Title V Permit. The public notice invited comments on the draft Title V Permit. The public comment period closed on December 19, 2016. During the public comment period, NHDES received comments from Sierra Club and Eversource Energy.

NHDES reviewed and considered all comments received during the public comment period. A summary of each comment and NHDES's response is presented below. Comments are organized by commenter and summarized in italic print.

Sierra Club Comments

1. *The sulfur dioxide emission limits in the proposed permit are inadequate to protect air quality. The proposed permit must be revised to include a sufficiently stringent numerical SO_2 emission limit for Schiller Units SR4 and SR6.*

   i. *The SO_2 emission limit proposed in the Title V Permit is wrongly based on a modeling analysis employing a non-regulatory default modeling option.*

NHDES Response

For the Schiller Station modeling analysis, NHDES used the ADJ_ U* option in AERMET, the meteorological preprocessor for the AERMOD air quality model. The ADJ_ U* option was coded into the model to address the under-prediction of surface friction velocity (U*) in AERMET and the subsequent over-prediction of modeled concentrations by AERMOD, particularly during low wind speed/stable atmospheric conditions.

On July 29, 2015, EPA published a proposed rule[23] that would, among other changes, incorporate the ADJ_U* option as a regulatory default option in the EPA *Guideline on Air Quality Models* (Appendix W to 40 CFR Part 51). On December 10, 2015, EPA issued a memorandum[24] (*Clarification on the Approval Process for Regulatory Application of the AERMOD Modeling System Beta Options)* from Richard A. Wayland, Director of the Air Quality Assessment Division) that clarified the approval process for the use of non-regulatory beta options in AERMOD that have been proposed as regulatory options in the proposed revision to Appendix W. This memorandum confirmed that the use of all non-default beta options, including the beta ADJ_ U* option, in regulatory modeling must receive EPA Regional Office approval.

For the Schiller Station modeling, a robust justification document was prepared by Exponent Inc. (for Eversource) for the use of the ADJ_ U* option (*Technical Memorandum, Request for Approval to Use ADJ_U* in AERMET, Eversource Energy's Schiller Station,* March 10, 2016). This document was prepared in close consultation with NHDES and includes references to a number of studies that show model over-prediction with the regulatory default option and better model performance with the ADJ_U* option. One recent study, performed in 2015, highlights model results at a complex terrain receptor which had a predicted to observed ratio of 2.2 with the regulatory default option. With the ADJ_U* option, this ratio went from 2.2 to a more realistic, yet still conservative, 1.53 (note that modeled to monitored ratios closer to 1.0 indicate better model performance). On March 18, 2016, NHDES requested EPA's concurrence that the use of the ADJ_U* option is justified in modeling for Schiller Station.

The Exponent/NHDES ADJ_ U* justification document was subjected to an extensive and rigorous review process to insure that it met the alternative model requirements in Section 3.2.2.b of Appendix W. Specifically, the justification document was reviewed and approved by the EPA Region 1 office, which concurred with the Exponent/NHDES findings. On April 7, 2016, the EPA Region 1 Office subsequently forwarded its review and concurrence to the EPA Model Clearinghouse, who, after its own review, approved the use of the ADJ_U* option for the Schiller Station modeling in a Model Clearinghouse memorandum dated April 29, 2016[25]. On May 2,

[23] 80 FR 45340
[24] https://www3.epa.gov/ttn/scram/guidance/clarification/AERMOD_Beta_Options_Memo-20151210.pdf
[25] https://cfpub.epa.gov/oarweb/MCHISRS/index.cfm?fuseaction=main.resultdetails&recnum=16-I-01

2016, NHDES received the formal approval letter from EPA Region 1 for the use of the beta ADJ_U* option for modeling of Schiller Station. It should be noted that the ADJ_U* option has now been adopted as a regulatory default option (when used with standard National Weather Service meteorological data, as was the case for Schiller Station) in the revised *Appendix W*, which was published as a final rule on January 17, 2017[26].

Lastly, Camille Sears, on behalf of Sierra Club, performed an extensive modeling analysis to examine the sensitivity of predicted impacts to a range of AERMOD model versions and options, including the ADJ_U* option. This analysis was documented in a cover letter dated October 25, 2015 and was used to support Sierra Club's comments on EPA's proposed revisions to *Appendix W*, including the proposed enhancements to the AERMOD modeling system. It should be noted that for the Lovett study, which has some similarity to the Schiller case (i.e. 1-hr SO_2, rural dispersion, complex terrain, and a tall stack), Camille Sears' modeling demonstrated that the ADJ_U* case had the best performance out of all the scenarios evaluated. For example, the AERMOD version 15181 with ADJ_U* scenario had a modeled robust highest concentration (RHC) to monitored RHC ratio of 0.91 while the regulatory version of AERMOD 15181 had a ratio of 0.77 (again, modeled to monitored ratios closer to 1.0 indicate better model performance)[27].

ii. *The SO_2 emission limit proposed in the Title V Permit is wrongly based on an improper modeling receptor grid.*

NHDES Response

The NHDES modeling employed a robust and carefully considered receptor network consisting of well over 10,000 modeled receptor points. In developing this network, NHDES followed the guidance in *Appendix W* which states, "in designing a receptor network, **emphasis should be placed on receptor density and location, not total number of receptors**" [**emphasis added**]. Typically, the density of receptor sites should be progressively more resolved near the new or modifying source, areas of interest, and areas with highest concentration with sufficient detail to determine where possible violations of a NAAQS or PSD increments are most likely to occur." As described in the October 6, 2016 Exponent revised modeling report, a dense and extensive Cartesian receptor grid was centered on Schiller and Newington Stations. Further, dense 1 km by 1 km receptor grids at 100-meter spacing were centered on monitor locations and on receptor points where previous modeling done by NHDES and Sierra Club indicated potential maximum predicted concentrations. The March 21, 2016 Air Quality Modeling Protocol for Schiller Station, prepared by Exponent Inc. included a detailed discussion of domain and receptor grid. Please note that EPA - Region 1 approved Schiller Station's modeling protocol on May 2, 2016.

[26] https://www.gpo.gov/fdsys/pkg/FR-2017-01-17/pdf/2016-31747.pdf

[27] Since the time of the Camille Sears analysis, EPA released an updated version of the AERMOD modeling system (AERMET version 16216 and AERMOD 16216r). This update corrects a known bug to the formulation of ADJ_U*. When invoking the ADJ_U* option, results predicted with version 16216r have generally been found to be higher than those predicted with version 15181. NHDES used AERMET version 16216 and AERMOD version 16216r in its most recent modeling.

iii. *The SO_2 emission limit proposed in the Title V Permit wrongly ignored relevant airport meteorological data. Eversource's modeling analysis should have employed meteorological data from Skyhaven rather than Portsmouth International Airport at Pease in order to assure greater accuracy with its meteorological input data.*

NHDES Response

NHDES did, in fact, carefully consider the use of meteorological data from Skyhaven Airport in Rochester. Exponent, in very close consultation with NHDES, performed a rigorous analysis of both the Portsmouth and Rochester meteorological locations. This analysis is documented in Appendix A of Exponent's March 21, 2016 Modeling Protocol (which was approved by EPA Region 1 on May 2, 2016 after extensive review). Using the guidance in Section 8.3 of *Appendix* W, Exponent and NHDES evaluated four main criteria:

1.) Proximity
2.) Complexity of terrain
3.) Exposure of the meteorological site; and
4.) Period of time during which data are collected.

