

Complying with 1-Hour NO₂ NAAQS

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Presentation Outline

1. NO₂ NAAQS – What is it?
2. Where does NO₂ come from?
3. How is compliance demonstrated?
4. When is compliance demonstrated?
5. What are implications of modeled non-compliance?
6. What are options if in modeled non-compliance?

NO2 NAAQS – What is it?

- U.S. Environmental Protection Agency (EPA) promulgated new 1-hour National Ambient Air Quality Standard (NAAQS) for NO₂ on February 9, 2010.
 - Meant to protect people with asthma, children and the elderly
 - Highly toxic and corrosive
 - Standard became effective April 12, 2010.
- The 1-hour NO₂ standard is 100 parts per billion (ppb) or 188 micrograms per cubic meter (µg/m³)
 - EPA retained the annual standard (100 µg/m³, 53 ppb)
- All state minor new source review (NSR) programs must meet the requirements of the 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

Where Does NO₂ Come From?

- Stationary Combustion Sources
 - Boilers
 - Thermal oxidizers
 - Emergency engines
 - Fire pump engines
 - POU control devices
- Combustion of Nitrogen Bearing Process Chemicals
 - HMDS
 - Monoethanolamine

How Is Compliance Demonstrated?

- Monitoring – Existing NO₂ ambient monitors within 10 km
- AERMOD *Predictive* Modeling
 - All continuous sources and worst cases of discontinuous sources
 - State NSR Permitted Facilities
 - Model for ambient* impacts
 - Apply 75% ambient NO_x to NO₂ conversion
 - Add background (in Texas, typically around 70 ug/m³)
 - Compare to threshold
 - Federal PSD Permitted Facilities
 - Model for ambient* impacts
 - Model other PSD sources in area (within 50 km typical)
 - Apply 75% ambient NO_x to NO₂ conversion
 - Add background
 - Compare to threshold

* Ambient does not mean off-property. Means outside fence line.

How Is Compliance Demonstrated?

- NSR Permitted Facilities
 - Compliance for “high first high”*
 - At 90% of NAAQS, otherwise other sources modeling
 - Use one year of meteorological data
- PSD Permitted Facilities
 - Compliance for average “eighth first high”*
 - At 100% of NAAQS (=188 ug/m³ minus background)
 - Use five years of meteorological data
- In Both Cases – All Property Equal

* Receptor with highest average of eighth highs over 5 years.

When Is Compliance Demonstrated?

- Can be *requested* with any permit activity
 - NSR permit amendment or renewal
 - Registration of PBR
 - Standard Permit claim
- Generally, site wide modeling *required* if project includes NO₂ emissions increase above Significant Impact Level (SIL) = 7.5 ug/m³

Hear Me Now Und Believe Me Later,

-- Some Sites Will Fail Site Wide Modeling --

(Despite fact that no monitors show noncompliance!)

What Are Implications of Modeled Non-Compliance?

- TCEQ Air Permits Division Stance:
 - To issue an NSR authorization, applicants must demonstrate NAAQS compliance
 - Thus, modeled non-compliance = no new or changed authorization

What Are Options If In Modeled Non-Compliance?

- In General (Per TCEQ Guidance)
 - Direct emissions reductions,
 - Emission reductions through enhanced control,
 - Enforceable permit conditions, and
 - Increasing stack height according to Good Engineering Practice (GEP).

What Are Options If In Modeled Non-Compliance

- In Practice - Modeling
 - Re-run model using non-regulatory AERMOD options*
 - Ozone Limiting Method (OLM)**
 - Plume Volume Molar Ratio Method (PVMRM)**
 - Perform monitoring to “recalibrate” model or establish site specific background
- In Practice – Permitting
 - Authorize combustion units through PBRs not requiring registration?

* If/when authorized by EPA/State.

** Allows use of in-stack NO₂/NO_x ratios.

What Are Options If In Modeled Non-Compliance?

- In Practice – Operational/Infrastructure Mods
 - Buy affected property
 - Reduce emergency generator test run-times and/or test only during daytime*,
 - Limit other operations to only during daylight hours,
 - Install ultra-low NOx burners,
 - Modify stack parameters or height – lower of GEP or 65m,
 - Move stacks or sources to more favorable location,
 - Eliminate oil firing of boilers, and
 - Change control technologies (both house and POU).

* EPA memo (Page, 6/29/10) – Requires permitting emergency ops!!!

What Are Options If In Modeled Non-Compliance?

- What You Can't Do = Dispersion Techniques
 - Enhance plume rise by adding dilution air to exhaust
 - Enhance plume rise by heating exhaust
 - Enhance plume rise by other selective handling of exhaust gas streams (e.g. combining flow from existing stacks)
 - Modify emissions or controls based on meteorological conditions

Summary

- 1-hr NO₂ NAAQS is here, now, and you are advised to know if modeling will demonstrate compliance, now.
- Don't be surprised if modeling does not predict compliance.
 - Be prepared to model, propose operational/infrastructure changes and then remodel
 - Iterate, until an acceptable compliance plan is developed
 - Is monitoring a useful tool? Ambient? In Stack?
- Expect to include infrastructure changes in capital costs for next project involving combustion sources (and requiring permit activity, of course)

And one last thing, everyone is equally aware of compliance status with the short term PM_{2.5} and SO₂ NAAQS, right?