AUG 1 5 2018

Robert J. Klee, Commissioner
Department of Energy and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127

   Re: Ongoing Requirements for Connecticut under the Sulfur Dioxide Data
   Requirements Rule

Dear Commissioner Klee:

I am writing to you regarding Connecticut's ongoing data requirements under the Data
Requirements Rule (DRR)[1] for sulfur dioxide (SO_2), specifically for the area around
Bridgeport Harbor Station in Fairfield County. On December 8, 2016, the Connecticut
Department of Energy and Environmental Protection (CT DEEP) submitted an air quality
characterization to the EPA, which included air quality modeling information for Bridgeport
Harbor Station as required by the DRR. The submittal included a request for Connecticut to
no longer be subject to ongoing data requirements under the DRR for the area around
Bridgeport Harbor Station in Fairfield County. On January 9, 2018, the EPA designated the
area around Bridgeport Harbor Station as attainment/unclassifiable, after consideration of all
available information, including CT DEEP's modeling of actual emissions for this area.

The DRR provides that "[f]or any area where modeling of actual SO_2 emissions serve as the
basis for designating such area as attainment for the 2010 SO_2 National Ambient Air Quality
Standard (NAAQS), the air agency shall submit an annual report to the EPA Regional
Administrator" providing specified types of information, including a recommendation as to
the need for further modeling to assess whether the area is continuing to attain the NAAQS.
See 40 CFR 51.1205(b). However, "[a]n air agency will no longer be subject to [these
requirements] if it provides air quality modeling demonstrating that air quality values at all
receptors in the analysis are no greater than 50 percent of the 1-hour SO_2 NAAQS, and such
demonstration is approved by the EPA Regional Administrator."

Your submittal of December 8, 2016 included modeling of actual emissions for Bridgeport
Harbor Station showing maximum SO_2 concentrations of 15.8 parts per billion (ppb),
representing 21 percent of the SO_2 NAAQS. The EPA has evaluated this modeling analysis,
and concludes that this analysis appropriately characterizes SO_2 air quality in the area. The
EPA also reviewed more recent emissions data for Bridgeport Harbor Station, and confirmed

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[1] 40 CFR Part 51, Subpart BB.

that annual SO$_2$ emissions have declined since the years modeled. This trend of declining emissions indicates that your modeling analysis is still relevant for the purpose of 40 CFR 51.1205(b)(2). Therefore, the EPA agrees that Connecticut has provided modeling demonstrating that SO$_2$ air quality values at all receptors in the area are no greater than 50 percent of the NAAQS, and I approve this demonstration. Consequently, no ongoing data submissions are required for this area going forward under 40 CFR 51.1205(b). Because there are no other areas in Connecticut subject to the DRR, Connecticut has completed its obligations under the DRR. The attachment to this letter provides the technical basis for my decision.

Thank you for the work your agency has done on these issues. If you have any questions, please contact me at (617) 918-1012 or David Conroy, Air Programs Branch Chief, at (617) 918-1661.

Sincerely,

Alexandra Dapolito Dunn
Regional Administrator

cc: Richard Pirolli, CT DEEP

Attachment

Assessment of Information Regarding Bridgeport Harbor Station as Related to the Ongoing Data Requirements Under the Sulfur Dioxide Data Requirements Rule

US Environmental Protection Agency, Region 1
August 8, 2018

1. Introduction

The Connecticut Department of Energy and Environmental Protection (CT DEEP) submitted a modeling analysis in December 2016 for the State's one source, Bridgeport Harbor Station ("Bridgeport Harbor") in Fairfield County, that is subject to the Data Requirements Rule (DRR) for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS). *See* 80 FR 51052. The 2010 1-hour SO_2 Primary NAAQS is 75 parts per billion (ppb) based on the 3-year average of the 99th percentile of the yearly distribution of 1-hour daily maximum concentrations. CT DEEP's submittal included a request for Connecticut to no longer be subject to ongoing data requirements under the DRR for the area around Bridgeport Harbor (referred to in this document as "the Bridgeport Harbor area").

