

Interim 1-Hour Sulfur Dioxide (SO₂) NAAQS Implementation Guidance August 1, 2010

Updated November 28, 2011, to clarify requirements for the existing 24-hour and annual standards.

The New 1-Hour SO₂ National Ambient Air Quality Standards (NAAQS)

The U.S. Environmental Protection Agency (EPA) promulgated a new 1-hour National Ambient Air Quality Standard (NAAQS) for SO₂ (June 22, 2010) that will be effective August 23, 2010.¹ The 1-hour SO₂ standard is 75 parts per billion (ppb) or 196 micrograms per cubic meter (µg/m³) at 25° Celsius (C) and 760 millimeters of mercury (mm Hg). In addition, EPA

- Retained the 3-hour secondary standard
- Revoked both the existing 24-hour and annual standards **however** they will remain in effect until one year after the effective date of the 1-hour SO₂ designations.²
- Retained the 3-hour, 24-hour, and annual increments.³

The EPA did not propose a change to the significant emission rate (SER) or significant monitoring concentration (SMC) and did not propose a 1-hour significant impact limit (SIL). EPA is reviewing the need for these screening tools.⁴ EPA is conducting a separate review of the secondary SO₂ NAAQS jointly with a review of the secondary NO₂ NAAQS.

In addition, in the notice EPA explains

- the state's responsibility to develop and implement a state implementation plan (SIP) that contains state measures necessary to achieve the air quality standards in each area (page 35571) and
- that minor new source review (NSR) programs must meet the statutory requirements in section 110(a)(2)(C) of the federal clean air act (CAA) which requires * * * regulation of the modification and construction of any stationary source * * * as necessary to assure that the [NAAQS] are achieved (page 35579).

¹75 Federal Register 35520, Primary National Ambient Air Quality Standard for Sulfur Dioxide, Final Rule, June 22, 2010

² 40 Code of Federal Regulations Section 50.4 (e)

³ 40 Code of Federal Regulations Section 51.21(c)

⁴ 75 Federal Register 35578-35580

TCEQ's General Air Permitting Authority

The TCEQ implements the NSR program through statutory authority for air permitting contained in Chapter 382 of the Texas Health and Safety Code -- the Texas Clean Air Act (TCAA). The current SIP and SIP-approved portions of Title 30, Texas Administrative Code (TAC) Chapters 106 and 116 implement the requirements of the TCAA and provide the basis to regulate 1-hour NO₂ for major and minor sources.⁵

In addition, the TCAA directs the commission to comply with the federal Clean Air Act (FCAA). The FCAA requires the state to develop a SIP that includes an air permit program. The program must regulate the construction and modification of any stationary source to assure the NAAQS are achieved; bring nonattainment areas into and maintain attainment of the NAAQS; and to prevent significant deterioration of air quality. The EPA has developed a NSR program that encompasses the statutory and regulatory programs that regulate the construction and modification of stationary sources as provided under FCAA section 110(a)(2)(C), FCAA Title I, parts C and D, and 40 Code of Federal Regulations (CFR) Sections 51.160 through 51.166.

- As of August 23, 2010, applicants must demonstrate compliance with the 1-hour SO₂ NAAQS.
 - Applies to new and modified facilities with increases of SO₂. Applies to major and minor sources.
 - Any permit and standard permit/PBR registration under technical review that specifically requires a NAAQS or SO₂ NAAQS compliance demonstration⁶ must demonstrate compliance with the 1-hour SO₂ standard.
 - The Air Permits Division (APD) will evaluate all standard permits and permits by rule (PBRs) to determine whether an hourly SO₂ NAAQS analysis would be appropriate and needed to confirm claims or amend these permitting tiers.

⁵ 30 TAC Section 116.110 requires an authorization to construct or modify a facility. Section 116.111 requires an applicant to demonstrate control technology and protectiveness before a permit can be issued. Computer modeling may be required as part of the demonstration. These rules apply to minor and major sources. Additional requirements are contained in Sections 116.150-151 and 116.160-163 for major sources and major modifications. At this time: 30 TAC §106.512.Stationary Engines and Turbines (not any associated §106.352 small combustion devices or §106.492 Flares at this time); 30 TAC §116.617 State Pollution Control Project Standard Permit; 30 TAC §116.620 Installation and/Modification of Oil and Gas Facilities (only with engines which are using §106.512 per the standard permit requirements).

