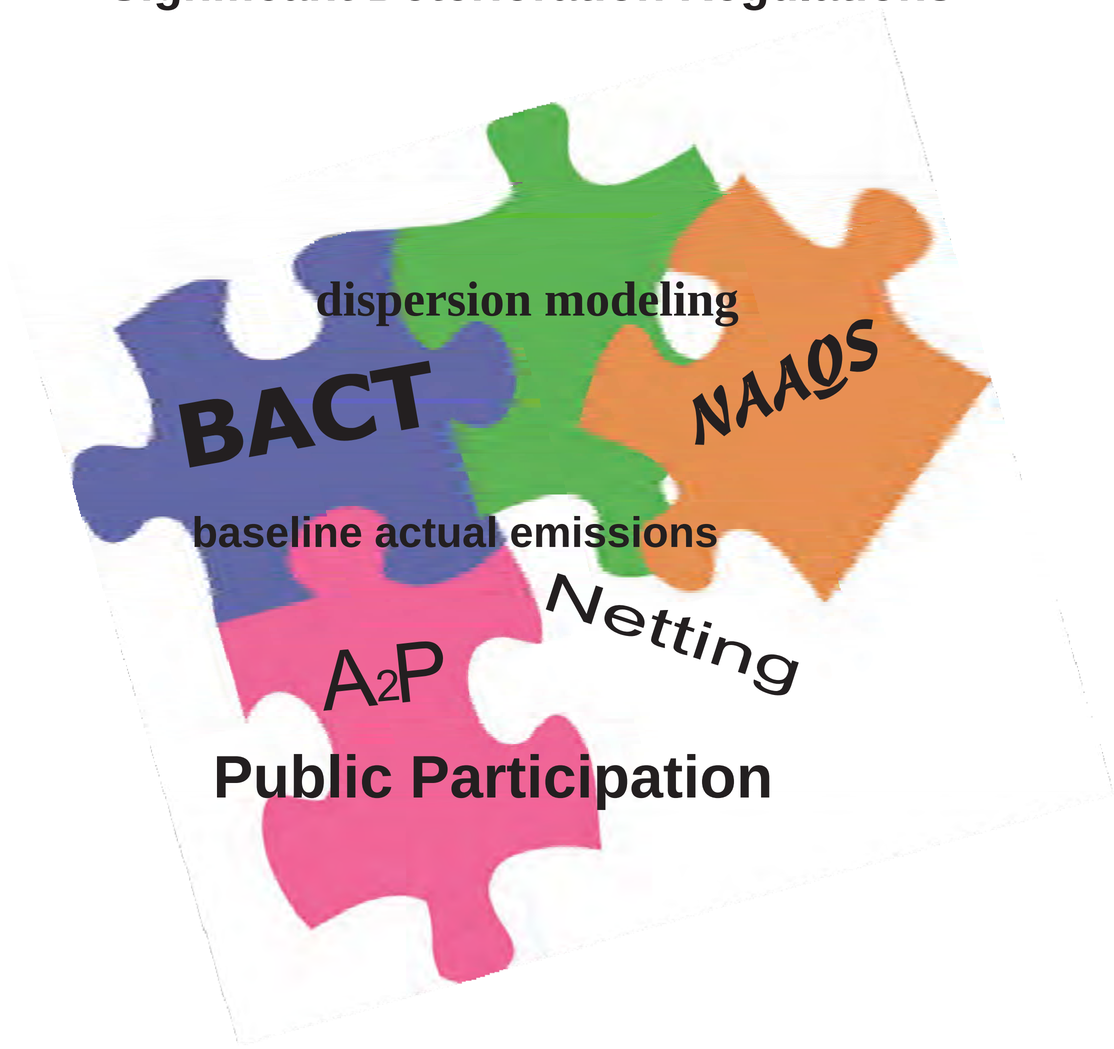
PSD

Workbook

A Practical Guide to Michigan's Prevention of Significant Deterioration Regulations



Michigan Department of Environmental Quality
www.michigan.gov/deq

Rev. 5/2014

Contents

List of Tables

DISCLAIMER

This publication is intended for guidance only and may be impacted by changes in legislation, rules, policies, and procedures adopted after the date of publication. Although this publication makes every effort to teach users how to meet applicable compliance obligations, use of this publication does not constitute the rendering of legal advice.

This publication has been reviewed by a steering committee and outside reviewers. Diligent attention was given to assure that the information presented herein is accurate as of the date of publication; however, there is no guarantee, expressed or implied, that use of this workbook will satisfy all regulatory requirements mandated by laws and their respective enforcement agencies. Reliance on information from this document is not usable as a defense in any enforcement action or litigation. The state of Michigan shall be held harmless for any cause of action brought on as a result of using of this publication.