EPA assessed information included in the State's submittal, supplemented by other information, to determine whether the State has met the requirements related to ongoing data requirements under the DRR for Bridgeport Harbor. Specifically, pursuant to 40 CFR 51.1205(b)(2), "[a]n air agency will no longer be subject to [these requirements] if it provides air quality modeling demonstrating that air quality values at all receptors in the analysis are no greater than 50 percent of the 1-hour SO_2 NAAQS, and such demonstration is approved by the EPA Regional Administrator." Based on this assessment, described below, EPA concludes that Connecticut has submitted a sufficient demonstration. Therefore, the State will no longer be subject to the ongoing data requirements under the DRR for Bridgeport Harbor.

2. Air Quality Monitoring Data for the Bridgeport Harbor Area

EPA considered SO_2 air quality monitoring data submitted by the State for the Bridgeport Harbor area. The State included monitoring data from Air Quality System (AQS) monitor number 09-001-0012 at the Edison School at 115 Boston Terrace, Bridgeport, Connecticut, in Fairfield County.[1] This monitor is approximately 3.2 km to the northeast of Bridgeport Harbor. Data collected at this monitor indicates that the monitored SO_2 Design Value (DV) for the period from 2014 to 2016 is 6 parts per billion (ppb; equivalent to 15.7 micrograms per cubic meter, $\mu g/m^3$).[2] EPA has confirmed that there are no additional relevant data in the AQS.

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[1] EPA's monitoring DV data are available at: https://www.epa.gov/air-trends/air-quality-design-values.
[2] The SO_2 NAAQS level is expressed in ppb but AERMOD gives results in $\mu g/m^3$. At the standard conditions applied in the ambient SO_2 reference method, 1 ppb SO_2 equals approximately 2.619 $\mu g/m^3$.

3. Air Quality Modeling Analysis for the Bridgeport Harbor Area

On December 8, 2016, Connecticut submitted an air quality modeling analysis for the Bridgeport Harbor area to satisfy the requirements of the DRR. This section presents Connecticut's air quality modeling analysis, and EPA's assessment of that analysis, for Bridgeport Harbor. The discussion and analysis that follows below will reference the August 2016 "SO$_2$ NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD),[3] as appropriate. After careful review of the State's assessments, supporting documentation, and all available data, as described below, EPA agrees with the State's conclusion that air quality values at all receptors in the analysis are no greater than 50 percent of the 1-hour SO$_2$ NAAQS.

