AIR DISPERSION MODELING GUIDANCE DOCUMENT:

How to Model

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, and ENERGY

AIR QUALITY DIVISION

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Contents

Introduction

This guidance document provides general information from the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Air Quality Division (AQD) on **how** dispersion modeling should be performed and submitted to the AQD when seeking a Permit To Install (PTI) application. The contents of this document were developed by dispersion modelers in the AQD, and it outlines current air quality modeling policies. It does not supersede any state or federal rules. EGLE's AQD modeling reviews follow the United States Environmental Protection Agency (USEPA) Guideline on Air Quality Models, 40 CFR Part 51, Appendix W[1]. Technical details considered in a modeling analysis can be found in the AQD's Technical Modeling Considerations[2] document.

The information below reiterates much of the information found in Appendix W and provides more detailed and specific recommendations applicable to Michigan. If questions arise on whether a dispersion modeling analysis **is required** for a facility, please reference the AQD's Policy and Procedure AQD-022: Dispersion Modeling Guidance for Federally Regulated Pollutants (AQD-022)[3].

Dispersion modeling is the primary regulatory tool for predicting ambient impacts through computer simulation. Dispersion models provide estimates of the relationship between emissions and the resulting ambient pollutant concentration levels at any given point downwind of a facility. When a project is subject to Prevention of Significant Deterioration (PSD), the regulations require that **modeling** for PSD increment and National Ambient Air Quality Standards (NAAQS) **must be submitted** to the AQD for the PTI application to be considered complete. The modeling submittal can be conducted by the applicant, or by a consultant on behalf of the applicant. AQD air dispersion modelers will verify the model inputs and rerun the submitted modeling to confirm the results.

In Michigan, increment consumption is considered to occur because of emissions from minor sources, as well as major sources or major modifications. Minor sources have the option of submitting the modeling with the PTI application or can elect to have the AQD conduct modeling on their behalf.

All modeling submittals and associated information must be submitted to the AQD using EGLE's MiEnviro Portal. Information on how to use the portal can be found on the MiEnviro Portal for air site.

See the checklist in Appendix A for requirements when submitting modeling information to the AQD.

[1] https://www.epa.gov/scram/clean-air-act-permit-modeling-guidance
[2] https://michigan.gov/-/media/Project/Websites/egle/Documents/Programs/AQD/modeling-and-meteorology/air-dispersion-modeling-guidance-document-technical-modeling-considerations.pdf
[3] https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Policies-Procedures/AQD/aqd-022.pdf

EGLE Preferred Models

The AQD uses the USEPA recommended air quality models listed in Appendix W. A brief description is below, but for more detailed information on the preferred models, see the USEPA's SCRAM website[4].

AERMOD Modeling System

The AQD uses the latest version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) for dispersion modeling analysis. AERMOD is a steady-state dispersion model for assessment of pollutant concentrations from a variety of sources. AERMOD simulates transport and dispersion from multiple points, area, or volume sources based on an up-to-date characterization of the atmospheric boundary layer. Sources may be in rural or urban areas, and receptors may be in simple or complex terrain. AERMOD accounts for building near-wake and far-wake effects; i.e., plume downwash, using the PRIME wake effect model. The AERMOD model employs hourly sequential meteorological data to estimate concentration for averaging times ranging from one hour to one year.

AERMOD requires the use of meteorological data, and data selection must follow the guidelines set in Appendix W. The meteorological data should be adequately representative of the area being modeled. This may be data from a nearby National Weather Service (NWS), site-specific, or prognostic meteorological data. The meteorological dataset input into the model should be vast enough to ensure worst-case meteorological conditions are adequately represented. As stated in Appendix W, five years of NWS data, at least one year of site-specific, or at least three years of prognostic meteorological data would be considered robust enough to encompass worst-case meteorology conditions. Meteorology data from the NWS is most commonly used. Consultation with and approval from the AQD are required if one is to use site-specific or prognostic meteorology data.

