DEQ	AIR QUALITY DIVISION POLICY AND PROCEDURE		DEPARTMENT OF ENVIRONMENTAL QUALITY
Original Effective Date: – February 20, 2013 Updated October 21, 2013 Updated December 10, 2013 Updated February 7, 2014 Updated August 29, 2014 Updated September 12, 2014 Updated October 13, 2014 **DRAFT** Revised Date: NA Reformatted Date: NA	Subject: Dispersion Modeling Guidance for Criteria Pollutants Program Name: Air Permits to Install Number:AQD-22	Page 1 of 14	Category: ☐ Internal/Administrative ☒ External/Non-Interpretive ☐ External/Interpretive

A Department of Environmental Quality (DEQ) Policy and Procedure cannot establish regulatory requirements for parties outside of the DEQ. This document provides direction to the DEQ staff regarding the implementation of rules and laws administered by the DEQ. It is merely explanatory; does not affect the rights of, or procedures and practices available to, the public; and does not have the force and effect of law.

INTRODUCTION:

This policy and procedure discusses the federal and state statutory and regulation-based requirements to assure compliance with the National Ambient Air Quality Standards (NAAQS) and the Prevention of Significant Deterioration (PSD) increments during the review and evaluation of Permit to Install (PTI) applications. As part of the PTI application approval process, a determination~~demonstration~~ that the project will not interfere with the NAAQS and the PSD increment must be made. This is true for both major sources and minor sources.

Major sources and major modifications at existing major sources in attainment areas are subject to PSD and are required to demonstrate that the project will not cause a violation of the NAAQS or PSD increment. This demonstration is done through dispersion modeling.

New minor sources and minor modifications at existing sources, with post-project allowable emissions less than the significant emission rates (SER), would typically be assumed to not cause a violation of the NAAQS or an exceedance of PSD increment. However, it is the experience of the Air Quality Division (AQD) staff that there are situations when it may be necessary to perform a demonstration to confirm these assumptions.

This guidance applies to the evaluation of regulated new source review (NSR) pollutants only and all previous guidance regarding the need to perform dispersion modeling of regulated NSR pollutants, as part of a PTI evaluation, as well as the 80% increment consumption demonstration, is hereby rescinded.

AUTHORITY:

The requirement to demonstrate compliance with the NAAQS and the PSD increment is found in the Clean Air Act and federal and state rules. The discussion outlining this

DRAFT

regulatory basis can be found in Appendix A. The pertinent part of the regulatory language is shown in italics.

DISCUSSION:

The AQD evaluates and issues PTIs for both major and minor sources. All sources going through the PTI process, whether major or minor, shall not interfere with the attainment or maintenance of the air quality standard for any regulated NSR pollutant as part of Michigan's attainment program. Additionally, increases in emissions cannot cause or contribute to an exceedance of the PSD increment. All changes in emissions occurring after the minor source baseline date affect the available increment. Although increment is a PSD requirement and PSD is commonly connected only with major sources and major modifications, all emission increases consume increment. This means that the state has the responsibility and obligation to prevent significant deterioration of air quality in all areas of the state designated as either attainment or unclassifiable, regardless of whether the source is major or minor.

The SER for regulated NSR pollutants subject to a NAAQS are defined in the federal and state PSD regulations as identified in Michigan's Air Pollution Control Rules, Part 18, Rule 336.2801 (Rule 1801). The purpose of the SER is to determine when a proposed modification at a source is subject to the major source PSD requirements. A PTI application that is for a project with either new emission units or the modification of existing emission units that are subject to Part 18 (Rule 1801 et. seq.) must include a demonstration, through dispersion modeling, that the air quality standards (the NAAQS and PSD increment) are protected for those regulated NSR pollutant emissions increases that exceed their SER.

For~~A~~ PTI applications ~~that is for a~~involving proposed projects where the emissions are less than the SER, regardless of the source size, the AQD must also determine~~monstrate~~ that the emissions will comply with the NAAQS and PSD increment. How this determination~~monstration~~ is made is outlined in this guidance document.