⁶ At this time: 30 TAC §106.512.Stationary Engines and Turbines (not any associated §106.352 small combustion devices or §106.492 Flares at this time); 30 TAC §116.617 State Pollution Control Project Standard Permit; 30 TAC §116.620 Installation and/Modification of Oil and Gas Facilities (only with engines which are using §106.512 per the standard permit requirements).

- Major source applicability is the first part of the permit technical review. The significance level remains at 40 tons per year.
 - If projects "net out" of major NSR review, minor NSR review is still required for facilities with new or increased emissions.

EPA has not provided implementation guidance as it did concerning implementation of the 1-hour NO₂ NAAQS for the NSR PSD program.⁷ EPA believes that models and guidance in the *Guideline on Air Quality Models*, Appendix W of CFR 40 Part 51 are sufficient for NSR prevention of significant deterioration (PSD) permitting.⁸ As previously stated, EPA is reviewing the need for screening tools and suggested that if needed an interim 1-hour SIL might be provided before August 23.⁹

Air Permits Division (APD) Interim Guidance

The APD will apply EPA guidance when available. There are many areas that require technical judgment and coordination with EPA. Following are some general comments permit reviewers and applicants should be aware of concerning APD's interim implementation:

- **Minor Source Applicability.** The EPA preamble focuses the discussion on major NSR but clearly addresses the requirement for states to have a minor NSR program. To meet TCAA and FCAA requirements and ensure consistency with the current permitting process, the APD continues to consider EPA's major source guidance as applicable to implement the state minor NSR program.
- **Best Available Control Technology (BACT).** The significant emissions rate (SER) is used to determine applicability of major NSR to new or modified sources of SO₂. While projects can net out of major NSR, they must be evaluated under TCEQ rules for minor NSR by 30 TAC Section 116.111. The SER remains at 40 tons per year for major modification. For minor projects, a BACT review is required. The TCEQ's three-tier BACT process is equivalent to EPA's top-down process. APD is currently updating pollution control guidance and will provide a draft to stakeholders for comment.
- **Impacts Evaluation.** Applicants must demonstrate that proposed emissions increase will not cause or contribute to a NAAQS violation. Applicants and reviewers must evaluate new and increased SO₂ emissions associated with a

⁷ <http://www.epa.gov/nsr/documents/20100629no2guidance.pdf>

⁸ 75 Federal Register 35579

⁹ 75 Federal Register 35580

project to satisfy this requirement. Air dispersion modeling may be required as applicable to support the evaluation. Modeling procedures for major or minor projects must be preapproved through development and review of a modeling checklist or protocol with the applicant, permit reviewer and modeling staff. Applicants must send major source (PSD) modeling protocols to EPA Region 6 as well.

- **Transition.** Applicants must continue to evaluate projects with project increases that exceed the 24-hour and annual SILs until one year after the effective date of the 1-hour SO₂ designations.
 - **Secondary NAAQS.** Applicants must continue to evaluate projects with project increases that exceed the 3-hour SIL to demonstrate compliance with 3-hour secondary SO₂ NAAQS.
 - **Increment.** Applicants must continue to evaluate projects with project increases that exceed the 3-hour, 24-hour and annual SILs to demonstrate compliance with 3-hour, 24-hour and annual SO₂ increments. This requirement will continue after the 24-hour and annual NAAQS are rescinded.
- **Demonstrating Compliance...Cause or Contribute.** APD has developed an interim 1-hour SO₂ SIL to determine when a project would cause or contribute to a modeled NAAQS violation based on EPA's 1-hour interim NO₂ SIL development.¹⁰ If the project's impacts are predicted to be at or lower than the SIL, no further impacts demonstration is required. However, if the model predicts a violation but the project is not significant, the APD may request that the applicant provide the sources that were predicted to cause the violation if this information was not included in the modeling output. APD recommends that applicants routinely use the model's source group option. This option will help applicants and APD staff readily identify significant contributors to high or unacceptable concentrations reported in the modeling analysis.
- **Interim 1-hour SIL** (also referred to as de minimis impact). The APD agrees that EPA's approach to use a SIL value that represents 4% of a 1-hour standard is reasonable. The APD followed the same process EPA used to derive the interim 1-hour NO₂ SIL to develop an interim 1-hour SO₂ SIL. The APD will use an interim 1-hour SO₂ SIL of 3 ppb. This value equates to 7.8 µg/m³ at 25° C and