The AQD has processed AERMOD-ready NWS meteorological data for 72 airport stations across Michigan. The Meteorological Data Support Document[5] contains the most recent five years of surface and upper-level meteorological data for all 72 stations. The AQD can be consulted to help identify which meteorological station is most representative for a specific modeling demonstration.

AERSCREEN

The AERSCREEN model is the USEPA-recommended screening model based on AERMOD. AERSCREEN is an interactive command-prompt application that produces estimates of "worst-case" 1-hour (hr) concentrations for a single source, without the need for hourly meteorological data, and also includes conversion factors to estimate "worst-case" 3-hr, 8-hr, 24-hr, and annual concentrations. The AERSCREEN program is currently limited to modeling a single point (vertical uncapped stack), capped stack, horizontal stack, rectangular area, circular area, flare, or volume source. AERSCREEN is intended

[4] https://www.epa.gov/scram/air-quality-dispersion-modeling

[5] https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/AQD/modeling-and-meteorology/meteorological-support.pdf

to produce concentration estimates that are equal to or greater than the estimates produced by AERMOD with a fully developed set of meteorological and terrain data, but the degree of conservatism will vary depending on the application.

SCREEN3

SCREEN3 is a single source Gaussian plume model, which provides maximum ground-level concentrations for point, area, flare, and volume sources, as well as concentrations in the cavity zone, and concentrations due to inversion break-up and shoreline fumigation. SCREEN3 is no longer a recommended screening model by the USEPA; however, the AQD allows the use of SCREEN3 for toxics modeling of minor applications. Sources that emit the same pollutant from several stacks with similar parameters that are in near proximity to each other may be analyzed by treating all the emissions as coming from a single representative stack, otherwise referred to as merged parameters for multiple stacks. Refer to Section 2.2 of the Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised[6] to determine how merged parameters are calculated.

SCREEN3 outputs only the 1-hr impacts. Table 1 lists conversion factors to convert 1-hr average concentrations to the other averaging times.

Table 1: SCREEN3 Conversion Factors

Averaging Period	USEPA Multiplying Factor for POINT Sources[7]
3-hour	0.9
8-hour	0.7
24-hour	0.4
Annual	0.08

Major Source PSD Modeling – prior to submitting application

Modeling Protocol

Before submitting a PSD application and the supporting modeling analysis, an applicant is required to submit a modeling protocol through the MiEnviro Portal for AQD staff to review. AQD staff will forward the protocol to the USEPA for their review, as well. After the reviews are complete, the AQD will respond to the company and/or consultant with comments on, or agreement with, the protocol from both the AQD and USEPA. The modeling protocol should include methodologies that will be used in the modeling demonstration. Suggested topics include, but are not limited to:

- Securing property boundary and method(s) used to preclude access by the general public;
- Receptor grid spacing; EGLE requests a minimum spacing of 25 meters surrounding the secure property boundary and/or in sensitive locations;

[6] https://www.epa.gov/sites/default/files/2020-09/documents/epa-454r-92-019_ocr.pdf
[7] "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised," EPA-454/R-92-019 (page 4-16).

- Land Use Classification (urban/rural);
- Meteorology and terrain;
- Pollutants to be modeled including averaging times pertaining to Significant Impact Levels (SILs), PSD Increment, and NAAQS;
- Application equipment and existing equipment to be included in the analysis; identifying pre- and post-baseline emission sources;
- Any intended use and justification for Tier 2 or Tier 3 NO_2 analysis;
- Any intended use and justification for Table 8.2 in Appendix W;
- Use of any methodology straying from a typical analysis; and
- Discuss/justify selection of monitors for representative background concentration of criteria pollutants.