Figure 1. Map of the Bridgeport Harbor Area and Modeling Domain
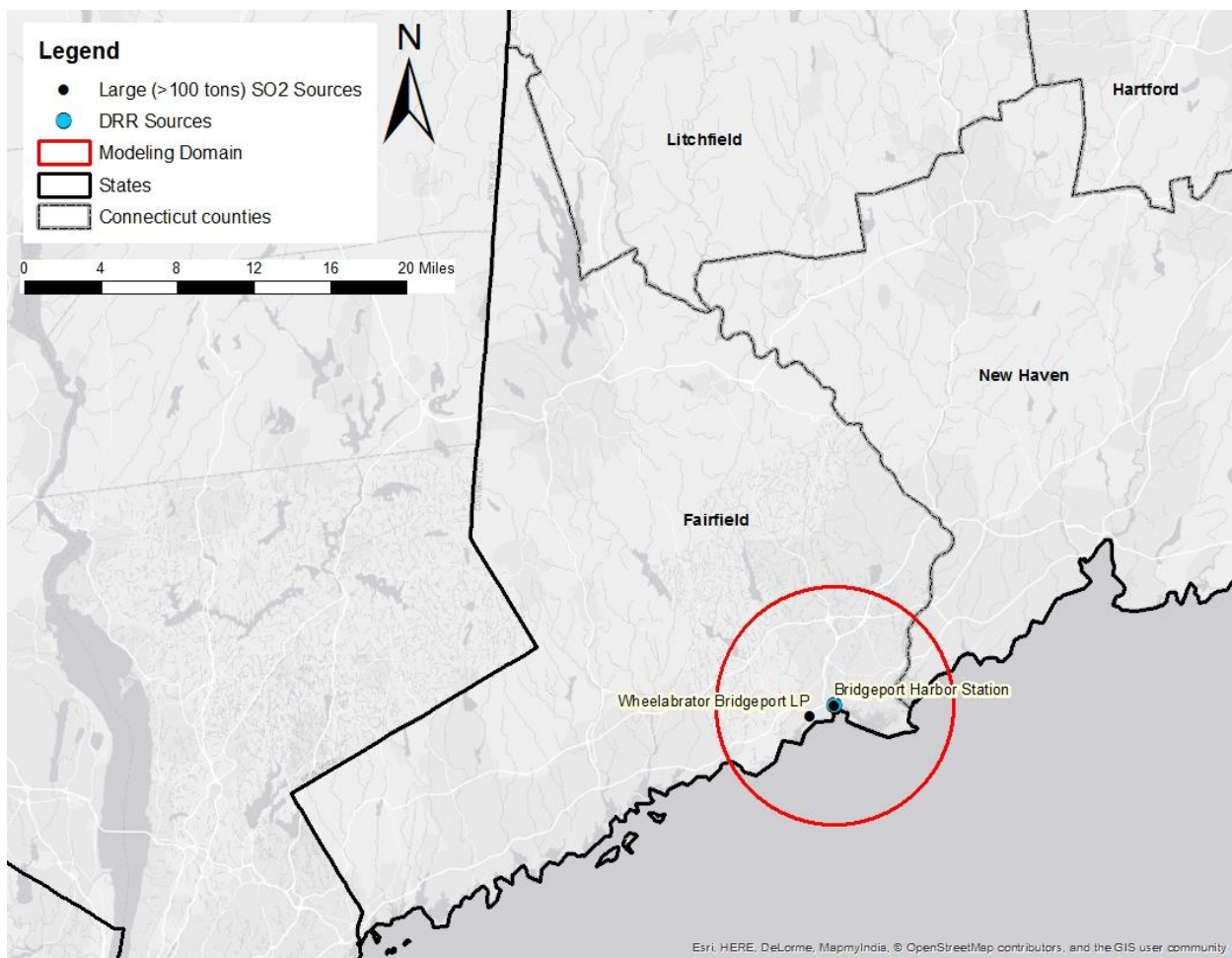
The source of this map image is Esri, used by EPA with Esri's permission.

As seen in Figure 1, the area the State assessed via air quality modeling is located in southeastern Fairfield County, including Bridgeport, Fairfield, Trumbull, and Stratford; and also in a small portion of Milford in New Haven County. Bridgeport Harbor is located near downtown Bridgeport at the inlet of the Pequannock River from the Bridgeport Harbor waterbody. Also

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[3] Available at: https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf.

included in Figure 1 is Wheelabrator Bridgeport LP, the only other nearby emitter of SO_2 of 100 tpy or greater in the Bridgeport Harbor area, based on information in the EPA's 2014 National Emissions Inventory. Only Bridgeport Harbor was explicitly modeled in the State's analysis. Wheelabrator Bridgeport LP is upwind from the monitor, and is therefore expected to be sufficiently captured by the monitoring data (see Section 3.8). EPA agrees with the State that the Bridgeport levels observed at the Edison monitor are appropriate for representing nearby sources in the monitored background level.

3.1. Model Selection

The State's assessment and characterization was performed using the AERMOD air dispersion modeling system, version 15181, analyzing actual emissions. AERMOD version 15181 was the most up-to-date version at the time of the State's submittal, using all regulatory default options. AERMOD is the dispersion modeling component of the AERMOD modeling system; other components of the system are described in the following sections, as appropriate. AERMOD version 18081 has since become the regulatory model version; however, EPA expects that no updates from 15181 to 18081 would be expected to result in higher concentrations for this modeling analysis. The State's selection of the AERMOD modeling system is consistent with recommendations included in EPA's Modeling TAD, and EPA agrees with the State's selection.