INTRODUCTION

This publication has been prepared to provide guidance to those who are subject to Michigan's Air Pollution Control Regulations. In particular, this workbook addresses the regulatory requirements for major stationary sources of air pollution to construct a new facility, or modify an existing facility, in the state of Michigan.

This publication was initially written in October, 2003. Subsequent to the initial publication, there have been changes in regulatory requirements at both the state and federal levels. This workbook has been prepared to assist and inform the regulated community, interested parties, and the general public, of air use permitting requirements for major stationary sources in the state of Michigan.

This workbook addresses permitting of major stationary sources and major modifications at major stationary sources in those areas of the state which are currently in compliance with the National Ambient Air Quality Standards (NAAQS). These geographic areas are referred to as "attainment areas". The goal of the state regulations is to maintain compliance with the NAAQS while allowing for economic growth through the prevention of significant deterioration of the air quality, hence the acronym "PSD". Since the majority of the state is in attainment, most of the permitting done in the state is PSD or minor source permitting.

For major stationary sources or major modifications at major stationary sources which are located in non-attainment areas, or where the air quality is exceeding the NAAQS, the goal is to regulate sources of pollution in such a way that the areas will come in compliance with the NAAQS. There is a separate control strategy, permitting strategy, emission limits, and regulatory requirements for permitting major stationary sources or major modifications at major stationary sources, in non-attainment areas, and this is known as non-attainment new source review (NSR).

Chapters 1 and 2 provide a general overview of the PSD regulations and a general framework for determining whether the PSD regulations may be applicable to your facility. Chapters 3 through 5 provide detailed technical guidance and procedures (the actual to actual test, the actual to potential test, the hybrid test, and netting) for making the final determination of PSD applicability. Chapter 6 provides information on plant wide applicability limits. Finally, Chapters 7 through 10 provide the regulatory requirements and technical demonstrations needed to address PSD.

Michigan has promulgated rules which address the permitting requirements for major stationary sources or major modification at major stationary sources in non-attainment areas and these requirements are contained in Part 19 of Michigan's administrative rules for Air Pollution Control. In very general terms the requirements for facilities subject to non-attainment NSR include the following:

- An analysis of alternative sites;
- The process is utilizing the Lowest Achievable Emission Rate (LAER);
- All sources owned or operated by the owner of the process under review are in compliance with all air pollution control regulations, or have a legally enforceable schedule for achieving compliance;
- Have provided offsets from existing sources.

If additional information about non-attainment new source review or minor source permitting is required, please contact the Air Quality Division (AQD) Permit Section, or the Office of Environmental Assistance (OEA).

As of the publication date of this document, all of the information contained in the workbook is current. Recognizing that the rules, regulations, and attainment designations are subject to change, the AQD highly recommends that anyone who needs to submit an air use permit application meet with the AQD Permit Staff in advance of the actual permit submittal. This meeting, known as "pre-application meeting," provides an opportunity to review all relevant information in advance of permit submittal; and assures that all necessary information will be contained in the permit application.

For those who may be interested in learning more general information about the MDEQ's Permitting Process; the AQD and the OEA sponsors workshops for air use permitting. Please contact the OEA at (800-662-9278) to obtain more information about these workshops or visit the AQD website at the following address:

www.michigan.gov/deqair

chapter 1

Overview

Major stationary sources and major modifications at major stationary sources are required by the Federal Clean Air Act (CAA) to undergo a new source review and obtain a permit before construction. This federal NSR program affects major stationary sources and major modifications at major stationary sources in areas designated as non-attainment, attainment, or unclassifiable. In attainment and unclassifiable areas, the federal NSR program is implemented under the PSD program as found in 40 CFR 52.21 and under Michigan's Part 18 Rules. These rules were promulgated pursuant to Act 451 of 1994 (as amended) of the Natural Resources and Environmental Protection Act.

The basic goals of the PSD program are: (1) to ensure that economic growth can continue while simultaneously preserving existing air quality (i.e., prevent degradation of air quality); and (2) to preserve and protect the air quality in areas of recreational, scenic, or historic value, such as national parks and wilderness areas (i.e., Class I areas). The primary provisions of the PSD regulations require that new major stationary sources and major modifications at major stationary sources be reviewed prior to construction to assure compliance with the NAAQS, the applicable PSD increment, and best available control technology (BACT).

On December 31, 2002, the United States Environmental Protection Agency (USEPA) substantially reformed the PSD program. The reformed program modified PSD as it had been implemented pursuant to the 1977 CAA mandates and 1980 federal court decisions. The 2002 NSR reforms became effective in the State of Michigan on March 3, 2003. The MDEQ has PSD regulations which have been fully approved as a part of the State Implementation Plan (SIP) by the USEPA. Michigan received SIP approval for its PSD regulations on March 25, 2010 (see FR Volume 75, No. 57, page 14352).