¹⁰ <http://www.epa.gov/nsr/documents/20100629no2guidance.pdf>

760 mm Hg. For the public record, applicants can refer to APD's guidance in their air quality analysis to justify the use of an interim SIL.

- **Use of the Interim SIL.** Results from the SCREEN3 model may be used for major and minor projects. For minor NSR, the applicant may compare the interim de minimis concentration to the
 - highest modeled 1-hour SO₂ concentration predicted across all receptors based on 1-year of the APD designated meteorological dataset for the project, or
 - highest of the 5-year average of the maximum modeled 1-hour SO₂ concentration predicted each year at each receptor based on the APD designated 5-year meteorological dataset for the project.

If the project is less than or equal to the de minimis, no further review is needed. If the project concentrations exceed the de minimis value, a site-wide SO₂ NAAQS analysis must be performed.

- **Mitigating Predicted Violations.** The emission reductions required for PSD in 40 CFR 165(b)(3) are not the same as the mandatory offsets required for nonattainment review. See 30 TAC Section 116.161. Applicants can mitigate modeled adverse impacts by such actions as direct emissions reductions, emission reductions through enhanced control, enforceable permit conditions, and increasing stack height according to Good Engineering Practice.
- **General Modeling Guidance.** EPA provides general guidance in 40 CFR Part 51 Appendix W on how to conduct an air quality analysis. Guidance in Appendix W does not specifically address procedures for the 1-hour SO₂ NAAQS. In general,
 - Design the size of the receptor grid to be large enough to show that concentrations are decreasing from the site.
 - Include nearby off-property emissions in the inventory, as applicable. Applicants can obtain 1-hour SO₂ emission rates for off-property sources from the Point Source Database (PSDB). Permit reviewers can advise applicants to include emission rates from authorized facilities that are not included in the PSDB as applicable
 - Provide air quality data in the area near the proposed facility. The air quality is the ambient background concentration that is added to the maximum predicted concentration. It is the applicant's burden to determine the air

quality data to be used in the air quality analysis and demonstrate its representativeness.

- The division will provide interim background concentrations for screening purposes. Applicants should contact the modeling staff for assistance regarding refined background concentrations.
- Use conservative screening background concentrations for projects that exceed the de minimis concentration.
- For PBR / standard permit demonstrations, as applicable. Add the screening background concentration for the county/region to the predicted concentration from the project. If the project plus background is less than or equal to $196 \mu\text{g}/\text{m}^3$, the demonstration is complete.
- For case-by-case minor source permitting. Follow the procedure for PBR / standard permits with prior approval. The applicant must demonstrate that the procedure is appropriate based on factors such as
 - Total SO_2 emissions at the site
 - Facility location and dispersion parameters
 - Previous approved modeling results
- **Screening for Other Averaging Periods.** The maximum predicted 1-hour concentration can be converted to other averaging times using standard conversion factors to compare to the SIL's for the 3-hour, 24-hour, and annual analysis.
- **Rounding.** Round concentrations to be compared to the NAAQS¹¹ to the nearest whole number or 1 ppb (decimals 0.5 and greater are rounded up to the nearest whole number, and any decimal lower than 0.5 is rounded down to the nearest whole number).
- **Ratio method.** Adjust predicted concentrations from site wide 1-hour emissions from other pollutants of combustion. For example, 1-hour NO_2 or CO concentrations used as a surrogate for 1-hour SO_2 concentrations.