Preconstruction Monitoring Waiver

The USEPA requires at least one year of continuous air monitoring data to determine background for each criteria pollutant proposed to be emitted in a significant amount at a major stationary source (40 CFR 52.21(m)). Guidance found in Section 8.3 of 40 CFR 51, Appendix W, allows the use of existing data in the vicinity of the source, if representative, as an alternative to requiring additional on-site preconstruction monitoring. Additional guidance on determining background for criteria pollutants can be found in the USEPA's Draft Guidance on Developing Background Concentrations for Use in Modeling Demonstrations[8]. In most cases, using the monitor closest to and upwind of the project area is recommended. If more than one option is available, preference should be given to the monitor with characteristics that are most similar to the project area. If there are no monitors located in the vicinity of the source, a "regional site" may be used to determine background. A "regional site" is one that is located away from the area of interest but is impacted by similar or adequately representative sources.

If the applicant believes sufficient data exists to provide representative regional background concentrations, they should appeal to the agency for a pre-construction monitoring waiver. The waiver request is made by completing a pre-construction monitoring waiver form through the MiEnviro Portal. The AQD will review the waiver request following guidelines outlined above to determine if the applicant showed sufficient data exists to support the use of representative regional background concentrations; the AQD will respond with a concurrence or non-concurrence to the waiver request.

Modeling of Criteria Pollutants

An applicant, submitting a PTI application subject to PSD review, is required to conduct an air quality analysis of the ambient impacts associated with construction and operation of the proposed new stationary source or modification. The main purpose of the air quality analysis is to demonstrate that new emissions emitted from a proposed new or modified source, in conjunction with other applicable

[8] https://www.epa.gov/system/files/documents/2023-10/draft-guidance-on-developing-background-concentrations-for-use-in-modeling-demonstrations.pdf

emissions increases and decreases from existing sources, will not cause or contribute to a violation of any applicable PSD Increments or NAAQS. For sources subject to PSD, a 5-year modeling analysis is required, as referred to in Appendix W.

Pollutants for which there exist a NAAQS are referred to as "criteria" pollutants. Criteria pollutants include:

- Particulate matter less than 10 microns: PM_{10}
- Particulate matter less than 2.5 microns: $PM_{2.5}$
- Sulfur Dioxide: SO_2
- Nitrogen Dioxide: NO_2
- Ozone: O_3
- Carbon Monoxide: CO
- Lead: Pb

The applicant must demonstrate that a proposed project will:

- Not cause or contribute to the deterioration of air quality greater than the specified allowed PSD Increments
- Not cause or contribute to a violation of the NAAQS.

Each modeling analysis will be unique due to the variety of sources, meteorology, and topographical conditions that may be involved. Nevertheless, the air quality analysis must be accomplished in a manner consistent with the requirements set forth in the PSD regulations. As stated above, refer to AQD-022 for questions related to determining what pollutants should be modeled as part of a PTI application.

A table listing applicable air quality standards for criteria pollutants can be found below in Appendix B.

Significant Impact Level (SIL)

The first step in a criteria pollutant modeling analysis is to determine predicted net impacts from the proposed project only. If predicted maximum net project impacts are less than the PSD SILs, the emissions of that pollutant will not be considered to cause or contribute to any violations of PSD Increment or NAAQS. Pollutants with predicted maximum net project impacts greater than the SIL require a refined modeling analysis. In some cases, a fully refined modeling analysis may be necessary even if project impacts are less than the SIL but could lead to a violation of any applicable regulatory threshold.

If performing an SIL analysis for $PM_{2.5}$, see the **Secondary Ozone and PM2.5 Analysis** section, below, to determine how to include secondary $PM_{2.5}$ impacts.

PSD Increment Analysis

A PSD Increment is the maximum allowable increase in concentration that is allowed to occur above a baseline concentration for a criteria pollutant. A baseline concentration is defined for each pollutant (along with a relevant averaging period) and, in general, is the ambient concentration existing at the time the first complete PSD permit application affecting the area is submitted. Significant deterioration is said to occur when the amount of new pollution would result in ambient pollutant concentrations above the baseline concentration by an amount greater than the PSD Increment. It is important to note, however, that the air quality cannot deteriorate beyond the concentration allowed by the applicable NAAQS, even if not all the PSD Increment is consumed. The AQD maintains statewide baseline dates for all criteria pollutants[9].