3.2. Model Dispersion Characteristics

The State conducted a land-use analysis for the 3 km area around the modeled source, consistent with Section 7.2.3 of the Guideline on Air Quality Models. The State determined that it was most appropriate to run the model in urban mode based on an analysis showing nearly equivalent land areas within 3 km of the modeled source, also accounting for the nearby industrialized zone, waterbody, and major interstate highway system. Use of rural dispersion characteristics is likely to result in lower near-field impacts, so the use of urban dispersion characteristics for this site is likely a more conservative (i.e., unlikely to underpredict concentrations) modeling assumption. For these reasons, EPA agrees with Connecticut's selection of urban dispersion characteristics.

3.3. Modeling Receptor Grid

The receptor network contained 5,593 receptors, and the network covered the southeastern portion of Fairfield County and a small portion in the west of New Haven County, as well as a portion of Long Island Sound. The State included receptors at 50 m spacing along the fenceline, and in a nested Cartesian grid as follows:

-   at 50 m spacing to 500 meters from the fenceline,
-   at 100 m spacing to around 2,500 m from the source,
-   at 250 m spacing to around 5,500 m from the source, and
-   at 500 m spacing to 10 km distance from the source.

Receptors were excluded within the facility fenceline. Figure 2, generated by the EPA based on modeling files submitted by the State, show the more near-field grids for the area of analysis.

The modeled domain exceeds the distance of 10 times the stack height in flat terrain generally expected to capture the maximum ground level concentration; in this case, that distance is 1.5 km based on the 152 m stack height. Therefore, EPA expects that the modeling domain is sufficient to identify maximum impacts in the Bridgeport Harbor area. As described later, the maximum modeled concentration occurred at 7.0 km from the source, well within the domain though the distance is greater than the 1.5 km estimate assuming flat terrain. EPA finds the receptor grid is appropriate for characterizing the Bridgeport Harbor area.

Figure 2. Near-field Receptor Grid for the Bridgeport Harbor Area
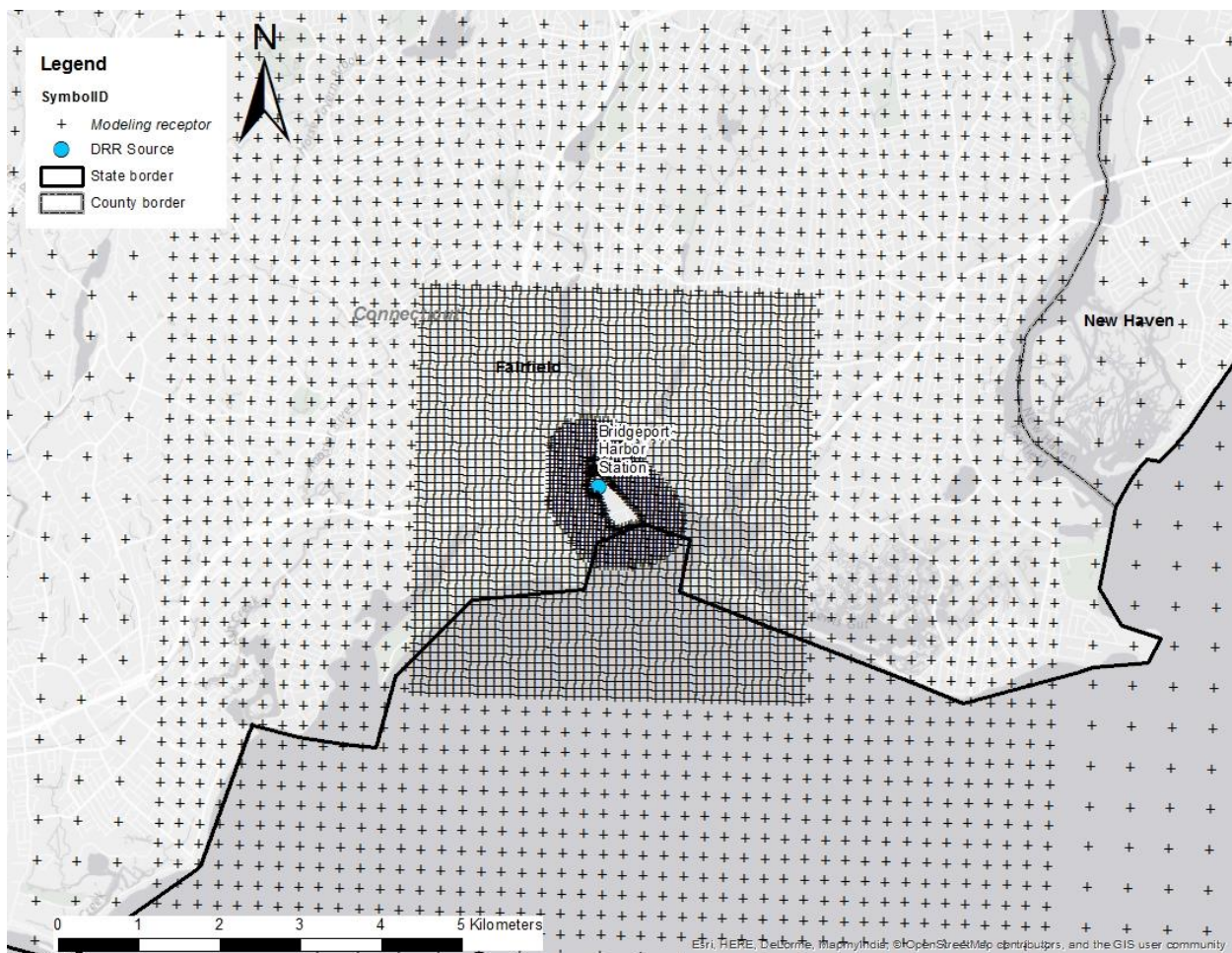
The source of this map image is Esri, used by EPA with Esri's permission.