The details of the analysis can be found in Appendix A of the Modeling Protocol, and are not repeated here. However, the analysis showed that the Portsmouth data is more appropriate for Schiller Station for each of the criteria except item 4, period of time (for which both sites were equal).

One item that does warrant further discussion, however, is item 1, proximity. Section 8.3.1.2.b of *Appendix W* states that "If one or more (including partial years), up to five years, of site specific data is available, these data are preferred for use in air quality analyses." Further, Section 8.3.3.1.a states that "Spatial or geographical representativeness is best achieved by collection of all the needed model input data in close proximity to the actual site of the source(s). Site specific measured data are therefore preferred as model input..." and "It should be noted that, while site specific measurements are frequently made "on-property" (i.e. , on the source's premises), acquisition of adequately representative site specific data does not preclude collection of data from a location off property." The proximity of the Portsmouth meteorological site to Schiller Station (approximately 2 miles) effectively makes it site specific data and therefore clearly more appropriate for modeling Schiller Station than the Rochester data (which is approximately 15 miles from Schiller). Further, in its own modeling guidance[28], NHDES recommends the use of Portsmouth meteorological data for modeling emissions sources in Portsmouth.

In its guidance, EPA does not prescribe the use of meteorological data from more than one site in a single modeling exercise. Therefore, NHDES had to choose the most representative data for Schiller Station's modeling analysis. Based on the analysis outlined in Appendix A of the EPA-approved Schiller Station's modeling Protocol and the points reiterated here, Portsmouth is clearly the more representative meteorological site, even considering the fact that the Rochester data includes 1-minute average wind speeds.

[28] http://des.nh.gov/organization/divisions/air/pehb/apps/aqm/help_guide.htm

iv. *The SO_2 Emission Limits for Schiller Units SR4 and SR6 Must Be Based on an Hourly Averaging Basis.*

NHDES Response

In its April 23, 2014 guidance memorandum, *Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions*, EPA has offered guidance and recommendations for developing emissions limits with a longer averaging period that would have comparable stringency as a limit with a 1-hour averaging period. Section D.2.a. (*Averaging times for SO_2 emission limits*) of this guidance document provides a detailed rationale for the appropriateness and usefulness of using such an approach. Section D.2.a. describes industry commenters' concerns that meeting a 1-hour average limit could be very difficult to achieve in practice, while environmental groups were concerned that longer term averages could create potential for violations. Specifically, on page 24 of the guidance document, EPA states:

> "After considering these comments, and analyzing the impact of emissions variability on air quality, the EPA expects that it may be possible in specific cases for states to develop control strategies **that account for variability in l-hour emissions rates through emission limits with averaging times that are longer than 1 hour, using averaging times as long as 30-days**, but still provide for attainment of the 2010 SO_2 NAAQS." **[emphasis added]**

The April 2014 guidance uses the term "critical emission value" to refer to the hourly emission rate that the model predicts would result in the 5-year average of the annual 99th percentile of daily maximum hourly SO_2 concentrations at the level of the 1-hour NAAQS, given representative meteorological data for the area. In the guidance document EPA further states that:

> "This view is based on the EPA's general expectation that, if periods of hourly emissions above the **critical emission value** are a rare occurrence at a source, particularly if the magnitude of the emissions is not substantially higher than the critical emissions value, these periods would be unlikely to have a significant impact on air quality, insofar as they would be very unlikely to occur repeatedly at the times when the meteorology is conducive for high ambient concentrations of SO_2. The EPA believes that making this option available to states could **reflect an appropriate balance between providing a strong assurance that the NAAQS will be attained and maintained, while still acknowledging the necessary variability in source operations** and the impairment to source operations that would occur under what could be in some cases an unnecessarily restrictive approach to constraining that variability". **[emphasis added]**

In order to provide adequate assurance that the NAAQS will be met, the April 2014 guidance offered a conservative methodology in that it requires that any emission limits based on averaging periods longer than 1 hour should be designed to have comparable stringency to a 1-hour average limit at the critical emission value. Simply put, any longer term average emission limit (e.g., 24-hour average) **must be adjusted downward** to compensate for the loss of stringency inherent in applying the longer term average limit. Appendices B and C of the April 2014 guidance document outline the methodology for determining emission limit adjustment factors for longer averaging periods. Appendix C specifically provides an "Example Determination of Longer Term Average Limit".

In an effort to balance environmental and economic benefits, NHDES is open to allowing regulatory flexibility, provided that the emission limits remain adequately protective of the NAAQS. Therefore, NHDES chose to apply the EPA guidance such that attainment with the NAAQS is assured while reasonable operational flexibility is maintained for the regulated source in question. NHDES applied the EPA guidance in a conservative manner and carefully followed the example provided in Appendix C of the guidance document. Specifically, NHDES derived the critical emission value through air dispersion modeling and then converted the hourly value into a longer term average emission limit by multiplying it with an adjustment ratio. For further details, please see Section VI. Calculation Of 24-Hr Calendar Day Average Emission Limit For SO_2 of the Permit Application Review Summary.

2. *Mercury and Air Toxics Standards (MATS) - The Proposed Permit Should Be Revised to Provide Additional Clarity in Its Requirements for MATS Compliance Monitoring and Testing*

   i. *In order to ensure the chosen monitoring method is "sufficient to assure compliance with the terms and conditions of the permit," as required by the CAA and its implementing regulations, the Proposed Permit and permit record should be revised to clearly identify which monitoring method Schiller will use to assure compliance with its applicable Hg, HCl, and PM emissions limits.*

NHDES Response

As specified in Table 5 to Subpart UUUUU, MATS rule provides multiple options to demonstrate compliance with the emission limits. Under the MATS rule, a source can demonstrate compliance with the emission limits through the use of either CEMS or stack tests.

- Eversource has installed and is currently operating a sorbent trap monitoring system on each boiler SR4 and SR6 to demonstrate continuous compliance with the MATS Hg emission limit.
- Eversource is currently demonstrating compliance with the PM and HCl limits using stack testing.