The Clean Air Act (CAA) of 1977 established pollutant increments for the prevention of significant deterioration of ambient air. Currently, increments exist for SO_2, NO_2, $PM_{2.5}$, and PM_{10}, excluding 1-hr averaging times. When modeling for compliance with the PSD Increments, it is necessary to demonstrate that the impact of the proposed sources plus the cumulative net impact of all other sources in the area, installed or removed since the baseline date, is less than the allowed increment.

If a PSD Increment consumption analysis is needed, the following modeling elements are required to complete the review for each applicable pollutant:

- Proposed maximum new emissions,
- Increment consuming emissions from existing on-site and off-site sources, which have a significant concentration area overlapping the significant impact area of the proposed project.

All sources (major and minor) installed after the applicable baseline date consume increment. Increment consumption (and expansion) will generally be based on changes in actual emissions reflected by the normal source operation for a period of two years. However, if little or no operating data are available, as in the case of permitted emission units not yet in operation at the time of the increment analysis, the **potential to emit** must be used instead. A facility is expected to provide emissions inventories for existing on-site increment consuming sources. Emissions inventories of off-site sources are available, upon request, from the AQD; however, per USEPA guidance, it is the applicant's responsibility to identify and quantify the off-site sources used in the PSD modeling analysis. See the Nearby Source Emissions Inventory and Background Data section, below, for more information.

The short-term (3-hr and 24-hr) increments for all criteria pollutants are deterministic standards. In other words, they cannot be exceeded more than once per calendar year. For example, when conducting a PSD modeling analysis for short-term periods (non-annual) of SO_2, the maximum high-second-high concentration predicted for any of the five calendar years modeled should be used in

[9] https://www.michigan.gov/egle/about/organization/air-quality/modeling-meteorology

comparison to the PSD Increment. Annual increments can never by exceeded; therefore, the maximum annual concentration, over the 5-year period, should be used.

For a $PM_{2.5}$ PSD Increment analysis, see the **Secondary Ozone and PM2.5 Analysis** section to determine how to include secondary $PM_{2.5}$ impacts.

NAAQS Analysis

Modeling to demonstrate compliance with the NAAQS is similar to PSD increment modeling, but with two differences. The first is that compliance with the NAAQS is based upon the total modeled air quality impact rather than just post-baseline net increases. In other words, potential emissions of all sources in the area that have modeled emission impacts above the SIL must be evaluated regardless of the date the facility was constructed. The second difference is that an ambient background, based on monitored air quality data, must be added to modeled impacts. Therefore, if a NAAQS analysis is needed, the following modeling elements are required:

- Proposed maximum new emissions;
- Potential emissions of all existing sources (on-site and off-site), which have a significant concentration area overlapping significant impact area of the proposed project;
- Background concentrations based on representative monitoring data.

A facility is expected to provide potential emissions inventories for existing on-site sources. Background concentrations and emissions inventories for nearby sources are available, upon request, from the AQD. However, per USEPA guidance, it is the applicant's responsibility to identify and quantify the background concentrations and off-site sources used in the NAAQS modeling analysis. See the Nearby Source Emissions Inventory and Background Data section, below, for more information.

When conducting NAAQS modeling the analysis must encompass the entire range for the selected meteorological data (see the AERMOD Modeling System section, above). As an example, since selecting meteorology data from the NWS is the most common, the NAAQS modeling analysis would include the full five years. The example of using NWS meteorology will be used below. If approved to use site-specific or prognostic meteorology, contact the AQD to discuss showing compliance with the NAAQS.