3.4. Terrain

The terrain in the Bridgeport Harbor area is gently rolling hills in the northern quadrants, and flat (water) in the southern quadrants. To account for these terrain changes, the State used AERMAP, the terrain processor for AERMOD, version 11103 to specify terrain elevations for all receptors.

The State used elevation data from the US Geological Survey's National Elevation Dataset at 10-meter (1/3-arc second) resolution. This approach is consistent with EPA's recommendations; therefore, EPA concludes the State's approach in specifying terrain elevations is appropriate.

3.5.   Modeling Source Characterization

The State used actual stack heights in conjunction with actual emissions for Bridgeport Harbor in accordance with the best practices outlined in the Modeling TAD. Connecticut did not characterize building downwash for Bridgeport Harbor because the actual stack height is in excess of good engineering practice height. Therefore, structure is not expected to contribute to excessive ground-level concentrations through a building downwash effect.

EPA examined aerial imagery for this facility to confirm the conclusion that downwash is not expected to contribute to excessive ground-level concentrations. This is a deviation from recommendations in the Modeling TAD. Based on the distance between the source and the location of the maximum modeled impacts (described in Section 3.9), and EPA's expectations for how the structure interacts with plume dispersion, EPA does not expect that downwash for this specific case would result in higher maximum modeled concentrations. Therefore, EPA concludes that the State adequately characterized the source's stack parameters, e.g., exit temperature, exit velocity, location, and diameter.

3.6.   Modeled Emissions

The State used annual actual SO_2 emissions between 2013 and 2015 in accordance with recommendations included in the Modeling TAD. Annual emissions for Bridgeport Harbor for the period modeled are summarized in Table 1. The State obtained actual hourly emissions data from the Bridgeport Harbor continuous emissions monitoring system (CEMS) and retrieved variable stack exhaust flow data from EPA's Clean Air Markets Database (CAMD). The State used a uniform stack exhaust temperature for all hours because variable stack temperature data were not available. Based on the available evidence, EPA concurs with Connecticut in its selections of emissions parameters and emissions rates for Bridgeport Harbor.