Eversource requested flexibility in the Title V Permit to be able to switch to another compliance option, i.e., CEMS. Therefore, the Title V Permit includes the monitoring methods currently used by Eversource (i.e., stack testing for PM and HCl and sorbent trap monitoring system for Hg) as well as the alternative compliance option of CEMS for PM, HCl and Hg. The Permit also includes monitoring, recordkeeping and reporting requirements associated with each compliance option. Please see Section VIII.B.2 (Review of Regulations) of the Permit Application Review Summary for further details.

   ii. *Proposed Permit's monitoring requirements for Unit SR4 and SR6's Hg, HCl, and PM emissions should provide that the emissions be monitored and measured through the use of a CEMS at all times the units are operating. The final permit must not allow for exceptions or alternatives to CEMS and must be clear that the CEMS data is to be used to determine and assure compliance with all applicable emission limits for these pollutants.*

NHDES Response

The MATS rule does not mandate the use of CEMS. Instead, it is only one of the options through which compliance may be demonstrated with the emission limits. EPA provided monitoring alternatives to using CEMS in the rule. In the MATS preamble (77 FR 9304), EPA stated:

> *"***We believe that continuous monitoring in the form of CEMS, sorbent trap monitoring systems, and PM CPMS, or frequent stack emissions testing are appropriate to ensure ongoing compliance with this final rule***".*

The MATS rule provides the option for use of either CEMS or sorbent trap monitoring systems for Hg. To demonstrate continuous compliance with the Hg emission limit, Eversource has installed sorbent trap monitoring system on each unit.

As alternatives to the use of PM CEMS and HCl CEMS, sources are allowed to conduct performance stack testing. To demonstrate compliance with the HCl emission limit, Eversource has elected to conduct periodic stack testing. In addition to the MATS-required stack testing, Eversource is required to monitor sorbent injection rate during the operation of each boiler and maintain the daily average sorbent injection rate at or above the average injection rate observed during the most recent performance stack test demonstrating compliance with the HCl emission limit.

Eversource has also elected to conduct periodic stack testing to demonstrate compliance with the PM emission limit. In addition to the MATS-required stack testing, Eversource is also required to comply with the compliance assurance monitoring (CAM) requirements for PM pollution control devices (i.e., electrostatic precipitators) as identified in Table 8 of the Title V Permit.

The combination of periodic stack testing and parametric monitoring described above are sufficient to demonstrate continuous compliance with the PM and HCl emission limits. This is consistent with EPA's statements in the preamble to the final MATS rule that MATS-specified emission testing will be enhanced by other (e.g., CAM) requirements to demonstrate continuous compliance with MATS.

iii. *The Proposed Permit must not allow performance tests for Hg, HCl, and PM to "be skipped in those quarters during which less than 168 boiler operating hours occur. An automatic exemption from performance testing during quarters with less than 168 boiler operating hours is insufficient to assure compliance with the relevant permit terms and is, therefore, improper.*

NHDES Response

40 CFR 63.10021(d) *How do I demonstrate continuous compliance with the emission limitations, operating limits, and work practice standards* of the MATS rule provides for the following skip test provision:

"If you use quarterly performance testing to demonstrate compliance with one or more applicable emissions limits in Table 1 or 2 to this subpart, you m**ay skip performance testing in those quarters during which less than 168 boiler operating hours occur**, except that a performance test must be conducted at least once every calendar year". **(emphasis added)**

The skip test provision included in Table 7 of the Title V Permit for emission units SR4 and SR6 is consistent with the MATS rule.

iv. *The Proposed Permit Should Be Revised to Clarify that Emissions Limitations and Standards Contained Therein Apply at All Times, Even During Startup, Shutdown, and Malfunction. As drafted, the Proposed Permit allows excess emissions from Schiller during startup, shutdown, or malfunctions. The permit must not provide exceptions for startups, shutdowns, or malfunctions, or otherwise allow periodic exceedances of emission limitations. All such grants of exemptions must be entirely removed from the Proposed Permit before the final permit is issued.*

NHDES Response

Table 5, Item 49 of the Title V Permit includes General Compliance Requirements for emission units SR4 and SR6, for which the regulatory basis is 40 CFR 63.10000 *What are my general requirements for complying with this subpart*. Per §63.10000(a),

> "You must be in compliance with the emission limits and operating limits in this subpart**. These limits apply to you at all times except during periods of startup and shutdown**; however, for coal-fired, liquid oil-fired, or solid oil-derived fuel-fired EGUs, **you are required to meet the work practice requirements**, items 3 and 4, in Table 3 to this subpart during periods of startup or shutdown". **(emphasis added)**

The MATS rule requires work practice standards for emissions during periods of startup and shutdown. The specific provisions of the startup and shutdown requirements and EPA's rationale for those provisions are discussed in more detail in the rule preambles at 77 FR 9304 (Final rule - February 16, 2012) and 79 FR 68777 (Final rule; notice of final action on reconsideration - November 19, 2014)[29]. Work practice standards that apply to SR4 and SR6 during startup and shutdown are included in Table 5, Item 49(b) of the Title V Permit.

Emission unit SR5 is subject to 40 CFR 63 Subpart DDDDD *National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters.* Per §63.7500(f), emission standards apply at all times the affected unit is operating, except during periods of startup and shutdown during which time the Owner or Operator must comply only with Items 5 and 6 of Table 3 to Subpart DDDDD (i.e., work practice standards).

In summary, while the MATS and Boiler MACT emission limits do not apply during startup and shutdown, emission units are required to comply with the applicable work practice standards. Permit conditions in Table 5, Item 23 and 49 of the Title V Permit incorporate the applicable requirements from federal regulations.

v. *The Proposed Permit Should Be Revised to Require Prompt Reporting of deviations and certain malfunctions.*

NHDES Response

Please see Section XXVII of the Title V Permit which incorporates language from Env-A 911 *Recordkeeping and Reporting Requirements For Permit Deviations* and includes prompt reporting of deviations.

[29] Also see EPA Response to Comments (RTC) document in EPA Docket ID No. EPA-HQ-OAR-2009-0234.

Eversource Energy Comments

1. *NHDES is not authorized to establish a new permit limit under NH Rule 616 for Schiller Station.*

NHDES Response

The Sierra Club in its July 24, 2014 Title V Petition claimed that "the SO_2 emission limits included in the Title V Permit are insufficient to protect air quality in Maine and, as a result, the limits violate NHDES's obligations in the New Hampshire State Implementation Plan to protect air quality in downwind states" (Claim A.2). The Sierra Club stated in the Petition that the emission limits for SO_2 must be revised to be more restrictive. For technical support of its claim, Sierra Club submitted air dispersion modeling analysis of Schiller Station's historical actual emissions and permitted emissions. Sierra Club stated that modeling results triggered the requirement in Env-A 616.01 that emission limits be set on a "case-by-case basis" to insure that air quality in Maine is not negatively impacted.

The July 28, 2015 Order that EPA partly granted Sierra Club's Petition directed NHDES "to explain, on the record for the Proposed Permit, either why no case-by-case analysis as described in NH Rule 616 is necessary based on its reasonable interpretation of that provision, or describe New Hampshire's case-by-case analysis and the result. If in performing the analysis, the state determines that different emission limits are necessary pursuant to NH Rule 616, then the state will need to undertake a permit revision and a new public process on that permit revision." The EPA Order further states "in considering how Env-A 616 may apply in the case-specific facts presented by Schiller Station, the state should consider technical information presented in the Petition as well as other technical information the state may be aware of that informs its interpretation of NH Rule 616 as it applies to Schiller Station at this time".