To determine compliance with certain deterministic NAAQS, specifically both averaging times of CO and annual NO_2, a year-by-year analysis over the 5-year meteorology dataset is required. Both averaging times of CO cannot be exceeded more than once per calendar year. When modeling those pollutants and averaging times, each year must be modeled separately to determine the second high impact for each year. The maximum second high over the five years is then used for compliance with the NAAQS. The annual NO_2 NAAQS can never be exceeded; therefore, the maximum annual impact over the five years is used for compliance with the NAAQS. PM_{10} is different as the 24-hr standard is based on the 6^{th} highest value at any receptor over a 5-year period. Therefore, a year-by-year analysis is not required, but rather a 5-year model run to determine the maximum 6^{th} high impact over the five years.

Unlike the other pollutants and averaging times, 1-hr NO_2, 1-hr SO_2, and annual and 24-hr $PM_{2.5}$ use a statistically based NAAQS modeled over a 5-year modeling period. Compliance is demonstrated by a 5-year average of a statistically determined percentile (i.e., 98th or 99th percentile) at each receptor. For instance, 1-hr NO_2 and 1-hr SO_2 are based on a multi-year average of the 98th percentile (NO_2) and 99th percentile (SO_2) of the annual distribution of daily maximum 1-hr values. Similarly, 24-hr $PM_{2.5}$ is based on the multi-year average of the 98th percentile of the annual distribution of daily 24-hr averages, and annual $PM_{2.5}$ is based on a five-year average. The 98th percentile for NO_2 and 24-hr $PM_{2.5}$ equals the modeled 5-year 8th high impact, and the 99th percentile for SO_2 equals the modeled 5-year 4th high impact. For a $PM_{2.5}$ NAAQS analysis, see the **Secondary Ozone and PM2.5 Analysis** section, below, to determine how to include secondary $PM_{2.5}$ impacts.

A Lead NAAQS analysis is based on calculating the maximum rolling 3-month average over the 5-year meteorology period.

Nearby Source Emissions Inventory and Background Data

An emissions inventory of nearby sources and background concentrations of criteria pollutants can be requested from the AQD. However, this data should be used for informational purposes as, per USEPA guidance, it is ultimately up to the applicant to identify and quantify additional source and background data included in modeling for a proposed application.

Upon request from the AQD, additional source information will include a list of facilities with expected overlapping of significant concentration areas for the proposed application for possible inclusion in PSD Increment and/or NAAQS modeling. Post-baseline emissions will be provided for the PSD Increment, while allowed emissions are provided for NAAQS. However, for NAAQS actual emissions will be provided if allowable emissions information is not available. Specific information for additional sources will include company names, permitted emissions (or maximum actual emissions, if applicable), Universal Transverse Mercator (UTM) coordinates, and stack parameters. To obtain this information, provide the following to AQD modeling staff:

- The company name and address;
- UTM coordinates (center of the facility or emission sources);
- List of pollutants anticipated to be modeled; and
- Other relevant details.

Background concentrations are accounted for through monitoring data. Background monitor concentrations are included in NAAQS modeling and the data represents the following: natural background, area facilities that do not overlap the significant impact of the permit facility, emissions from mobile sources, and regional transport from more distant sources. The monitor representativeness to the permit facility needs to be considered when selecting a monitor for background data. This analysis is done on a case-by-case basis, and the most representative monitor is not necessarily the closest monitor to a permit facility. Background data can be requested from the AQD or obtained from the USEPA's air monitoring page[10].

As stated above, it is ultimately up to the applicant to identify and quantify additional source and background data included in modeling for a proposed application. The applicant should review data received from the AQD and verify that the data is correct. For detailed information on determining additional sources and background concentrations for a PSD Increment and/or NAAQS analysis, refer to the USEPA's Guidance on Developing Background Concentrations for Use in Modeling Demonstrations[11].

Additional Impact Analysis

All PSD permit applicants must prepare an Additional Impact Analysis for each pollutant subject to PSD (i.e., emitted at greater than their significant emissions threshold). This analysis assesses the impacts on soils, vegetation, and visibility caused by any increase in emissions of a regulated New Source Review (NSR) pollutant from the source or modification under review. In most cases, emissions increases will not have adverse impacts on soils, vegetation, or visibility. Regardless, the Additional Impact Analysis must be performed.