Table 1. Actual SO₂ Emissions Between 2013 and 2015 for Bridgeport Harbor

Facility Name	SO₂ Emissions (tpy)		
	2013	2014	2015
Bridgeport Harbor	782	922	707

3.7.   Meteorological Modeling and Surface Characteristics

The State selected the surface meteorology from the National Weather Service (NWS) Automated Surface Observing Systems (ASOS) station at Sikorsky Airport in Stanford, Connecticut, 5.0 km to the east-northeast of the source, and coincident upper air observations from a different NWS station located in Brookhaven, New York, around 42 km to the southeast of the source, as best representative of meteorological conditions within the area of analysis. The

State followed the methodology and settings presented in the AERMET, the meteorological data processor for AERMOD, version 15181 User's Guide and Addendum, as clarified in the March 8, 2013 memorandum from Tyler Fox "Use of ASOS meteorological data in AERMOD dispersion modeling," in the processing of the raw meteorological data into an AERMOD-ready format. The State processed 1-minute resolution data for a 3-year period from 2013 through 2015 from the Sikorsky Airport ASOS station using AERMET version 15181 and AERMINUTE version 15272, a pre-processor to AERMET for 1-minute ASOS data.

The State used AERSURFACE, the surface characteristics processor for AERMET, using land cover data from the 1992 National Land Cover Dataset representative of the Sikorsky Airport NWS station to estimate the surface characteristics of the area of analysis. The State estimated values for 12 spatial sectors out to 1 km at a monthly temporal resolution for average conditions. The Sikorsky Airport ASOS station is located within the modeling domain, and is suitably representative of the meteorological conditions at Bridgeport Harbor.

EPA concludes from this information that the meteorological data were selected and treated appropriately and are suitable for the current assessment.

3.8. Background Concentrations

To characterize background concentrations of SO_2, the State used the hourly varying "tier 2" approach described in the Modeling TAD and in the EPA's March 1, 2011, memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 Ambient Air Quality Standard." Specifically, the State relied on the 99th percentile (by hour of day and season) based on monitoring data from the Edison School for 2013-2015. Using this approach, the State developed 96 individual values to represent 24-hourly values for each of four seasons. The range of background values included in the State's modeling is from 1.0 ppb, equivalent to 2.6 micrograms per cubic meter ($\mu g/m^3$), to 8.7 ppb (22.8 $\mu g/m^3$), with an average value of 3.9 ppb (10.3 $\mu g/m^3$). The background concentrations for this area of analysis were determined by the State and are presented in Table 2.

The background values used for the assessment of the Bridgeport Harbor area are consistent with EPA's recommended approach, and EPA concludes that they are appropriate based on the data and reasoning provided by the State.

3.9. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Bridgeport Harbor area of analysis are summarized below in Table 3. The results presented in Table 4 show the geographic location and magnitude of the highest predicted modeled concentration based on the input parameters. The State's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 41.3 $\mu g/m^3$, equivalent to 15.8 ppb. This value is approximately 21 percent of the NAAQS. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the facility. Figure 3

was included as part of the State's recommendation, and indicates that the predicted value occurred in western Milford approximately 7.0 km to the east of Bridgeport Harbor. The modeling submitted by the State indicates that air quality values at all receptors in the analysis are no greater than 50 percent of the 1-hour SO_2 NAAQS.

Table 2. Modeled SO_2 Background Concentrations in ppb

Hour	Season			
	Winter	Spring	Summer	Fall
1	7.4	5.0	1.1	3.3
2	7.4	4.4	1.1	3.4
3	7.7	5.0	1.2	3.4
4	7.0	5.6	1.0	3.0
5	7.4	5.2	1.2	3.0
6	7.4	5.6	1.0	2.8
7	8.6	5.7	1.5	3.2
8	8.5	5.1	1.6	3.6
9	8.7	3.8	1.6	3.9
10	7.3	3.5	1.8	3.5
11	7.0	3.2	2.3	5.5
12	6.3	4.3	2.6	4.1
13	6.3	4.0	1.6	4.1
14	6.4	4.1	1.5	3.4
15	5.4	3.0	1.5	3.1
16	4.5	2.5	1.0	2.6
17	4.0	2.1	1.9	2.6
18	4.8	2.8	2.1	2.5
19	5.5	2.5	2.2	2.5
20	5.5	3.2	2.4	2.6
21	6.1	4.6	5.6	2.9
22	6.4	4.0	1.8	2.8
23	6.7	3.7	1.2	2.5
24	7.0	4.3	1.8	3.1