Env-A 616 *Interstate Air Quality Impacts* was adopted into N.H. Code of Administrative Rules on February 19, 1981 when Schiller Station's utility boilers were converted to coal. Env-A 616 was approved into New Hampshire's SIP in 1992. Env-A 616.01 states "The division shall apply special emission limits to stationary sources on a case-by-case basis to ensure that their air quality impacts on adjacent states shall not interfere with the measures taken in those states to prevent significant deterioration of air quality and shall not prevent the attainment or maintenance of National Ambient Air Quality Standards in those states".

Following the language of the Order, NHDES determined that a case-by-case analysis was necessary. Env-A 616 provides the underlying authority for NHDES to apply emissions limitations in situations where it found that major stationary sources along interstate borders had the potential to interfere with the measures taken in another state to prevent significant deterioration of air quality or attainment or maintenance of National Ambient Air Quality Standards. On October 23, 2015, in its initial response to the EPA Order, NHDES notified EPA of its intent to conduct air dispersion modeling analysis for case-by-case analysis of Schiller Station's emissions. Both Eversource and Sierra Club were copied on this letter. On November 12, 2015, Eversource promptly submitted an air quality modeling protocol <u>to support</u> NHDES's case-by-case review of Schiller Station emission limits as specified in the SIP approved rule Env-616. The November modeling protocol was subsequently updated in response to EPA-Region 1 comments received on December 8, 2015. In their comment letter, EPA specifically noted that "NHDES in response to EPA Order, has proposed to model Schiller Station and nearby Newington Station to ensure that that Schiller Station does not have the <u>potential</u> to cause or contribute to a violation of the 1-hour SO_2 NAAQS". Eversource submitted an updated protocol on March 21, 2016 along with the justification to use ADJ_U* beta option in the analysis. The modeling protocol was subsequently approved by EPA on May 2, 2016. All interested parties in this case including EPA, Eversource and Sierra Club had clear understanding that NHDES's case-by-case analysis of Schiller Station's emissions will be conducted using air dispersion modeling analysis.

In fulfilling its legal obligation to respond to the Order, NHDES, in close consultation with Eversource and Exponent Inc., performed a thorough air quality dispersion modeling analysis to evaluate <u>allowable</u> SO_2 emissions from Schiller Station and other nearby sources. This modeling was performed in accordance with an EPA-approved March 2016 modeling protocol[30]. This analysis was specifically designed to find the "critical emission value", which is the level of emissions at which the NAAQS is met. This critical emission value assures that the

[30] See updates to modeling protocol (Attachment B)

NAAQS are met at all locations, including locations in neighboring Maine. Since Schiller Station is physically capable of emitting at levels higher than the critical emissions value, it was necessary to establish a new permit limit to keep emissions at or below this level and insure that the NAAQS is protected (i.e., attained and maintained) in New Hampshire and its neighboring states.

The air dispersion modeling analysis has demonstrated that an hourly emission limit for SR4 and SR6 is required to demonstrate compliance with the 1-hour SO_2 NAAQS. By using EPA's April 23, 2014 *Guidance for 1-Hour SO_2 Nonattainment Area SIP Submission*, NHDES then developed a longer term average limit that has comparable stringency as an hourly-based emission limit. As required by the EPA Order, NHDES revised the Title V Permit and undertook a new public review process for the permit revision.

In response to the revised draft Title V Permit issued by NHDES on November 10, 2016, Eversource has conducted additional modeling analysis using actual emissions from a recent three year period (2012-2014). This modeling demonstrates the very reassuring result that recent SO_2 emissions from Schiller Station have not threatened the NAAQS in New Hampshire or its neighboring states. This result is also supported by recent air quality monitoring studies (e.g., Air Quality Monitor Study at Eliot Maine[31], October 24, 2014 - April 1, 2016) which have shown measured SO_2 concentrations well below the level of the NAAQS. Modeling analyses using actual emissions and field monitoring studies are important tools for determining whether facilities are currently contributing, or have contributed to, air quality levels that are above the NAAQS. As mentioned earlier, since Schiller Station is mechanically capable of emitting SO_2 in amounts above the level that would meet the NAAQS, an enforceable permit limit is necessary to assure that the NAAQS will be protected at all times.

2. *NHDES Is Not Subject to the DRR or Obligated to Meet the DRR's Deadlines.*

NHDES Response

The Data Requirements Rule (40 CFR 51 Subpart BB - *Data Requirements for Characterizing Air Quality for the Primary SO_2 NAAQS*) which was promulgated on August 21, 2015, applies to any air agency in whose jurisdiction is located one or more applicable sources of SO_2 emissions that have annual actual SO_2 emissions of 2,000 tons or more; or in whose jurisdiction is located one or more sources of SO_2 emissions that have been identified by the air agency or by the EPA Regional Administrator as requiring further air quality characterization. Under the DRR implementation schedule, state air agencies were required to submit to EPA by January 15, 2016, a list of affected sources under its jurisdiction. In the DRR preamble[32], EPA stated that:

> "The EPA appreciates the comments urging the establishment of specific criteria in the rule for identifying additional areas that warrant air quality characterization, but the EPA finds that these areas are better identified on a case-by-case basis reflecting a judgment considering the range of factors that influence the likelihood of NAAQS violations……Consequently, the EPA is retaining the discretion for air agencies and the EPA to require additional areas to be characterized beyond those with a source exceeding the emission threshold. However, the EPA is not revising the rule to establish specific criteria for identifying such areas; the EPA is instead relying on case-by-case evaluation of the various relevant factors to determine which additional areas warrant air quality characterization".

Although its actual emissions has been below 2,000 tons in recent years, Schiller Station was identified by NHDES as requiring further characterization in large part because the facility was the subject of a Title V Petition which claimed that its emissions were interfering with the attainment and maintenance of the SO_2 NAAQS in a neighboring state. On January 5, 2016, NHDES submitted the DRR source list (i.e., Schiller and Newington Stations) to EPA Region 1. The January 5th letter was forwarded to Eversource on January 6, 2016.

The next key milestone for purposes of DRR implementation was July 1, 2016, the date by which each air agency was required to identify, for each listed source, the approach it will use to characterize air quality in the respective area (i.e., air quality modeling or ambient air quality monitoring). For sources that an air agency decides to evaluate through air quality modeling, DRR required the air agency to submit to the EPA Regional Administrator a modeling protocol by July 1, 2016, and the completed modeling analysis by January 13, 2017.

[31] http://www.dhhs.nh.gov/dphs/gtfscc/documents/eliot-air-quality-study-2014-16.pdf
[32] See pages 51061 and 51062.