¹¹ 40 CFR 50 Appendix T, 4 Rounding Conventions for the 1-Hour Primary SO_2 NAAQS

- Develop appropriate ratios.¹² Example, $[\text{SO}_2 \chi = (\text{SO}_2 \text{ Q}) (\text{SO}_2 \chi) \div (\text{CO}_2 \text{ Q})]$.
- Add SO₂ background concentrations to the adjusted NO₂ or CO maximum surrogate concentration. If the project plus background is less than or equal to 196 µg/m³, the demonstration is complete.
- Use of nearby ambient monitored data -- Planned maintenance, startup, shutdown (MSS).
 - The site cannot be new and all facilities must have been operating.
 - Applicants must demonstrate that the hourly SO₂ emission rate being requested for the planned MSS maximum allowable emission rate table (MAERT) is a value that actually occurred (within approximately plus or minus 10%).
 - Applicants can identify the closest SO₂ ambient air monitor to the site.
 - If a monitor is within approximately 10 kilometers (~ 6 miles), the applicant must obtain and provide the highest 1-hour SO₂ concentration within at least the most recent three years of complete data, as well as the period of time the emissions actually occurred.
 - If the highest concentration exceeds the 1-hour SO₂ NAAQS, or a monitor is not within approximately 10 kilometers (~ 6 miles), the applicant must coordinate with the permit reviewer to request a modeling meeting or conference call with the permit reviewer and modeling staff to determine an alternative approach to demonstrate compliance. This approach may require refining the monitored data to account for the form of the standard, obtaining representative monitoring data from another location, and/or modeling.
- Use of nearby ambient monitored data -- PBR/standard permit Production/Operation.
 - The site cannot be new and all facilities must have been operating.
 - Applicants can identify the closest SO₂ ambient air monitor to the site.
 - If a monitor is within approximately 10 kilometers (~6 miles), the applicant must obtain and provide the highest 1-hour SO₂ concentration within at least the most recent three years of complete data, as well as the period of time the emissions actually occurred.

¹² Q = emissions; χ = concentrations.

- Applicants can add the predicted 1-hour SO₂ concentration from the project to the monitored background concentration to compare to the standard.
 - If the highest concentration exceeds the 1-hour SO₂ NAAQS, or a monitor is not within approximately 10 kilometers (~ 6 miles), the applicant must coordinate with the air dispersion modeling team to request a modeling meeting or conference call with modeling staff to determine an alternative approach to demonstrate compliance. This approach may require refining the monitored data to account for the form of the standard, obtaining representative monitoring data from another location, and/or modeling.
- Models.
 - AERMOD is the preferred model for use with major projects.
 - SCREEN3 can be used for major and minor projects. APD must preapprove the use of SCREEN3 for multiple facilities if the applicant proposes non-standard modeling techniques.¹³
 - The Industrial Source Complex model with Plume Rise Model Enhancements (ISC-PRIME) can be used for minor projects.

¹³ Some standard techniques: use the stack with the worst-case dispersion as a representative stack. Assume project maximum emissions are emitted from the representative stack. Or, one run for each facility using the maximum hourly emission rate and 1) sum the predicted concentrations from overlapping grids or 2) sum the highest concentration anywhere on the grid from each run to determine the maximum concentration. Use the following equation to determine the worst-case stack: $M = \frac{hs V T_s}{Q}$ where

M = a parameter that accounts for the relative influence of stack height, plume rise, and emission rate on concentrations;

hs = the physical stack height in meters;

$V = (\pi/4) d_s^2 v_s$ = stack gas flow rate in cubic meters per second;

ds = inside stack diameter in meters;

vs = stack gas exit velocity in meters per second;

Ts = the stack gas exit temperature in Kelvin; and,

Q = pollutant emission rate in grams per second.

The stack that has the lowest value of M is used as a representative stack. The sum of the emissions from all stacks is assumed to be emitted from the representative stack; that is, the stack whose parameters resulted in the lowest value of M.