

DATE: February 22, 2016

TO: Air Permit Applicants

FROM: Kristin Hart, Chief, Air Permits and Stationary Source Modeling Section

SUBJECT: Guidance for Including PM<sub>2.5</sub> in Air Pollution Control Permit Applications

**Introduction:** The Department has prepared a technical support document (TSD) on particulate matter with an aerodynamic diameter of 2.5 microns or less (PM<sub>2.5</sub>) that examines the science behind the primary (direct) and secondary formation of PM<sub>2.5</sub>, its distribution and lifetime in the atmosphere, statewide monitoring results of PM<sub>2.5</sub> and the appropriateness of using refined air dispersion models to estimate concentrations of PM<sub>2.5</sub> in the ambient air. Based on the conclusions of the PM<sub>2.5</sub> TSD, two changes are being implemented in how the Department evaluates PM<sub>2.5</sub> emissions in air pollution control permits:

- Examination of the current scientific literature concerning particle pollution leads to the conclusion that low temperature industrial sources do not directly emit PM<sub>2.5</sub> in quantities that have the potential to cause or contribute to a violation of the NAAQS.
- The PM<sub>2.5</sub> TSD makes a finding using a weight of evidence approach that direct emissions of PM<sub>2.5</sub> do not cause or exacerbate a violation of the ambient air quality standards or increment.

These conclusions affect the air quality assessment portion of an air permit review, as well as how and when PM<sub>2.5</sub> emissions are estimated. In the past, any source of particulate matter was assumed to be a source of both PM<sub>10</sub> and PM<sub>2.5</sub>. However, not all emissions units that emit particulate matter and PM<sub>10</sub> are also sources of measurable PM<sub>2.5</sub> emissions. This memo offers guidance to permit applicants on when they must include estimates of PM<sub>2.5</sub> emissions in an air pollution control permit application and when to expect air pollution permits to contain limitations on PM<sub>2.5</sub> emissions.

**Calculating PM<sub>2.5</sub> Emission Rates:** Air permit applications are required to contain emission estimates of all air contaminants emitted by the equipment to be included in the permit. For purposes of minor source construction permitting and operation permitting, PM<sub>2.5</sub> is defined as particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers measured in the ambient air. In considering whether a piece of equipment is a direct source of PM<sub>2.5</sub>, it is important to consider the formation mechanism of PM<sub>2.5</sub>. A large amount of energy is required to create a particle of such a small size. Therefore, not all sources of particulate matter should automatically be assumed to directly emit PM<sub>2.5</sub>. Studies have confirmed that there are measurable amounts of direct PM<sub>2.5</sub> emissions from combustion sources and high temperature industrial processes such as smelters, foundries, aluminum production, glass manufacturing, sulfate (Kraft) pulping, etc.

As the PM<sub>2.5</sub> TSD demonstrates, it is unlikely that mechanical sources and low temperature operations directly emit PM<sub>2.5</sub> in quantities with the potential to adversely impact the NAAQS and are, by themselves, unlikely to trigger the major source permitting programs. Because of the unlikelihood of impacting the NAAQS and the lack of availability of accurate, reliable emission factors for direct PM<sub>2.5</sub> emissions for mechanical sources and low temperature operations, the Department believes that it is unnecessary and overly burdensome for all minor permit applicants to calculate potential emissions of direct PM<sub>2.5</sub> from these sources.

For larger sources an additional level of review is required in order to assure that the Title V permit application meets the requirements of Part 70 and ch. NR 407, Wis. Adm. Code, and to assure that major source construction permit applicability is determined in a manner consistent with Wisconsin's federally approved state implementation plan and the federal major source permitting program.

Applicants of Title V operation permits with potential emissions of  $PM_{2.5}$  from combustion sources and high temperature industrial processes totaling 80 tons per year or more and construction permit applicants whose potential emissions of  $PM_{2.5}$  from combustion sources and high temperature industrial processes place them within a 20% margin of major NSR applicability are required to examine  $PM_{2.5}$  emissions from all sources and provide estimates in applications. This applies to new and existing Title V major sources, existing major NSR sources and minor construction sources emitting  $PM_{2.5}$  from combustion sources and high temperature industrial processes at a rate of 80% or more of the NSR major source threshold.