Although each applicant for a PSD permit must perform an Additional Impact Analysis, the depth of the analysis generally will depend on existing air quality; the quantity of emissions; and the sensitivity of local soils, vegetation, and visibility in the source's impact area. It is important that the analysis fully documents all sources of information, underlying assumptions, and any agreements made as a part of the analysis. The Additional Impact Analysis generally has three parts: 1) growth, 2) soils and vegetation, and 3) visibility. For more information on how to perform an Additional Impact Analysis, refer to Michigan's Part 18. Prevention of Significant Deterioration of Air Quality Rule 336.2815[12].

Class I Area Impacts (PSD, Visibility, Air Quality Related Values)

Class I areas are areas of special national or regional natural, scenic, recreational, or historic value for which the PSD regulations provide special protection. Michigan has two Class I areas: Seney National Wildlife Refuge, and Isle Royale National Park.

It should be noted that facilities constructing in Michigan may need to evaluate impacts in the Michigan Class I areas; however, an analysis in other states may also need to be performed. It is up to the applicant to perform the Class I analysis, or to show that no Class I area(s) will be affected by the proposed project. Class I areas in other states include but are not limited to Mammoth Cave (KY), Boundary Waters Canoe Wilderness Area (MN), Voyageurs National Park (MN), and Rainbow Lake (WI).

[10] https://www.epa.gov/outdoor-air-quality-data

[11] https://www.epa.gov/system/files/documents/2024-11/guidance-on-developing-background-concentrations-for-use-in-modeling-demonstrations.pdf

[12] https://ars.apps.lara.state.mi.us/AdminCode/DownloadAdminCodeFile?FileName=R%20336.2801%20to%20R%20336.2823.pdf&ReturnHTML=True

One way in which air quality degradation is limited in all Class I areas is by more stringent limits defined by the PSD Class I increment thresholds shown in [Appendix B](). The increments are the maximum increases in ambient pollutant concentrations allowed over baseline concentrations. The Class I increments more stringently limit increases in ambient pollutant concentrations caused by new major sources or major modifications than do the Class II increments. PSD regulations require a PSD increment and NAAQS analysis of any PSD source when the emissions increase pollutant concentrations by 1 $\mu g/m^3$ or more (24-hr average) in a Class I area. If a Class I area increment and NAAQS analysis is required, modeling for Class I areas should include not only emissions from the proposed source, but also other sources that may consume increment in the Class I area.

Also, applicable to Class I areas are Air Quality Related Values (AQRVs), which are features or properties of the Class I area that could be adversely affected by air pollution even if the pollutant concentrations do not exceed the Class I increments. The CAA gave the Federal Land Managers (FLMs) an affirmative responsibility to protect AQRVs and they are responsible for evaluating a source's projected impact on a Class I area's AQRVs. These AQRVs include visibility, vegetation, lakes and streams, soils, fish, animals, and monuments. The appropriate FLM can discuss specific AQRVs for a particular Class I area and advise the applicant of the level of analyses needed to assess potential impacts on these resources, and the appropriate methods that should be employed. AQRV information for Class I areas in Michigan can be obtained from the National Park Service[13]. It is the company's responsibility to contact FLMs regarding a Class I analysis.

For more information on how to perform a Class I analysis, refer to Michigan's Part 18 Rules, Prevention of Significant Deterioration of Air Quality Rule 336.2816[14].

Secondary Ozone and $PM_{2.5}$ Analysis

The AQD requires PSD applicants to submit a secondary analysis for both ozone and $PM_{2.5}$ based on potential emissions from the project. The Guidance for Ozone and Fine Particulate Matter Permit Modeling[15] (final guidance) was issued by the USEPA on July 29, 2022. The USEPA's recommended approaches for assessing impacts are summarized below.