EXCEPTIONS TO THE POLICY:

As discussed above, a determination~~monstration~~ that a proposed project will not interfere with the NAAQS and the PSD increment must be made. There are numerous reasons why dispersion modeling would be needed for the review of a project that is not a major source or a major modification, and with allowable emissions increases that are less than the SER. Examples of situations where dispersion modeling may be needed include:

- Poor dispersion characteristics due to building or stack design or area topography. (e.g., non-vertical discharges, obstructions such as raincaps, stack heights less than 1.5 times the building height, changes in stack parameters that degrade dispersion characteristics.)
- Close proximity of sensitive populations such as hospitals and schools.
- Knowledge of an existing or potential NAAQS or PSD increment problem in the area, based on existing monitoring data or past modeling demonstrations.
- High background concentration where a minor impact could trigger a NAAQS violation.
- High short-term (hourly) emission rates in relation to the annual emissions.

If the AQD's judgment is that, based on the above, the source has potential to interfere with the maintenance of the NAAQS or to cause or contribute to an exceedance of the PSD increment; the applicant may be required to submit a demonstration that the source will not have an adverse air quality impact.

POLICY:

Minor SER Greenfield, Minor SER Modification, and Minor Modifications of Non-Major Pollutant:

An owner or operator in the following situations that is applying for a PTI will not typically be required to conduct a qualitative analysis or a dispersion modeling analysis to demonstrate compliance with the PSD increment and NAAQS.

These source modifications do not typically interfere with the maintenance of the NAAQS or compliance with PSD increment. However, there may be circumstances when additional qualitative analysis or dispersion modeling of an emissions change less than the SER may be appropriate, as discussed elsewhere in this document.

The following definitions apply to this section:

> *Minor SER Greenfield* – A new greenfield stationary source with total facility-wide potential to emit (PTE) less than the respective SER for all regulated NSR pollutants. (See Example _)
>
> *Minor SER Modification* – A minor modification at an existing stationary source with regulated NSR pollutant emissions less than the respective SER, and the total facility-wide emissions for each regulated NSR pollutant remain less than the SER after the project. (See Example _)
>
> *Minor SER Modification of Non-Major Pollutant (NMP)* – A minor SER modification of a non-major pollutant (NMP) at an existing major PSD source is one where the project emissions of the NMP are less than the SER, and the emissions of the NMP remain less than the SER facility-wide after the project. Communication with the AQD prior to the submission of a PTI application is highly recommended.

Minor SER Modifications at Existing Minor PSD and Major PSD Sources:

For the situations below, the following tables identify, on a regulated NSR pollutant basis, when a demonstration for regulatory purposes may not be required. The criteria are based on the allowable emissions of the specific pollutant, and the stack parameters for the project.

The stack parameters in the tables refer to point sources only. If there are fugitive emissions from the project, refer to the fugitive emissions discussion below. The following definitions apply to this section:

Minor SER Modification at an Existing Minor PSD Source

- Project emissions are less than the applicable SER and:
  - The total facility emissions become greater than the SER but remain less than the applicable PSD threshold. (See Example _)
  - The total facility emissions are already greater than the SER but remain less than applicable PSD thresholds. (See Example _)
  - The total facility emissions become greater than applicable PSD thresholds after the project. (See Example _)

Minor SER Modification at an Existing Major PSD Source

- Project emissions of the NMP are less than the applicable SER and the total facility-wide emissions of that NMP are greater than the SER. (See Example _)
- Project emissions of the major pollutant are less than the applicable SER. (See Example _)

If the project emission increase is greater than the SER, a demonstration ~~ir dispersion modeling~~ will be required as part of the permit application~~, unless the applicant has received prior approval from the AQD that a qualitative assessment is appropriate~~. Communication with the AQD prior to the submission of a PTI application is highly recommended.