- For a new or existing Title V major source, if potential emissions of  $PM_{2.5}$  from all combustion sources and high temperature industrial processes are less than 80 tons per year, permit applicants will not be required to include  $PM_{2.5}$  emission estimates for mechanical processes such as crushing, grinding, sanding, sizing, evaporation of sprays, suspension of dusts, and other low temperature operations in the application. Applicants may reference this memo in their permit applications to justify emission estimates. The Department and US EPA may, at their discretion, request that emissions calculations be performed using the best available information during the permitting process or at a later time.
- New or existing Title V major sources with potential emissions of  $PM_{2.5}$  from all combustion sources and high temperature industrial processes of 80 tons per year or more will need to examine  $PM_{2.5}$  emissions from all sources and provide estimates in applications.
- For all types of construction permits, if potential emissions from all combustion sources and high temperature industrial processes are less than 80% of the major source construction permit threshold as defined in NR 405.02(22), or in the case of existing major sources for construction permits, if the increase in emissions from all combustion sources and high temperature industrial processes that are part of the physical change or change in method of operation is less than 80% of the  $PM_{2.5}$  significant emission rate, permit applicants will not be required to include  $PM_{2.5}$  emission estimates for mechanical processes such as crushing, grinding, sanding, sizing, evaporation of sprays, suspension of dusts, and other low temperature operations in the application. Applicants may reference this memo in their permit applications to justify emission estimates. The Department and US EPA may, at their discretion, request that emissions calculations be performed using the best available information during the permitting process or at a later time.
- For all types of construction permit applications, if the potential emissions of  $PM_{2.5}$  from the combustion sources and high temperature industrial processes that exceed 80% of the major source construction permit threshold as defined in NR 405.02(22), or in the case of existing major sources for construction permits, if the increase in emissions from all combustion sources and high temperature industrial processes that are part of the physical change or change in method of operation exceeds 80% of the  $PM_{2.5}$  significant emission rate, the permittee will need to examine  $PM_{2.5}$  emissions from all sources and provide estimates in applications.

- All permit applicants should continue to include estimates of primary PM<sub>2.5</sub> emissions for combustion processes, and high temperature industrial processes.
- Many permit applicants rely on emission factors published in U.S. EPA document AP-42 when estimating emissions for air pollution control permitting. EPA's emission factor document is only one tool available to permit applicants for estimating emissions and, in general, is to be used only when no source specific emission information is available. The permit applicant is expected to utilize the best available information when performing such calculations. The Department will not require an applicant to use a PM<sub>2.5</sub> emission factor published in AP-42 for low temperature and material handling processes, if it can be shown that the emission factor development was not based on actual measurements collected using appropriate reference or equivalent test and sampling methods.
- In all cases, the Department considers all available information on air pollution emissions when reviewing a permit application. The preliminary determination that a source can meet the statutory criteria for permit issuance is made on a case-by-case basis. The Department may request additional information from an applicant or will review any additional data provided by commenters to assess the PM<sub>2.5</sub> emissions during the review process or to respond to public comment.

**Modeling PM<sub>2.5</sub> Emissions:** As indicated above and in the *February 2016 Wisconsin Air Dispersion Modeling Guidelines*, individual source modeling of PM<sub>2.5</sub> emissions for permits for existing sources, new minor sources, and minor modifications of major sources will not be performed by the Department. Instead, the Department will use its weight of evidence approach for these permits to demonstrate that the source will not cause or exacerbate a violation of the PM<sub>2.5</sub> ambient air quality standards. Modeling for PM<sub>2.5</sub> will still be required, according to applicable U.S. EPA rule and guidance, for PSD and NAA major source permit reviews and major modifications of such sources.

**PM<sub>2.5</sub> Limitations in Permits:** The following types of PM<sub>2.5</sub> emission limitations may be included in air pollution control permits:

- Limits established to avoid major source construction permitting
- Limits previously established in a construction or operation permit (such limits may be changed through an appropriate permit action such as a new construction permit or a permit revision)
- A limit set as BACT or LAER in a PSD or NAA major source construction permit
- Any applicable PM<sub>2.5</sub> limitation established in an applicable standard such as a New Source Performance Standard (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP)<sup>1</sup>

New PM<sub>2.5</sub> emission limits or other requirements will not be established in permits based on modeled emission rates except as required under the major PSD or Nonattainment NSR programs.

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<sup>1</sup> There are currently no NSPS or NESHAPs that regulate PM<sub>2.5</sub> directly. Federal regulations have focused on reducing emissions of PM<sub>2.5</sub> by regulation of the precursor pollutants SO<sub>2</sub> and NO<sub>x</sub>.