Ozone

Based on the latest draft USEPA guidance, two assessment cases exist for Ozone.

Case 1: if NO_2 emissions **and** VOC emissions are less than their Significant Emission Rates (SERs), no secondary ozone analysis is required.

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[13] https://www.nps.gov/index.htm

[14] https://ars.apps.lara.state.mi.us/AdminCode/DownloadAdminCodeFile?FileName=R%20336.2801%20to%20R%20336.2823.pdf&ReturnHTML=True

[15] https://www.epa.gov/system/files/documents/2022-07/Guidance_for_O3_PM25_Permit_Modeling.pdf

Case 2: if **either** NO_2 **or** VOC are greater than their SERs, a secondary analysis needs to be performed for both NO_2 and VOC.

$PM_{2.5}$

Based on the latest draft USEPA guidance, two assessment cases exist for $PM_{2.5}$.

Case 1: if direct $PM_{2.5}$ emissions, NO_2 emissions, **and** SO_2 emissions are less than their SERs, no primary or secondary $PM_{2.5}$ analysis is required.

Case 2: if **either** direct $PM_{2.5}$ emissions **or** NO_2 emissions **or** SO_2 emissions are greater than their SERs, a primary analysis is required for $PM_{2.5}$ and a secondary analysis is required for both NO_2 and SO_2.

The secondary analysis of both ozone and $PM_{2.5}$ should follow the Tier 1 and Tier 2 approaches outlined in the AQD's Technical Modeling Considerations document or the USEPA's 2017 Guideline on Air Quality Models[16]. Currently, the AQD does not require a secondary ozone and/or $PM_{2.5}$ analysis for minor sources.

Minor Source Modeling

In Michigan, increment consumption is considered to occur because of emissions from minor sources, as well as major sources or major modifications. Minor sources have the option of submitting the modeling with the application or can elect to have the AQD conduct modeling on their behalf. Modeling of minor sources follows the same methodology as major PSD applications; however, one year of modeling utilizing maximum impacts is allowed, rather than five years. (R.336.1241[17]).

Submission of a modeling protocol is suggested but not required for minor source application. See discussion above on suggested topics to be included in a modeling protocol. If a protocol is submitted for a minor source, it will only be evaluated by AQD modeling staff. No preconstruction monitoring is required for minor sources.

If opting to have the AQD perform modeling, the applicant is required to provide the information listed in Appendix B before the review can be completed.

Toxic Air Contaminants – Demonstration of Compliance with Rule 225

Dispersion modeling may also be required to demonstrate compliance with the health-based screening level requirements of Rule 225 (R.336.1225) using the Air Dispersion Modeling Methodology of

[16] https://www.epa.gov/sites/default/files/2020-09/documents/appw_17.pdf

[17] https://ars.apps.lara.state.mi.us/AdminCode/DownloadAdminCodeFile?FileName=R%20336.1201%20to%20R%20336.1299.pdf

Rule 227(1)(c) (R.336.1227) found in Part 2 of the State of Michigan Air Pollution Control Rule[18]. Modeling must be performed with the maximum emission rate of each toxic pollutant. The maximum ambient air impact used for comparison to the AQD's Toxic Air Contaminant screening levels should be based on the first high impact using the most recent year of meteorological data (R.336.1241). A list of all screening levels can be found on the AQD's Air Toxics website[19].

If opting to have the AQD perform modeling (minor sources only), the applicant must provide the information listed in Appendix A before the review can be completed.

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[18] https://ars.apps.lara.state.mi.us/AdminCode/DownloadAdminCodeFile?FileName=R%20336.1201%20to%20R%20336.1299.pdf

[19] https://www.michigan.gov/egle/about/organization/air-quality/air-toxics

Appendix A: Modeling Submittal Checklist

The following information is required before AQD staff can perform a modeling review of a PSD application or perform modeling on behalf of a company for minor source applications.