In fulfilling its obligations under the DRR, NHDES chose to purse the option in paragraph §51.1204, *Enforceable emissions limits providing for attainment*. This paragraph states, "At any time prior to January 13, 2017, the air agency may submit to the EPA federally enforceable SO_2 emissions limits (effective no later than January 13, 2017) for one or more applicable sources that provide for attainment of the 2010 SO_2 NAAQS in the area affected by such emissions. The submittal shall include associated air quality modeling and other analyses that demonstrate that all modeling receptors in the area will not violate the 2010 SO_2 NAAQS, taking into account the updated allowable emission limits on applicable sources as well as emissions limits that may apply to any other sources in the area. The air agency shall not be subject to the ongoing data requirements of § 51.1205 for such area if the air quality modeling and other analyses demonstrate that the area will not violate the 2010 SO_2 NAAQS." NHDES pursued this option for two important reasons:

i. It relieves the agency and the regulated source of the additional administrative burdens associated with 40 CFR §51.1205; and

ii. As described earlier, NHDES is conducting a modeling analysis to derive emission limits for Schiller Station as per its obligations under Env-A 616 in its response to EPA's Order regarding the Sierra Club petition.

The following table summarizes NHDES obligations with respect to 1-hr SO_2 NAAQS and the applicable deadlines.

NHDES Response To	Selected Approach	Purpose	Deadline
EPA Order regarding Sierra Club's Petition	Air dispersion modeling analysis	To conduct the case-by-case review of Schiller's allowable emissions as specified under Env-A 616.	1. As per Env-A 609.19(f) *Permit Reopenings for Cause*: "where the reopening of a permit is the result of an objection by EPA filed as a result of a citizen petition to EPA pursuant to Env-A 614, the department shall, within 90 days of receipt of such an objection, resolve the objections by terminating, modifying, or revoking and reissuing the permit. 2. The EPA Order that granted part of Sierra Club's Petition was published in the federal register on September 1, 2015 (80 FR 52752).
Data Requirements Rule	Air dispersion modeling analysis	To establish emission limits that provide for attainment	January 13, 2017 (40 CFR 51.1204)

Modeling-based SO_2 emission limitations developed pursuant to the SIP approved rule Env-A 616 are federally-enforceable and would also satisfy the requirement under 40 CFR 51.1203(d)(2) that the allowable emission limits used in the DRR modeling analysis be federally-enforceable. NHDES therefore comingled and streamlined its obligations under Title V permitting and DRR. To this effect, Eversource submitted a modeling protocol, which was prepared in close consultation with NHDES, to simultaneously address the specific modeling requirements for the Title V process and the DRR. Throughout the permitting process, NHDES worked with Eversource to finalize the emission limitations prior to the January 13, 2017 deadline.

3. *NHDES' Calculation of Final Permit Limit is Incorrect*

NHDES Response

As mentioned earlier, NHDES applied the April 23, 2014 EPA *Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions* to develop a longer term average emission limit in consideration of the regulated source's concerns regarding the economic and operational challenges of meeting an hourly based limit and in consideration of NHDES' own directive under its guiding principles to consider economic vitality while pursuing its obligations under the law. NHDES worked with EPA Region 1 to fully understand the intent of the guidance and the methodologies that EPA used to develop the assessment of setting longer term average limits (Appendix B), the example calculations (Appendix C), and the review of relationships and the average ratios in Appendix D. EPA Region 1, in turn, consulted with the staff at EPA Headquarters who helped develop the guidance and the methodologies contained therein. EPA Headquarters staff confirmed to EPA Region 1 that all of the example calculations and example ratios reflect analyses that were done on a mass emissions (e.g. lb/hr) basis and that EPA did not intend to suggest that the Appendix C methodology could be performed on a lb/MMBtu basis.

However, notwithstanding the above discussion, the EPA guidance on page 33 clearly states that "SO_2 emission limits are often expressed in terms of emissions rates (e.g., pounds per hour) or in terms of emission factors (e.g., lb/MMBtu heat input), with the latter type of limit reflecting the emission factor that at the source's maximum operating rate would result in emissions at the rate found to provide for attainment. The variability of values for these two parameters will likely be different. Therefore, analyses of a longer term average limit that is comparably stringent to a 1-hour limit at the critical emissions value would need to be designed to assess variability for the parameter for which an emission limit is being set." Also page C-1 of Appendix C states that "This appendix provides sample calculations to illustrate EPA's suggested approach for determining an appropriately adjusted 30-day average emissions limit, calculated on a rolling average basis. Similar techniques could be applied in determining adjustments for other averaging times and for other types of limits such as limits on emissions per unit heat input".

Since a limit expressed in units of lb/MMBtu is more protective of the NAAQS in that it provides for protection under all operating load conditions, NHDES is proposing to express the final permit limit in units of lb/MMBtu. To resolve the issue of applying the guidance on a mass vs. emission factor basis, NHDES relied on an adjustment ratio analysis performed by staff at EPA's Clean Air Markets Division (CAMD). CAMD staff used emissions data from Gallagher Station in Indiana, which has a robust historical record of operating data that includes operation of DSI controls. They used the 99th percentile values of the sets of 24-hour calendar day averages and 1-hour values to develop the ratios, which is consistent with the EPA Guidance and its example calculations. CAMD staff calculated 24-hour calendar day to 1-hour adjustment ratios for SO_2 using Gallagher's data on a mass basis and an emission factor basis. They did the calculations for Gallagher Units 2 and 4 over several time periods, including 2012 to 2015 and 2012 to 2016. The results of CAMD's analysis are shown below:

Gallagher Station - 24-hour vs. 1-hour Adjustment Ratios* for SO_2				
Emission Unit	2012 to 2015		2012 to 2016**	
	Mass Basis	Rate Basis	Mass Basis	Rate Basis
Unit 2	0.8806	0.8636	0.8818	0.8637
Unit 4	0.8437	0.9106	0.8564	0.9083

* Adjustment ratios in this case reflect the ratio of the 99th percentile 24-hour calendar day value to the 99th percentile 1-hour value.

** 2016 data are preliminary.

Since there is a relatively short historical record for Schiller SR4 and SR6 that reflects the DSI controls, there is not sufficient information to judge whether Gallagher Unit 2 or 4 is more representative of the Schiller units. Therefore, the most conservative approach is to use the lower (i.e. more stringent) of the two Gallagher Unit adjustment ratios. CAMD's results in the table above show that when using the lower of the two values, the mass-based adjustment ratios and the rate-based adjustment ratios yield the same result for 2012 to 2016. That is, 0.8637 (Unit 2, rate basis) is equivalent to 0.8564 (Unit 4, mass basis) when rounded to two decimal places. These results demonstrate that in the case of Gallagher Station, a rate-based adjustment ratio can have comparable stringency to a mass-based ratio.