## **PM<sub>2.5</sub> Requirements by Permit Type:**

- **Operation Permits:** PM<sub>2.5</sub> emissions will not be modeled for operation permit actions, so generally, no PM<sub>2.5</sub> emission limits or other requirements should appear in operation permits, unless the limits were previously established or were included in a requirement being incorporated or adopted from an existing construction permit or a federal standard.
- **PSD Major Source Permits:** Permits for major PSD sources or major modifications to PSD sources will include limits determined by modeling to protect the ambient air quality standards as well as PSD BACT limitations for PM<sub>2.5</sub> if there is a significant net increase in PM<sub>2.5</sub> emissions. Section NR 405.02(27)(a), Wis. Adm. Code defines a significant net increase to be 10 tons of PM<sub>2.5</sub> per year, or 40 tons of NO<sub>x</sub> per year or 40 tons of SO<sub>2</sub> per year as PM<sub>2.5</sub> precursors. Existing construction permit limits and BACT limitations for PM<sub>2.5</sub> emissions will remain in effect and be carried forward in future permits, unless modified through a construction permit action.
- **NAA Major Source Permits:** There are currently no PM<sub>2.5</sub> nonattainment areas in Wisconsin. If any PM<sub>2.5</sub> nonattainment areas are designated in Wisconsin in the future, sources located in a nonattainment area undergoing a major source permit review may be subject to lowest achievable emission rate (LAER) limits and offset requirements for PM<sub>2.5</sub> emissions, pursuant to ch. NR 408, Wis. Adm. Code. Existing LAER limitations and offset requirements for PM<sub>2.5</sub> emissions will remain in effect and be carried forward in future permits, unless modified through a construction permit action.
- **Minor Construction Permits** For all other construction permit actions, individual source air quality modeling will not be used to determine whether sources of PM<sub>2.5</sub> cause or exacerbate a violation of the PM<sub>2.5</sub> ambient air quality standards. The PM<sub>2.5</sub> TSD concludes that these direct emissions do not affect ambient air quality. Specific PM<sub>2.5</sub> emission limits will only be included if a limit is needed to assure that the project is construction of a minor PSD or nonattainment NSR source; or a minor modification of an existing major source; or if a limit was previously established and must be carried forward from a previous construction permit or from a federal standard.

## **Acronyms:**

BACT – Best Available Control Technology

LAER – Lowest Achievable Emission Rate

NAA – Nonattainment Area (used in reference to major source construction permitting in nonattainment areas)

NESHAP – National Emission Standards for Hazardous Air Pollutants

NO<sub>x</sub> – Nitrogen Oxides

NSPS – New Source Performance Standard

PM – Particulate Matter

PM<sub>2.5</sub> – Particulate Matter with an aerodynamic diameter of 2.5 microns or less

PM<sub>10</sub> – Particulate Matter with an aerodynamic diameter of 10 microns or less

PSD – Prevention of Significant Deterioration (used in reference to major source construction permitting in attainment areas)

SO<sub>2</sub> – Sulfur Dioxide

TSD – Technical Support Document

**Definitions from ch. NR 400, Wis. Adm. Code:**

“Particulate” or “particulate matter” means any airborne divided solid or liquid material with an aerodynamic diameter smaller than 100 micrometers.

“Particulate matter emissions” means all finely divided solid or liquid material, other than uncombined water, emitted to the ambient air as measured by an applicable reference method or an equivalent or alternative method specified by the department.

“PM<sub>2.5</sub>” means particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured in the ambient air by a reference method based on Appendix L of 40 CFR part 50, incorporated by reference in s. NR 484.04 (6g), and designated in accordance with 40 CFR part 53, incorporated by reference in s. NR 484.03 (5), or by an equivalent method.

“PM<sub>2.5</sub> emissions” means PM<sub>2.5</sub> emitted to the ambient air as measured by an applicable reference method or an equivalent or alternative method specified by the department. PM<sub>2.5</sub> emissions include filterable emissions and gaseous emissions from a source or activity that condense to form particulate matter at ambient temperatures.

“PM<sub>10</sub>” means particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured in the ambient air by a reference method based on Appendix J of 40 CFR part 50, incorporated by reference in s. NR 484.04 (5), and designated in accordance with 40 CFR part 53, incorporated by reference in s. NR 484.03 (5), or by an equivalent method.

“PM<sub>10</sub> emissions” means finely divided solid or liquid material, with an aerodynamic diameter less than or equal to a nominal 10 micrometers, emitted to the ambient air as measured by an applicable reference method or an equivalent or alternative method specified by the department. PM<sub>10</sub> emissions include filterable emissions and gaseous emissions from a source or activity that condense to form particulate matter at ambient temperatures.