Table 1

NOx, SO_2, PM10, and PM2.5* NAAQS

Allowable Emissions	Stack Requirements[1]	Demonstration Required[2]
Greater than SER	As necessary to meet NAAQS and PSD increment	Y
100%-50% of SER	Minimum height: 60 feet and 1.5 times the building height Orientation: Vertically unobstructed	N
	Minimum height: 30 feet Orientation: Vertically unobstructed Building: No Downwash	N
25%-50% of SER	Minimum height: 40 feet and 1.5 times the building height Orientation: Vertically unobstructed	N
	Minimum height: 20 feet Orientation: Vertically unobstructed Building: No Downwash	N
Less than 25% of SER	None	N

1) The minimum requirements for stack height, stack/building relationship, and vertically-emitting do not apply to:
a) Emission units that otherwise meet the PTI exemption criteria under R336.1279 through R336.1290 or that contribute less than 20% of the overall project emissions increase on a pollutant basis; and
b) Intermittent sources, such as emergency generators.
2) Unless otherwise deemed necessary as an exception to this Policy and Procedure or unless the applicant decides to

DRAFT

submit a demonstration~~air dispersion modeling~~.
*See Table 3 if PSD increment is applicable.

Table 2

CO

Allowable Emissions	Stack Requirements	Demonstration Required
Greater than SER	As necessary to meet NAAQS and PSD increment	Y
Less than 100% of SER	None	N

Table 3

PM2.5 PSD Increment (Supersedes Table 1 if PM2.5 PSD Increment review applies)

Allowable Emissions	Stack Requirements[1]	Demonstration Required[2]
Greater than SER	As necessary to meet PSD increment	Y
Natural Gas Combustion Sources		
100%-25% of SER	Minimum height: 60 feet and 1.5 times the building height Orientation: Vertically unobstructed	N
	Minimum height: 40 feet Orientation: Vertically unobstructed Building: No Downwash	N
Less than 25% of SER	None	N
All Other Sources		
100%-50% of SER	As necessary to meet PSD Increment	Y
50%-25% of SER	Minimum height: 60 feet and 1.5 times the building height Orientation: Vertically unobstructed	N
	Minimum height: 40 feet Orientation: Vertically unobstructed Building: No Downwash	N
Less than 25% of SER	Minimum height: 40 feet and 1.5 times the building height Orientation: Vertically unobstructed	N
	Minimum height: 30 feet Orientation: Vertically unobstructed Building: No Downwash	N

1) The minimum requirements for stack height, stack/building relationship, and vertically-emitting do not apply to:
a) Emission units that otherwise meet the PTI exemption criteria under R336.1279 through R336.1290 or that contribute less than 20% of the overall project emissions increase on a pollutant basis; and
b) Intermittent sources, such as emergency generators.
2) Unless otherwise deemed necessary as an exception to this Policy and Procedure or unless the applicant decides to submit a demonstration~~air dispersion modeling~~.

DRAFT

If the criteria in the tables above are not met, the applicant will submit a demonstration to the AQD including one of the following:

- A qualitative assessment supporting the conclusion that the proposed modification will not interfere with maintenance of the NAAQS or cause or contribute to an exceedance of the PSD increment.

- Dispersion modeling demonstrating that the proposed modification will not interfere with maintenance of the NAAQS or cause or contribute to an exceedance of the PSD increment.

Qualitative Assessment:
For an existing source that is not triggering a major PSD modification~~ and the emissions are not greater than the SER~~, a qualitative air quality assessment may be used. See Appendix C for examples where a qualitative assessment would be appropriate.

Items to consider in the air quality assessment are a narrative description of the current air quality conditions and the expected impact the permitted source would have on that air quality. Other factors to consider in the qualitative discussion include previous modeling results if available, meteorology, terrain, distance to ambient air, expected emissions increases and decreases and associated release characteristics, quality of data, etc. If the qualitative assessment cannot demonstrate compliance with applicable NAAQS and PSD increment~~that no impacts to air quality would be expected~~, a screening analysis should next be performed. Sources that cannot demonstrate protection of air quality using a screening technique should continue to refined modeling.

If upon review of the qualitative assessment, it is the AQD's judgment that additional air quality impact analyses are necessary to demonstrate that the proposed modification will not interfere with maintenance of the NAAQS or cause or contribute to an exceedance of a PSD increment, the applicant will be required to conduct a dispersion modeling analysis.