Since CAMD's 2012 to 2016 analysis included preliminary data for 2016, NHDES relied on CAMD's 2012 to 2015 results. Since there was insufficient data to determine which of the two Gallagher units is more representative of the units at Schiller, the best scientific option for protecting the NAAQS and human health was to use the more conservative (i.e. lower) of the two values. This is consistent with the EPA guidance, which states that "Given the uncertainties in extrapolating emissions characteristics from data for another source, the EPA advises states to assure that a conservative use of the other source's data is applied in determining the appropriate emission limit adjustment." (Note: Although this wording appears in Section V.D.2.c. of the Guidance entitled "Sources without CEMS", NHDES feels that it is appropriate to apply this recommendation in all cases where data from another source is used in deriving an adjustment factor for the source of interest). Therefore, NHDES selected the lower of the two rate-based adjustment ratios for Gallagher Units 2 and 4 for 2012 to 2015. This yields a final rate-based calendar day to 1-hour adjustment ratio of 0.8636 (note: as a quality assurance measure, NHDES performed its own rate-based adjustment ratio analysis for Gallagher Units 2 and 4 for 2012 to 2015 and obtained very similar results to CAMD's).

4. *NHDES Improperly Denied Eversource the Opportunity to Use Updated Guidance*

NHDES Response

The EPA-approved modeling protocol for the Schiller Title V and DRR permitting effort referenced the February 2016 *SO_2 NAAQS Designations Modeling Technical Assistance Document*[33]. Sections 5.1 and 7.1 of the February TAD recommend that the most recent three years of meteorological data be used for DRR modeling. Therefore, the EPA-approved protocol and subsequent modeling reflected the use of three years of meteorological data for the DRR modeling and five years of data for the Title V modeling. Since the DRR modeling with three years of meteorological data resulted in the more conservative (i.e. more stringent) air quality impact, these results were used as the basis for the revised permit limit included in draft Title V Permit that NHDES issued on November 10, 2016. However in August 2016 during the course of the permitting effort, EPA revised the modeling TAD. Sections 5.1 and 7.1 of this updated modeling TAD recommend that a minimum of three years of meteorological data be modeled. Consequently, Eversource suggested that five years of meteorological data be used for both the Title V and DRR modeling efforts. NHDES initially discouraged this suggestion for the following reasons: (1) schedule constraints, and (2) potential for outside comment, namely adverse comments from environmental groups or others due to a shift in methodology that deviates from the already-approved protocol and which results in a less stringent result.

Although the two reasons mentioned above may have had some merit at the time, they do not in and of themselves constitute a regulatory or technical basis for discouraging the use of five years of meteorological data. To this end, NHDES has performed updated modeling using five years of meteorological data consistent with the August 2016 version of the modeling TAD. This approach is also consistent with Section 5.4 of the TAD which states that when using allowable emissions (as in Schiller's case), the modeling exercise is no longer attempting to mimic an air quality monitor but becomes more like a SIP or PSD/NSR application. Please note that the language in Section 5.4 remained the same in both versions of the TAD (i.e., February and August). However, the updated modeling incorporates two additional considerations that must be noted:

i. In addition to the wording change regarding the number of meteorological years to model, the August modeling TAD cleared up ambiguous wording from the February 2016 version regarding receptor placement. Section 4.2 of the August modeling TAD states: "For SO_2 designations modeling, the areas to consider for receptor placement are those areas that would be considered ambient air relative to each modeled facility, including other facilities' property." Therefore, the updated modeling includes receptors within the fence lines of Schiller and Newington Stations. Modeling results at these receptors include the contributions of the modeled background sources and the background air quality data. However, results at these receptors do NOT include the contribution of Schiller or Newington Stations to impacts within their own respective fence lines.

ii. EPA recently released a new version of the AERMOD modeling system (AERMET version 16216 and AERMOD version 16216r). AERMOD version 16216r (dated January 17, 2017) includes a correction to a known bug in the formulation of the adjusted surface friction velocity (ADJ_U*)

[33] https://www.epa.gov/sites/production/files/2016-04/documents/so2modelingtad.pdf

option, which was discovered in the previous version (AERMOD 15181). Since the Schiller Station modeling incorporates the ADJ_U* option, and since AERMOD version 15181 had been used up to this point, all previous results for Schiller reflect a known error in the application of the ADJ_U* option that could lead to underestimation of maximum impacts. Therefore it was necessary to use AERMOD version 16216r for the updated modeling.

Updated modeling results and SO_2 emission limit for SR4 and SR6

When using five years of meteorological data (which DES re-processed with AERMET 16216) and re-modeling with AERMOD version 16216r, DES determined that the critical emission rate for each of Schiller Units SR4 and SR6 is 552 lb/hr. When appropriately converting to a lb/MMBtu basis for protection of the NAAQS under all load conditions, this value becomes 0.962 lb/MMBtu using the maximum hourly heat input rating of 574 MMBtu/hr for each of SR4 and SR6. Using the more conservative (i.e., lower) 24-hour to 1-hour adjustment ratio from the CAMD 2012 to 2015 analysis of Gallagher Station Units 2 and 4, the revised proposed permit condition becomes:

- 0.962 lb/MMBtu (hourly rate) x 0.8636 (adjustment ratio) = 0.83 lb/MMBtu, based on a boiler operating day avg.

5. *Comment regarding the inclusion of Temporary Permit TP-0157 conditions into the Title V Permit*

DES Response

As per Env-A 609.19 and 40 CFR 70.7(f) *Permit Reopenings for Cause,* NHDES is required to reopen and revise a Title V Operating Permit if an additional requirement, adopted after the date of issuance of a Title V Operating Permit, becomes applicable for a source having a permit with 3 or more years remaining prior to the expiration date of the permit. SR4 and SR6 became subject to the federal rule 40 CFR, Part 63, Subpart UUUUU *National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units* (also known as MATS) on April 16, 2016. Temporary Permit TP-0157 issued on April 15, 2015 includes all applicable requirements of MATS. TP-0157 expired on October 31, 2016. On August 2, 2016, Eversource submitted a permit application requesting that NHDES clarify the language in Table 3, Item 7 of TP-0157 and incorporate the amended TP-0157 into the Title V Permit. The language in Table 3, Item 7 in the current Permit TP-0157 is as follows:

> "Maintain the daily average sorbent injection rate in lbs/hr at or above the average injection rate observed during the most recent performance stack test demonstrating compliance with the HCl emission limit".

NHDES included the above permit condition to ensure continuous compliance in between the stack tests. In the August 2016 permit application, Eversource proposed the following language to replace Table 3, Item 7:

> "Maintain the daily average of sorbent injection rate in lbs/hr at or above the average injection rate observed during the most recent performance stack test performed while burning coal with the same or similar sulfur and chloride content to demonstrate compliance with the HCl emission limit".

Eversource requested the revised language "to utilize its history of sorbent injection rates that were previously proven to demonstrate compliance with the HCl limit through performance stack testing". Specifically, if the sulfur or chloride content (as determined by coal analyses) changes between stack tests, but is the same or similar to the sulfur and chloride content of coal previously burned during a prior performance stack test used to demonstrate compliance with the applicable HCl limits, Eversource requested that the injection rate be changed to match the most recent injection rate proven to demonstrate compliance on this coal type.

