

## **Interim 1-Hour Nitrogen Dioxide (NO<sub>2</sub>) NAAQS Implementation Guidance July 22, 2010**

### **The New 1-Hour NO<sub>2</sub> 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 NO<sub>2</sub> (February 9, 2010) that became effective April 12, 2010. The 1-hour NO<sub>2</sub> standard is 100 parts per billion (ppb) or 188 micrograms per cubic meter (µg/m<sup>3</sup>) at 25° Celsius (C) and 760 millimeters of mercury (mm Hg). EPA retained the annual standard (100 µg/m<sup>3</sup>, 53 ppb) and annual increment (25 µg/m<sup>3</sup>).<sup>1</sup> EPA is currently conducting a separate review of the secondary NO<sub>2</sub> NAAQS jointly with a review of the secondary SO<sub>2</sub> NAAQS.

The EPA retained the annual primary and secondary standards and 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). The EPA is reviewing secondary standards and plans to propose secondary standards for NO<sub>2</sub> in July 2011.

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 6521) 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 6525).

### **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 NO<sub>2</sub> for major and minor sources.<sup>2</sup>

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<sup>1</sup> 75Federal Register 6474, Primary National Ambient Air Quality Standards for Nitrogen Dioxide, Final Rule, February 9, 2010.

<sup>2</sup> 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

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 April 12, 2010, applicants must demonstrate compliance with the 1-hour NAAQS.
  - Applies to new and modified facilities with increases of nitrogen oxide (NO<sub>x</sub>)/NO<sub>2</sub>. Applies to major and minor sources.
  - Any permit and standard permit/PBR registration under technical review that specifically requires a NAAQS or NO<sub>2</sub> NAAQS compliance demonstration<sup>3</sup> must demonstrate compliance with the 1-hour NO<sub>2</sub> standard.
  - The Air Permits Division (APD) will evaluate all standard permits and permits by rule (PBRs) to determine whether an hourly NO<sub>2</sub> NAAQS analysis would be appropriate and needed to confirm claims or amend these permitting tiers.
- 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 Guidance

On June 29, 2010, EPA released guidance concerning implementation of the 1-hour NO<sub>2</sub> NAAQS for the NSR PSD program.<sup>4</sup> While the EPA focuses its discussion on the

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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).

<sup>3</sup> 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).

<sup>4</sup> <http://www.epa.gov/nsr/documents/20100629no2guidance.pdf>

prevention of significant deterioration (PSD) portion of the NSR program, the TCEQ continues to base implementation of the state minor source program on EPA's major source guidance as applicable.

- Stephen D. Page Memorandum, June 29, 2010, Guidance Concerning the Implementation of the 1-hour NO<sub>2</sub> NAAQS for the Prevention of Significant Deterioration Program (Page Memo).
- Anna Marie Wood Memorandum, June 28, 2010, General Guidance for Implementing the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO<sub>2</sub> Significant Impact Level (Wood Memo.)
- Tyler Fox Memorandum, June 28, 2010, Applicability of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard (Fox Memo).

In addition, on July 15, 2010, EPA conducted a webinar that discussed the guidance contained in the memorandum and answered questions e-mailed from participants.<sup>5</sup>

### **Air Permits Division (APD) Interpretation of EPA Guidance**

The APD will apply the EPA guidance on a case-by-case basis. 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 EPA's interim guidance and APD's interim implementation:

#### Page Memo

Pages 1-2. EPA focuses the discussion on PSD and does not directly refer to minor NSR. 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.

#### Wood Memo

Page 3. Introduction. The EPA explains that as of April 12, 2010, applicants must demonstrate that proposed emissions increase will not cause or contribute to a NAAQS violation. Applicants and reviewers must evaluate new and increased NO<sub>x</sub>/ NO<sub>2</sub>

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<sup>5</sup> [http://www.epa.gov/apti/webinars/WEBINAR-NO2%20Policy%20Guidance\\_7-15-2010.pdf](http://www.epa.gov/apti/webinars/WEBINAR-NO2%20Policy%20Guidance_7-15-2010.pdf) and [http://www.epa.gov/apti/webinars/WEBINAR-Part2\\_NO2\\_ModelingGuidance\\_15July2010.pdf](http://www.epa.gov/apti/webinars/WEBINAR-Part2_NO2_ModelingGuidance_15July2010.pdf)

emissions associated with a 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.

Page 5. Air Quality Based Emission Limitations. The TCEQ's three-tier best available control technology (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.