Fugitive Emissions:
If criteria pollutant ~~F~~fugitive emissions exist as either part of an overall project or as the entire project, they~~and~~ should be included in the emission calculations when determining if a modeling demonstration is required. A project that involves fugitive emissions should identify the level of fugitive emissions, the location of the fugitive emissions associated with the project, and any control strategy that will be used for those fugitive emissions in the discussion. It is suggested that the permit applicant contact the AQD to discuss the proposed project, and associated fugitive emissions, to determine if a ~~modeling~~ demonstration is appropriate. This may be done at a pre-application meeting or conference call prior to the submittal of a permit application.

Additionally, when criteria pollutant fugitive emissions are part of an overall project at a facility, consideration should be made that if the project by itself meets the requirements of any of the previous tables—where a modeling demonstration would not be required—the fugitive emissions alone may not necessarily require a ~~modeling~~ demonstration.

DRAFT

PROCEDURES:

Prior to the submittal of a permit application, the applicant is encouraged to participate in a pre-application meeting where, among other things, modeling requirements are discussed. If the application is for a project that is subject to major source review (i.e. PSD), the applicant is required to submit modeling with the initial application for those regulated NSR pollutants that trigger major source requirements. Following is the procedure for all regulated NSR pollutants not subject to major source requirements.

Responsibility	Action
Permit Engineer	As part of the technical completeness review : • Determine the category of the proposed project. • Conduct an evaluation of the proposed project and facility to determine whether~~at type of~~ a demonstration is required~~appropriate~~ or whether the applicant has otherwise met the criteria in this policy. • Communicate with the applicant regarding their submittal and whether further information is necessary.
Applicant	If applicable, ensure that the criteria in Tables 1-3 are met or a demonstration is included as part of the application or upon request of the AQD~~Submit qualitative analysis, or submit dispersion modeling as appropriate~~.

If questions arise whether dispersion modeling should be performed, the permit reviewer should discuss this with their unit supervisor or peer reviewer. The permit engineer may discuss the proposed project and course of action with the modelers in the Strategy Development Unit if questions regarding the air dispersion modeling arise. The results of which should be conveyed to the applicant during the additional information request step of the Permit Review Process.

REFERENCES:

Alabama Power Co. v. Costle 636 F. 2d 323, 362 (DC Cir 1979)

APPROVAL:

_____ _____

DRAFT

Mary Ann Dolehanty, Permit Section Supervisor Date

DRAFT

Appendix A
Authority—Dispersion Modeling

The requirement to demonstrate compliance with the NAAQS and the full PSD Increment are found in the Clean Air Act, and federal and state rules. The following discussion outlines this regulatory basis. For clarity, the pertinent part of the regulatory language is shown in italics.

Clean Air Act, Title I – Air Pollution Prevention and Control.

Subpart 1.

Sec. 110. Implementation plans

(a)(1) Each State shall, after reasonable notice and public hearings, adopt and submit to the Administrator, within 3 years (or such shorter period as the Administrator may prescribe) after the promulgation of a national primary ambient air quality standard (or any revision thereof) under section 109 of this title for any air pollutant, a plan which provides for implementation, maintenance, and enforcement of such primary standard in each air quality control region (or portion thereof) within such State. …

(2) Each implementation plan submitted by a State under this Act shall be adopted by the State after reasonable notice and public hearing. Each such plan shall—

(A) ……

(C) include … regulation of the modification and construction of any stationary source within the areas covered by the plan as necessary to assure that national ambient air quality standards are achieved, including a permit program as required in parts C and D;

(D) contain adequate provisions—

(i) prohibiting, consistent with the provisions of this title, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will—

(I) contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard, or

(II) interfere with measures required to be included in the applicable implementation plan for any other State under part C to prevent significant deterioration of air quality or to protect visibility,

(ii) insuring compliance with the applicable requirements of sections 126 and 115 (relating to interstate and international pollution abatement);

…

(K) provide for—

(i) the performance of such air quality modeling as the Administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any air pollutant for which the Administrator has established a national ambient air quality standard, and

(ii) the submission, upon request, of data related to such air quality modeling to the Administrator; …

Part C – Prevention of Significant Deterioration of Air Quality

Sec. 160. Purposes

The purposes of this part are as follows:

(b) to protect public health and welfare from any actual or potential adverse effect which in the Administrator's judgment may reasonably be anticipate to occur from air pollution or from exposures to pollutants in other media, which pollutants originate as emissions to the ambient air, notwithstanding attainment and maintenance of all national ambient air quality standards; …

Sec. 161. Plan Requirements

In accordance with the policy of section 101(b)(1), each applicable implementation plan shall contain emission limitations and such other measures as may be necessary, as determined under regulations promulgated under this part, to prevent significant deterioration of air quality in each region (or portion thereof) designated pursuant to section 107 as attainment or unclassifiable.