Table 3. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Bridgeport Harbor area

Input Parameter	Value
AERMOD Version	15181 (regulatory default mode)
Dispersion Characteristics	Urban (Population: 308,000)
Modeled Sources	1
Modeled Stacks	1
Modeled Structures	0
Modeled Fencelines	1
Total receptors	5,593
Emissions Type	Actual
Emissions Years	2013-2015
Meteorology Years	2013-2015
NWS Station for Surface Meteorology	Sikorsky Airport ASOS
NWS Station Upper Air Meteorology	Brookhaven, New York NWS
NWS Station for Calculating Surface Characteristics	Sikorsky Airport ASOS
Methodology for Calculating Background SO_2 Concentration	AQS site number 09-001-0012, Tier 2, temporally varying by hour of day and season
Calculated Background SO_2 Concentration	1.0 to 8.7 ppb (see Table 2)

Table 4. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Bridgeport Harbor Area

Averaging Period	Data Period	Receptor Location [UTM zone 18] UTM-X (meters)	UTM-Y (meters)	99th percentile daily maximum 1-hour SO_2 Concentration ($\mu g/m^3$) Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2013-2015	659,000	4,561,000	41.3	196.4*

* At the standard conditions applied in the ambient SO_2 reference method, 1 ppb SO_2 equals 2.619 $\mu g/m^3$.

3.10. EPA's Assessment of the Modeling Information Provided by the State

The modeling submitted by the State does not contain any significant departures from the Modeling TAD. As explained in the preceding sections, EPA concurs with the State's selection of modeling components, including: urban operating mode; modeling domain and receptor placement; source characterization, including stack parameters; emissions parameters and rates; meteorological data and surface parameters; terrain elevations; and background concentrations. Connecticut did not characterize building downwash in its analysis of emissions from Bridgeport Harbor Station. Based on the distance between the source and the location of the maximum modeled impacts, and EPA's expectations for how the structure interacts with plume dispersion, EPA does not expect that downwash for this specific case would result in higher maximum modeled concentrations. Therefore, EPA concludes that the modeling submitted by the State is sufficient to demonstrate whether the concentrations in the Bridgeport Harbor area are greater than 50 percent of the 1-hour SO_2 NAAQS.