NHDES did not approve Eversource's request for a change in the permit language because of the following reasons:

1. As of October 2016, Eversource has conducted only one compliance stack test[34] to verify compliance with the MATS HCl emission limit.
2. During the period of April 16 - June 30, 2016, coal was only burned for approximately 48 hours total in SR4 and SR6.

[34] Initial performance stack tests were conducted on SR4 and SR6 on March 15 -17, 2016.

Given that there is limited DSI operational data, NHDES incorporated the language from Table 3, Item 7 of TP-0157 unchanged into the revised Title V Permit.

The DSI/ACI air blower parameters (as presented in the Schiller Station's Air Pollution Control Equipment Plan for Dry Sorbent and Activated Carbon Injection Systems updated on August 2, 2016), were included in the revised Title V Permit to ensure that the air pollution control devices are operating within the proper ranges.

The Title V Permit was reopened primarily in response to the EPA Order. Since the Permit is being reopened, NHDES also incorporated TP-0157 (i.e., applicable MATS requirements) into the Title V Permit as per Env-A 609.19(a)(1).

Attachment B
(EPA Response to Updated Modeling)

From: Biton, Leiran <biton.leiran@epa.gov>
Sent: Monday, February 13, 2017 11:14 AM
To: Healy, David
Cc: 'melissa.cole@eversource.com'; 'Zachary Fabish'; Baru, Padmaja; Milbury, Gary; McDonnell, Ida

Subject: RE: Updated Schiller Station Modeling
Hello Dave,

Thank you for sending this update on the modeling for Eversource Schiller Station. Your proposed changes to the modeling are in line with EPA guidance, and with our discussions to date. Based on your write-up, I agree that these changes are appropriate for the analysis you are conducting.

Thank you for keeping us informed and up-to-date, and, as always, please feel free to contact me with any questions or problems as they arise. (And good luck digging out of the snow storm!)

Best,
Leiran
--
Leiran Biton
US EPA Region 1, New England
Office (617) 918-1267
biton.leiran@epa.gov
The environment will be just a little bit sadder if you choose to print this message.

From: Healy, David [mailto:David.Healy@des.nh.gov]
Sent: Friday, February 10, 2017 10:05 AM
To: Biton, Leiran <biton.leiran@epa.gov>
Cc: 'melissa.cole@eversource.com' <melissa.cole@eversource.com>; 'Zachary Fabish' <zachary.fabish@sierraclub.org>; Baru, Padmaja <Padmaja.Baru@des.nh.gov>; Milbury, Gary <Gary.MilburyJr@des.nh.gov>
Subject: Updated Schiller Station Modeling

Hi Leiran,

For your information and records, we wanted to convey some changes in methodology regarding the 1-hr SO2 air dispersion modeling for Eversource Schiller Station.

Previous 1-hr SO2 modeling was performed by Exponent and NHNHDES and documented in Exponent modeling reports dated June 17, September 14, and October 6, 2016. All of this modeling followed the procedures in the March 21, 2016 "Technical Memorandum, Air Quality Modeling Protocol for Schiller Station", which was prepared by Exponent in consultation with NHNHDES and approved by EPA Region 1 on May 2, 2016.

As you know, NHNHDES has performed an updated modeling analysis to address comments on the Draft Title V Permit from Sierra Club and Eversource (Sierra Club and Eversource comment packages dated December 19, 2016). This updated modeling also addresses topics that we discussed with you and other EPA Region 1 staff during various phone calls and meetings.

Although the updated modeling still follows the overarching methodology in the approved March 2016 protocol, we wanted to let you know that the following specific methodologies have changed somewhat:

1) AERMET version 16216 and AERMOD version 16216r (dated January 17, 2017) were used in the updated modeling (previous modeling used AERMET/AERMOD version 15181, as specified in the March 2016 protocol). AERMOD version 16216r corrects a known bug in the formulation of ADJ_U* which could lead to under-

prediction of maximum impacts. Therefore it was necessary to re-do the modeling with the corrected update of the AERMOD modeling system.

2) Five years of meteorology were used for the DRR modeling (previous modeling used three years, as specified in the March 2016 protocol). This was done in accordance with the August 2016 version of the "SO2 NAAQS Designations Modeling Technical Assistance Document" (TAD).

3) Receptors were placed within the fence lines of Schiller and Newington Stations (receptors were excluded from these areas for the previous modeling, as specified in the March 2016 protocol). This was also done in accordance with the August 2016 TAD which, in addition to wording changes regarding the number of meteorological years to model, cleared up ambiguous wording regarding receptor placement. NOTE: Model results at these receptors do NOT include the contribution of Schiller or Newington Stations to impacts within their own respective fence lines.

Again, we wanted to convey these methodology changes to you for your information and your records since they differ somewhat from the March 2016 modeling protocol. Please let us know if you have any questions on this information.

Thanks a lot and have a great weekend if I don't speak with you again beforehand,

Dave

David Healy
Air Quality Analyst/Modeler
New Hampshire Dept. of Environmental Services
29 Hazen Drive
P.O. Box 95
Concord, NH 03302-0095

Phone: 603-271-0871
Fax: 603-271-1381
E-mail: david.healy@des.nh.gov
Web: www.des.nh.gov

Attachment C
(Revision to the AERMOD Modeling System v16216 Correspondence from EPA)

From: Biton, Leiran [mailto:biton.leiran@epa.gov]
Sent: Wednesday, January 18, 2017 10:11 AM
To: Dan Riley; Healy, David; Elliott, Doug; Jude Catalano; Kevin Ostrowski; Landry, Lisa; glenn.pacheco@state.ma.us; Sam Sampieri; Steven Coughlin (steven.coughlin@state.ma.us); Wilfredo Lemus
Cc: Paul Miller
Subject: FW: Revision to the AERMOD Modeling System v16216

TO: Region 1 State Modelers

Please see the note from George Bridgers below regarding a new release of AERMOD/AERMET. The latest version is now "16216r". Please ensure that the latest version is used in any new modeling analyses, which includes new versions of AERMET.
Feel free to respond with questions as they arise.
Best,
Leiran
--
Leiran Biton
US EPA Region 1, New England
Office (617) 918-1267
biton.leiran@epa.gov
P The environment will be just a little bit sadder if you choose to print this message.

From: Bridgers, George
Sent: Tuesday, January 17, 2017 7:30 PM
To: Avey, Lance <Avey.Lance@epa.gov>; Biton, Leiran <biton.leiran@epa.gov>;
Subject: Revision to the AERMOD Modeling System v16216

Greetings,
On December 20th, 2016, Gina McCarthy signed the final rule for the revisions to the *Guideline on Air Quality Models* (Appendix W). At that time, the EPA released the latest regulatory version of the AERMOD Modeling System, version 16216, corresponding to the Appendix W final rule. Since its release, a few issues in the AERMOD model code and compilation have been discovered and brought to our attention that warrant our releasing a revised version of the model to coincide with the publication of the Appendix W final rule in the Federal Register and subsequent rule effective date. The Federal Register publication of Appendix W occurred earlier today, January 17th, 2017, which establishes February 16th as the rule's effective date. A direct link to the Federal Register publication is provided below.