To this end, states develop implementation plans to prevent significant deterioration of air quality. The requirements for preparation, adoption, and submittal of these implementation plans are in the Code of Federal Regulations, Title 40 – Protection of Environment, Part 51, Section 51.160 (40 CFR 51.160) and Section 51.166 (40 CFR 51.166).

51.160 Legally enforceable procedures.

(a) Each plan must set forth legally enforceable procedures that enable the State or local agency to determine whether the construction or modification of a facility, building, structure or installation, or combination of these will result in-- …

(2) Interference with attainment or maintenance of a national standard in the State in which the proposed source (or modification) is located or in a neighboring State.

(b) Such procedures must include means by which the State or local agency responsible for final decisionmaking on an application for approval to construct or modify will prevent such construction or modification if-- …

(2) It will interfere with the attainment or maintenance of a national standard.

Similarly, Section 51.166 requires State plans to prevent exceedance of air increments and the national standards. The requirements of 40 CFR 51.166 are now part of Michigan Air Pollution Control Rules – Part 18. Prevention of Significant Deterioration.

The Michigan Air Pollution Control Rules contain the following requirements to protect the air quality standards.

R 336.1207 Denial of Permits to Install.

Rule 207. (1) The department shall deny an application for a permit to install if, in the judgment of the department, any of the following conditions exist:

(a) The equipment for which the permit is sought will not operate in compliance with the rules of the department or state law.

(b) Operation of the equipment for which the permit is sought will interfere with the attainment or maintenance of the air quality standard for any air contaminant

(c) The equipment for which the permit is sought will violate the applicable requirements of the clean air act, as amended, 42 U.S.C. §7401 et seq., …

R 336.2811 Source impact analysis.

Rule 1811. The owner or operator of the proposed major source or major modification shall demonstrate that allowable emission increases from the proposed major source or major modification, in conjunction with all other applicable emissions increases or reduction, including secondary emissions, shall not cause or contribute to air pollution in violation of either of the following:

(a) Any national ambient air quality standard in any air quality control region.

(b) Any applicable maximum allowable increase over the baseline concentration in any area.

DRAFT

Appendix B
Definition of Terms

SIGNIFICANT EMISSION RATE The significant emission rates are defined in R 336.2801(qq) and the more commonly modeled regulated NSR pollutants are summarized in the table below:

Regulated NSR Pollutant	Significant Emission Rate (tpy)
Carbon Monoxide (CO)	100
Nitrogen Dioxide (NO2)	40
Sulfur Dioxide (SO2)	40
Particulate Matter ≤ 10 microns (PM10)	15
Particulate Matter ≤ 2.5 microns (PM2.5)	10
Lead	0.6

PROJECT The project ~~is the~~ emissions are associated with the installation and/or modification at the stationary source. Also, if a netting analysis is included in the application, the point at which you determine if a demonstration is required is the emissions increase prior to taking into account any contemporaneous decreases.

MAJOR SOURCE Stationary sources that have the potential to emit 250 tons per year or more of a regulated NSR pollutant or, if they fall into one of the 26 source categories listed in R 336.2801(cc), have the potential to emit 100 tons per year or more of a regulated NSR pollutant.

MAJOR MODIFICATION A physical change in or change in the method of operation of an existing major stationary source that would result in both of the following:
(i) A significant emissions increase of a regulated NSR pollutant;
(ii) A significant net emissions increase of that pollutant from the major stationary source.

MINOR SOURCE A stationary source that does not meet the definition of "major source".

MINOR SOURCE MODIFICATION A physical change in or change in the method of operation of an existing minor stationary source where the potential to emit, including the proposed project, remains below the applicable level (i.e., 100 or 250 tons per year) which would result in the stationary source being classified as a major source.