Figure 3. Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Area of Analysis for the Bridgeport Harbor Area
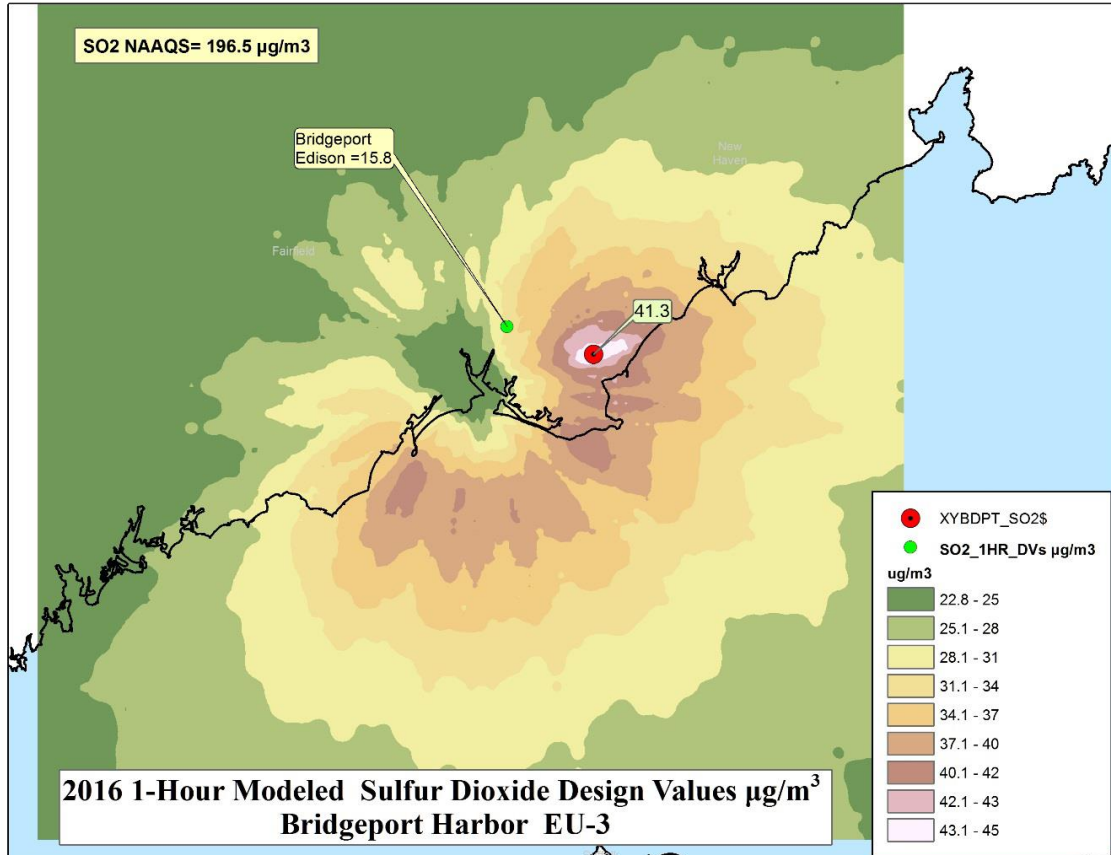
4. SO$_2$ Emissions trends

To supplement the assessment of the State's modeling analysis, EPA retrieved annual SO$_2$ emissions data for Bridgeport Harbor from the CAMD emissions database for 2014 through 2017. These data are presented in Table 5. These data indicate that annual SO$_2$ emissions from Bridgeport Harbor have declined every year from 2014 through 2017, reflecting diminished utilization of the coal-fired Unit 3 boiler over that period.

Table 4. SO$_2$ Emissions Trends for Bridgeport Harbor Unit 3 from 2014 to 2017

Year	Heat Input (Million British Thermal Units)	SO$_2$ (tons)
2014	8,680,700	921.6
2015	6,605,667	707.2
2016	2,310,510	238.8
2017	2,396,569	228.9

Source: EPA CAMD database, available at: https://ampd.epa.gov/ampd/.

Emissions in 2016 and 2017, averaging about 234 tons per year, appear to be at comparable levels for these two years. These emissions are considerably lower than the level of emissions from 2013 to 2015 included in the State's modeling, as seen in Table 1, which averaged about 804 tons per year during that period. Based on these data, EPA concludes that the State's modeling analysis likely overestimates current SO$_2$ impacts due to Bridgeport Harbor in the area.

5. Conclusion

The State's modeling analysis is based on 2013 through 2015 data. The State's analysis, indicates that impacts from Bridgeport Harbor are no greater than 50 percent of the NAAQS. Though more recent information is available, these data indicate that annual SO$_2$ emissions from Bridgeport Harbor have continued to decline. Furthermore, there is no indication of changes in processes or permit conditions at Bridgeport Harbor that would result in higher hourly SO$_2$ emissions and result in higher ambient impacts in the Bridgeport Harbor area. Therefore, EPA concludes that the State's modeling analysis is sufficiently representative of the current SO$_2$ air quality in the Bridgeport Harbor area.

Based on the State's modeling demonstration and EPA's analysis of supplemental emissions information showing that the State's demonstration is still sufficiently representative of the area, EPA concludes that impacts from Bridgeport Harbor are no greater than 50 percent of the NAAQS. With the EPA Regional Administrator's approval of Connecticut's December 2016 modeling demonstration, Connecticut will no longer subject to ongoing data requirements for this area under 40 CFR 51.1205(b).