Specifically, these are the issues that were discovered in the version 16216 AERMOD model code:

1.) Code logic with respect to the need for setting the BETA control option flag for NO2 Tier 3 OLM modeling was not removed from the previous versions of the AERMOD model code. Correcting this oversight does not change modeled concentrations and makes the code consistent with the Appendix W final rule, as intended.
2.) Code logic and error messages related to the regulatory default or beta status of using the adjust u* option in conjunction with site-specific turbulence data were corrected to be consistent with the Appendix W final rule, as intended. These corrections do not change the modeled concentrations.
3.) Two lines of code were inadvertently removed and two coding errors occurred in the AERACIRC source type programming between AERMOD versions 15181 and 16216. There could be substantial modeled concentrations differences for AERACIRC sources resulting from these issues. Both of these interrelated issues were not intended and have been revised to reflect the model code as proposed in version 15181.
4.) Several lines of code were added to initialize variables used in the BLP MAXDCONT option that otherwise might have resulted in a run-time error.
5.) Formatting statements were modified to correct runtime errors with the SCIM option in AERMOD.
6.) Several minor code modifications (spacing, tabs, etc…) have been implemented to allow the model code to compile with fewer warnings/errors across various Fortran compilers. These modifications do not change

modeled concentrations.

7.) AERMOD has been recompiled to fully support both 32-bit and 64-bit Microsoft Windows Operating Systems. The December release did not work on some 32-bit systems. The recompilation for 32/64 bit compatibility does not change modeled concentrations.
8.) AERSCREEN was revised to allow for 6 characters in the AERMOD version number, *e.g.*, 16216r. The revision does not change modeled concentrations.

We are asking for all AERMOD Modeling System users to **re-download** the AERSCREEN and AERMOD model executables and/or source code (if you compile the code specifically for your systems) from the EPA's SCRAM website at your earliest convenience. Direct links to the model executables and source code are provided below for easy reference. Given the interconnectivity of this version of AERMOD to the Appendix W final rule and corrections to ensure that the model is consistent with this final rule, we are not changing the model version with this revision. Rather, we are adding the letter "r" to the end of the version number. So, AERMOD Modeling System users and regulatory reviewers can easily identify if the appropriate version of the AERMOD model is being executed by the identification of "AERMOD – Version 16216r" or "AERMOD (16216r)" in the model output files.

Finally, a few typographic errors or errata were discovered in the AERMET and AERMOD User's Guides. These errors have been corrected, the User's Guides refreshed on SCRAM, and corresponding Errata Memorandums placed in the Appendix W final rule Docket. It is advisable for all AERMOD Modeling System users to also re-download both of these documents at this time.

We apologize for any inconvenience that the model executables / source code issues described above may have caused throughout the dispersion modeling community and greatly appreciate the prompt feedback from the user community since the initial release of version 16216. Please share this announcement and information with your respective tribal, state, and local air agencies and any other colleagues and interested parties as soon as possible. As always, do not hesitate to contact me if there are any questions or needed clarification.

My regards,
George

Federal Register Version of Appendix W Final Rule (January 2017):
https://www3.epa.gov/ttn/scram/appendix_w/2016/AppendixW_2017.pdf
AERMOD Model Executable: https://www3.epa.gov/ttn/scram/models/aermod/aermod_exe.zip
AERMOD Model Source Code: https://www3.epa.gov/ttn/scram/models/aermod/aermod_source.zip
AERSCREEN Model Executable and Source Code: https://www3.epa.gov/ttn/scram/models/screen/aerscreen_code.zip
AERMET User's Guide: https://www3.epa.gov/ttn/scram/7thconf/aermod/aermet_userguide.pdf
AERMET User's Guide Errata
Memorandum: https://www3.epa.gov/ttn/scram/appendix_w/2016/AERMET_Users_Guide_Errata.pdf
AERMOD User's Guide: https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf
AERMOD User's Guide Errata
Memorandum: https://www3.epa.gov/ttn/scram/appendix_w/2016/AERMOD_Users_Guide_Errata.pdf

_____

George M. Bridgers, CPM, Environmental Scientist
U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
AQAD - Air Quality Modeling Group
109 TW Alexander Drive
Room C431B - Mail Drop C439-01
Research Triangle Park, NC 27711
Phone: 919-541-5563
Fax: 919-541-0044

From: Biton, Leiran [mailto:biton.leiran@epa.gov]
Sent: Wednesday, January 04, 2017 1:28 PM
To: Dan Riley; Healy, David; Elliott, Doug; Jude Catalano; Kevin Ostrowski; Landry, Lisa; glenn.pacheco@state.ma.us; Sam Sampieri; Steven Coughlin (steven.coughlin@state.ma.us); Wilfredo Lemus
Cc: Paul Miller; Colecchia, Annamaria; Kelly, Bob
Subject: FW: follow up on AERMOD 16216 adjusted u*

TO: REGION 1 STATE MODELERS

Please see the note from James Thurman (OAQPS) below, regarding differences in concentrations using AERMOD with ADJ_U* in model versions 15181 vs 16216. If you have any information to share about this, particularly about whether this is affecting facilities in your states, including source types and met data sources, please pass it along so that we can more quickly identify any issues.

Thanks, and best,
Leiran
--
Leiran Biton
US EPA Region 1, New England
Office (617) 918-1267
biton.leiran@epa.gov
P The environment will be just a little bit sadder if you choose to print this message.

From: Thurman, James
Sent: Wednesday, January 04, 2017 10:46 AM
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Cc: Bridgers, George <Bridgers.George@epa.gov>; Fox, Tyler <Fox.Tyler@epa.gov>
Subject: follow up on AERMOD 16216 adjusted u*

All,
If you want to pass along the following information about the bug fix to your states/locals, feel free to do so, making it clear that if they have specific information on source types and source of met data, to pass along to the Region.

We have been receiving some reports from consultants that some sources modeled with AERMOD 16216 adjusted u* are showing higher concentrations than with adjusted u* with 15181.

The reason for the increase is due to two bug fixes in the adjusted u* calculations in AERMET 16216. These are ***NOT*** formulation changes, these are true bug fixes. The formulation in 16216 is the same as 15181. One bug fix was to correct the denominator in the critical u* calculation, to be consistent with the same calculation in the Qian and Venkatram paper the adjustment is based on, and also to move the equation to its proper place in the model code. The change in the denominator is most likely the driving change as we are now dividing by 4 instead of 2 in the critical u* equation, thus making the adjustment smaller than in 15181 and leading to higher concentrations than 15181.

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