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Related Practices

Environmental & Natural Resources

WDNR Issues a New Policy for Implementing the One-Hour NO₂ NAAQS

On March 26, 2018, the Wisconsin Department of Natural Resources (WDNR) finalized a new guidance memo entitled “Determining the Impact of Industrial Stationary Sources on Ambient 1-Hour NO₂ Concentrations in Permit Reviews.”

This guidance uses a “weight of evidence” approach to simplify how stationary sources of nitrogen dioxide emissions (NO₂) obtain air permits in Wisconsin. In the guidance memo, the WDNR demonstrates that emissions of NO_x from small stationary sources do not cause or exacerbate violations of the one-hour NO₂ National Ambient Air Quality Standard (NAAQS). As a consequence, WDNR will no longer require air dispersion modeling to be performed to demonstrate compliance with the one-hour NO₂ NAAQS when issuing most air pollution control permits to stationary sources. Exceptions to the policy include:

1. Facilities which have one or more individual combustion units with a maximum heat input rating of 250 mmBtu/hour; and
2. Sources seeking Prevention of Significant Deterioration (PSD) construction permits.

Background

NO₂ is a ubiquitous pollutant generated as a byproduct of combustion from stationary, mobile, and area sources. Since the adoption of the modern Clean Air Act, the United States Environmental Protection Agency (EPA) has regulated NO₂ in the atmosphere. In 1971, EPA established the allowable ambient NO₂ concentration as 54 parts per billion (ppb) averaged on an annual basis. In 2010, EPA increased the allowable concentration to 100 ppb, but based compliance with the standard on a more stringent three-year average of the 98th percentile of the annual distribution of daily maximum one-hour NO₂ concentrations. This increased stringency, coupled with the inherent conservative assumptions used in dispersion modeling and the variability of NO₂ formation, created challenges for smaller stationary

sources when performing the air dispersion modeling normally associated with issuing air permits.

On this point, the WDNR may only approve an air permit application after finding, among other things, that “[t]he source will not cause or exacerbate a violation of any ambient air quality standard or ambient air increment under s. 285.21(1) or (2).” Air dispersion modeling has been the predominate mechanism for demonstrating compliance with this criterion. However, air modeling has its limitations and presents challenges which are unique to NO₂.

NO₂ is an unstable pollutant in the atmosphere. The concentration of NO₂ will vary based on temperature, the presence of sunlight, pressure, and the presence of ozone and volatile organic compounds. Air quality dispersion models have historically generalized these variables by using a source’s NO_x emission rate to simply estimate NO₂ concentrations. In effect, regulators have merely been regulating NO_x (all species of nitrogen oxide emissions) and not limiting regulation to the actual pollutant for which there is the NAAQS (NO₂). This approach has been sufficient for large stationary sources which emit large amounts of NO₂ and have tall stacks which serve to disperse pollutants. However, many smaller sources of NO₂ emissions have highly variable emission rates with short stacks. The conversion of NO₂ in the atmosphere (i.e., its instability) has resulted in many smaller sources experiencing challenges using traditional dispersion modeling to demonstrate compliance with the new NO₂ NAAQS. The WDNR has been looking at these issues and have developed a new approach to address these complications.

WDNR’s New Approach

The WDNR’s new approach to NO₂ recognizes that the one-hour NO₂ NAAQS is not based on a maximum hourly value but rather is a statistical formulation of hourly impacts over multiple years. Indeed, compliance with the one-hour NO₂ NAAQS is based upon the three-year average of the 98th percentile of the annual distribution of daily maximum hourly NO₂ concentrations within an area. Stated more plainly, the EPA or a state will rank the monitored one-hour NO₂ measurements for each year from highest to lowest. The fourth highest readings for each of three consecutive years are added together and then divided by three to provide the value which is compared to the NAAQS.

Building on this premise, WDNR concludes that the historic approach of creating and enforcing maximum hourly NO₂ emission limitations for stationary sources does not correlate to the form of the one-hour NO₂ NAAQS. Limiting the hourly emission rate of NO₂ from a stationary source is not a strategy closely aligned with demonstrating compliance with the one-hour NO₂ NAAQS. This conclusion is supported by NO₂ monitoring data which demonstrates that the entire United States is in attainment with the one-hour NO₂ NAAQS. In fact, Wisconsin and other Midwestern states have NO₂ concentrations which are less than 75% of the one-hour NAAQS. These concentrations have been steadily decreasing over time but not due to emission limits imposed by air permits issued to smaller sources. Rather, these ambient reductions have resulted from the implementation of mobile-source emission reduction strategies and from interstate pollution transport rules limiting emissions from large NO_x point sources (EGUs and coal-fired industrial boilers). These mobile and large stationary source emissions account for roughly 78% of NO₂ ambient concentrations.

WDNR’s new policy observes that the relatively small percentage of NO₂ that might be added to ambient air by small stationary sources is too inconsequential to be deemed as “causing or exacerbating” an exceedance of the NO₂ NAAQS when compared to the other emission sources that are also contributing to ambient concentrations.

Non-Modeling Approach to Demonstrating Compliance with the One-Hour NO₂ NAAQS

Building on this analysis, WNDR will no longer require air dispersion modeling to be performed for the one-hour NO₂ NAAQS when issuing air permits for small industrial/commercial natural gas-fired devices, industrial processes, or commercial combustion devices which burn fuel oil. For these small sources of NO₂ emissions, WNDR will use the “weight of evidence” approach discussed above to conclude that such emissions do not cause or contribute to exceedances of the one-hour NO₂ NAAQS.

Traditional dispersion modeling will still be required for facilities which have one or more individual combustion units with a maximum heat input of 250 mmBtu/hr and sources seeking Prevention of Significant Deterioration (PSD) construction permits.

If you have any questions with respect to this guidance, please do not hesitate to contact Todd Palmer or Taylor Fritsch.

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