Prior to modeling submittal (PSD applications only)

- Modeling protocol
- Preconstruction monitoring waiver request

Modeling information submitted with application

- Name and address of the facility
- Brief process description
- Detailed site map showing:
  - Buildings, including dimensions and heights
  - Emission point locations
  - Secure property clearly identified
- Table listing stack/emission point parameters to be modeled, including UTM coordinates
- Pollutants to be evaluated and specific emission rates for all emission points
- Modeling write-up summarizing the methodologies used during the modeling review (not required when minor source modeling is performed by the AQD)
- AERMOD and associated modeling input files (required for minor sources if modeling is submitted to the AQD):
  - AERMOD input file
  - BPIP (building) input file
  - AERMOD output file
- Table(s) summarizing modeling results
- Any other information deemed necessary/important

All modeling information must be submitted within MiEnviro Portal. Please note that some file extensions are not allowed. If necessary, the extension of modeling input files can be changed to .txt.

What not to submit to the AQD

- Please do not submit terrain files. Rather, in the modeling write-up summary, identify the terrain datum used in the modeling analysis. The AQD will upload the necessary terrain files within the AERMOD software.
- Do not submit meteorology files unless modeling with site-specific or prognostic meteorological data. The AQD will use the AERMOD-ready meteorology files that are available online. In the modeling write-up summary, identify the most representative meteorology site that was used in modeling.

Appendix B: Applicable Air Quality Standards

CRITERIA POLLUTANT NAAQS/PSD/SIL LEVELS

Pollutants	Averaging Time	**NAAQS**		**PSD Permitted Class Increments**			**Significant Emissions Increase**	**Significant Monitoring Concentrations**		**Significant Impact Levels**	
		Primary	Secondary	I	II	III				**Class I**[5]	**Class II**
		(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(ton/year)	(µg/m³)	Term	(µg/m³)	(µg/m³)
PM_{10}	Annual	(revoked)		4	17	34	15				1[1]
	24-Hour	150	150	8	30	60		10	24-Hour		5[1]
$PM_{2.5}$	Annual	9	15	1	4	8	10 (PM2.5) 40 (NO_2) 40 (SO_2)				0.13[2]
	24-Hour	35	35	2	9	18		0	24-Hour		1.2[2]
SO_2	Annual	(revoked)	26[6]	2	20	40	40			0.1	1[1]
	24-Hour	(revoked)		5	91	182		13	24-Hour	0.275	5[1]
	3-Hour	(revoked)		25	512	700				1.23	25[1]
	1-Hour	196									7.8[4]
CO	8-Hour	10,000					100	575	8-Hour		500[1]
	1-Hour	40,000									2,000[1]
NO_2	Annual	100	100	2.5	25	50	40	14	Annual	0.1	1[1]
	1-Hour	188									7.5[3]
Lead	3-Month Rolling	0.15	0.15				0.6	0.1	3-Month		
Ozone	8-Hour	70 ppb	70 ppb				40 (VOC) 40 (NO_2)	100	ton/year		1 ppb[2]

[1] CO, NO2 (annual), PM10, SO2 (annual, 24-hour, and 3-hour) SILs codified in 40 CFR 51.165(b)(2)

[2] Supplement to the Guidance on Significant Impact Levels for Ozone and Fine Particulates in Prevention of Significant Deterioration Permitting Program - April 30, 2024

[3] NO2 1-hour SIL established in USEPA Guidance Concerning the Implementation of 1-hour NO2 NAAQS for the Prevention of Significant Deterioration Program – June 29, 2010

[4] SO2 1-hour SIL established in USEPA Guidance Concerning the Implementation of 1-hour SO2 NAAQS for the Prevention of Significant Deterioration Program – August 23, 2010

[5] Class I Area Significant Impact Levels Memorandum – September 10, 1991

[6] Secondary National Ambient Air Quality Standards (NAAQS) for Nitrogen Dioxide (NO2) and Sulfur Dioxide (SO2) and Particulate Matter (PM)