NON-MAJOR POLLUTANT Any pollutant for which the potential to emit from a stationary source, including the proposed project, is below the applicable level (i.e., 100 or 250 tons per year) which would result in the stationary source being classified as a major source.

NEW STATIONARY SOURCE The siting and installation of a stationary source as defined in R 336.1119(r) where one did not previously exist. Also referred to as a greenfield site

ALLOWABLE EMISSIONS The emission rate calculated using the maximum rated capacity of the process or process equipment, unless there are legally enforceable limits that

DRAFT

	restrict the operating rate or the hours of operation, or both, and the most stringent of the following: (i) Any applicable standards pursuant to the clean air act. (ii) Any applicable emission limit specified in the Michigan Air Pollution Control Rules, including a limit that has a future compliance date. (iii) Any applicable emission rate specified as a legally enforceable permit condition or voluntary agreement, performance contract, stipulation, or order of the department, including a rate that has a future compliance date
FUGITIVE EMISSIONS	Those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening.

.

Appendix C
Modeling Scenario Examples

Scenario 1:

Facility X submits a permit application to add a new fuel for an existing boiler at their facility. The new fuel is lower emitting for all pollutants on a short term and annual basis. All of the stack parameters remain the same for the emission unit. No new standards have been promulgated. In this scenario, a qualitative analysis may be appropriate to explain why air dispersion modeling is not necessary for the criteria pollutants to meet the applicable NAAQS and PSD increment.

Scenario 2:

Facility X submits a permit application to add a new fuel for an existing boiler at their facility. The new fuel is lower emitting for all pollutants on a short term and annual basis. The current configuration at the facility is two stacks; the new configuration is one shorter stack. No new standards have been promulgated. Although the emissions will have decreased after the project, since the dispersion characteristics have been altered, modeling would be required in order to demonstrate that the criteria pollutant emissions will meet the applicable NAAQS and PSD increment for this scenario.

Scenario 3:

Facility X submits a permit application for a new test cell at an existing engine test cell facility. The new test cell will utilize existing permitted fuel restrictions and ton per year restrictions. There will be one new stack constructed at the facility which will be included in the flexible group. No new standards have been promulgated. In the previous application, which was only one year ago, emissions of criteria pollutants were evaluated using air dispersion modeling. The analysis was completed assuming all of the emissions from the test cells went through the worst case stack. Since the new application is to keep all existing limits, but install a new stack, a qualitative analysis demonstrating that the new stack would not be the worst case stack may be warranted. However, if the qualitative analysis shows that the new stack is the worst case stack, then air dispersion modeling would be required.

DRAFT

Scenario 4:

Facility X owns an existing facility that has boilers, coating lines, and numerous other pieces of process equipment. Facility X is a PSD source. Facility X wants to install two new boilers in another building located across the street but which is considered to be part of the same stationary source. The new boilers will each have an exhaust stack, but the stacks will be shorter than the stacks for the existing boilers located in the other building. The new boilers will burn a cleaner fuel which will generate lower emissions both on a long term and short term basis than the existing boilers. Overall, the emissions will decrease from the facility, but the project (installing two new boilers) has emissions greater than the applicable SER. No new standards have been promulgated. In this scenario, modeling would be required because although the overall emissions are decreasing from the facility (through netting), the emissions from the project are above significant, the new boiler stacks are shorter than the existing boiler stacks, and the new boilers are located in a different building than the existing boilers even though it is within the same stationary source.

Scenario 5:
This scenario is in relation to footnote 1 in Tables 1 and 3

Facility X is planning to install five pieces of equipment—four (4) boilers and one (1) space heater. The total emissions from all five pieces of equipment are 30 tons per year. The four boilers contribute 25 tons of the total 30 tons and meet the stack requirements identified in the table(s). The space heater contributes 5 tons to the project emissions but does not meet the stack requirements identified in the table(s). While the total project emissions are 30 tons per year for the purposes of evaluating the need to model, the space heater alone generates less than 20% of the total project emissions. The facility should not be required to perform dispersion modeling because the only stack that does not meet the requirements in the table contributes only 16% to the project's emissions.

Scenario 6: *To be submitted*

Scenario 7: *To be submitted*

Scenario 8: *To be submitted*

DRAFT