Pages 5-6.

- Demonstrating Compliance...Cause or Contribute. APD will use the EPA 1-hour interim NO<sub>2</sub> SIL to determine when a project would cause or contribute to a modeled NAAQS violation. 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.
- Mitigating Violations with Air Quality "Offsets." While EPA refers to "offsets" 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.

Pages 10-11. Significant Emissions Rate (SER). The SER is used to determine applicability of major NSR to new or modified sources of NO<sub>2</sub>. While projects can net out of major NSR, they must be evaluated under TCEQ rules for minor NSR. This would include a BACT and impacts evaluation.

Pages 11-13. Interim 1-hour SIL (also referred to as de minimis impact). The APD will use the EPA interim 1-hour NO<sub>2</sub> SIL of 4 ppb. This value equates to 7.5 µg/m<sup>3</sup> at 25° C and 760 mm Hg. Before EPA provided its SIL, the APD advised applicants to use the SIL developed by NESCAUM (Northeast States for Coordinated Air Use Management). However, any modeling already submitted or in progress based on that SIL (10 µg/m<sup>3</sup>) will not need to be reaccomplished. For the public record applicants can refer to EPA's and APD's guidance in their air quality analysis to justify the use of an interim SIL.

Page 12. 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 to

- the highest modeled 1-hour NO<sub>2</sub> concentration predicted across all receptors based on 1-year of APD designated meteorological dataset for the project, or
- the highest of the 5-year average of the maximum modeled 1-hour NO<sub>2</sub> 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 NO<sub>2</sub> NAAQS analysis must be performed.

#### Fox Memo

Page 14. Introduction. EPA provides general guidance in 40 CFR Part 51 Appendix W on how to conduct an air quality analysis. In the Fox memo, EPA clarifies guidance contained in Appendix W that does not specifically address procedures for the 1-hour NO<sub>2</sub> NAAQS, and provides selected interim implementation guidance. In general

- For major NSR, follow EPA guidance contained in the referenced EPA memoranda as annotated by APD.
- Do not back calculate from an annual concentration to obtain a 1-hour concentration.
- 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. Obtain a short-term 1-hour NO<sub>2</sub> retrieval from the PSDB to a maximum distance of 50 kilometers from the site. For PSD, include any technically complete (sent to 2nd Public Notice) or recently issued permits, 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 188  $\mu\text{g}/\text{m}^3$ , 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  $\text{NO}_2$  emissions at the site
    - Facility location and dispersion parameters
    - Previous approved modeling results
- Round concentrations to be compared to the NAAQS<sup>6</sup> 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  $\text{SO}_2$  or CO concentrations used as a surrogate for 1-hour  $\text{NO}_2$  concentrations.
  - Develop appropriate ratios.<sup>7</sup> Example,  $[\text{NO}_2 \chi = (\text{NO}_2 \text{ Q}) ( \text{SO}_2 \chi) \div (\text{SO}_2 \text{ Q})]$ .
  - Add  $\text{NO}_2$  background concentrations to the adjusted  $\text{SO}_2$  or CO maximum surrogate concentration. If the project plus background is less than or equal to 188  $\mu\text{g}/\text{m}^3$ , the demonstration is complete.

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<sup>6</sup> 40 CFR 50 Appendix S, 4.2 Rounding Conventions for the 1-hour Primary  $\text{NO}_2$  NAAQS

<sup>7</sup> Q = emissions;  $\chi$  = concentrations.

- 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 NO<sub>2</sub> 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 NO<sub>2</sub> 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 NO<sub>2</sub> 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 NO<sub>2</sub> 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.
- Uses 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 NO<sub>2</sub> 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 NO<sub>2</sub> 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 NO<sub>2</sub> 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.

Page 15. 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.<sup>8</sup> The Industrial Source Complex model with Plume Rise Model Enhancements (ISC-PRIME) can be used for minor projects.

Page 15. Tier 2. The NO<sub>x</sub> / NO<sub>2</sub> conversion factor of 75% may be used for PSD and minor source screening (SCREEN3) or refined modeling (ISC-PRIME or AERMOD, as applicable).

Page 15. Tier 3. Applicants must submit protocols and APD and EPA must preapprove the use of the ozone limiting method (OLM) or the Plume Volume Molar Ratio Method (PVMRM). This requirement applies to major and minor projects.

Page 18. Emission Inventories. Applicants can obtain 1-hour NO<sub>2</sub> 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.

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<sup>8</sup> 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.