In very general terms, a PSD permit application may be divided into a control technology review; in which the control technology is reviewed and selected; and an ambient impact analysis, in which the impact of the proposed emissions are estimated via the use of dispersion modeling.

The requirements of the PSD program apply to new major stationary sources and major modifications to existing major stationary sources. A "major stationary source" is any source type belonging to a list of source categories which emits or has the potential to emit 100 tons per year or more of any regulated NSR pollutant, or any other source type which emits or has the potential to emit any regulated NSR pollutant in amounts equal to or greater than 250 tons per year. Furthermore, a major stationary source is also any source which has the potential to emit more than 100,000 tons per year of Greenhouse Gases (GHGs) expressed as carbon dioxide equivalents (CO_2e). A stationary source generally includes all pollutant-emitting activities which belong to the same industrial grouping, are located on contiguous or adjacent properties, and are under common control.

A major modification is generally a physical change or a change in the method of operation of an existing major stationary source which would result in both a significant emissions increase and a significant net emissions increase of any NSR pollutant.

Important Terms

One key to PSD is to understand the terms that are used in the program. The following are some of the key terms used in PSD permitting:

- National Ambient Air Quality Standards (NAAQS)
- PSD Increment Concentrations
- Regulated NSR Pollutants
- Project
- Attainment Areas
- Non-attainment Areas
- Unclassifiable Areas
- Class I areas
- Class II areas
- Best Available Control Technology (BACT)
- Potential to Emit (PTE)
- Major Stationary Source
- Contemporaneous Period
- Emissions unit (EU)
- Significant Thresholds
- Allowable Emissions
- Actual Emissions
- Baseline Actual Emissions (BAE)
- Projected Actual Emissions (PAE)
- Major Modifications
- Excludable Emissions (EE)
- Pre-construction monitoring

Definitions for all of the above terms are contained in the CAA and the Michigan Air Pollution Control rules.

National Ambient Air Quality Standards

The CAA requires the USEPA to establish ambient air ceilings above which pollutants may cause harm to the public health or welfare. In response to this charge, the USEPA developed the NAAQS. The NAAQS fall into two categories: primary and secondary standards. Primary standards are generally protective of public health. Secondary standards are generally protective of public welfare (i.e., soils, vegetation and structures).

The NAAQS have been established for particulate matter that has an aerodynamic diameter less than or equal to a nominal 10 microns in diameter (PM10), particulate matter that has an aerodynamic diameter less than or equal to a nominal 2.5 microns in diameter (PM2.5), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and ozone. Ozone is formed in the ambient air by the reaction of volatile organic compounds (VOCs) and NO_2 under certain atmospheric conditions (i.e., primarily hot and sunny). Ozone is therefore regulated through its precursors (NO_2 and VOC). Precursors of PM2.5 (NO_2 and SO_2) also need to be addressed by quantifying these precursors when it is feasible to do so.

The following table identifies the current NAAQS:

Table 1 National Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	Primary	8-hour	9 ppm	Not to be exceeded more than once per year
	Secondary	1-hour	35 ppm	
Lead (Pb)	Primary and Secondary	Rolling 3-month average	0.15 µg/m^3	Not to be exceeded
Nitrogen Dioxide (NO_2)	Primary	1-hour	100 ppb	98th percentile, averaged over 3 years
	Primary and Secondary	Annual	53 ppb	Annual mean
Ozone	Primary and Secondary	8-hour	0.075 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
PM2.5	Primary	Annual	12 µg/m^3	Annual mean, averaged over 3 years
	Primary and Secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
PM10	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)	Primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year
Notes: The NAQQS listed in this table are current at the time of publication. The most current NAAQS may be seen at the following web address: **www.epa.gov/air/criteria.html**				

The USEPA is required under sections 108 and 109 of the CAA to establish, review, and revise (as appropriate) the NAAQS. The CAA requires periodic review of the science upon which the standards are based as well as the standards themselves. The process of establishing or reviewing a standard(s) includes the following steps:

- Planning
- Integrated Science Assessment
- Risk/Exposure Assessment
- Policy Assessment
- Rulemaking

PSD Increment Concentrations

Unlike the NAAQS, which act as ceiling concentrations, the PSD Increments represent the maximum allowable increase in pollutant concentrations from all increment consuming sources. The impact of emissions is compared against the baseline concentration for the area. Each individual new source or major modification is compared against PSD increment concentration.

The following table identifies the current PSD increment values:

Table 2 PSD Increment Concentration Values

Pollutant	Averaging Period	PSD Class I Increment	PSD Class II Increment	Model Value Used for Comparison to NAAQS
SO_2	3-hour	25	512	Highest Second High
	24-hour	5	91	Highest Second High
	Annual	2	20	Highest
PM10	24-hour	8	30	Highest Second High
	Annual	4	17	Highest
PM2.5	24-hour	2	9	Highest Second High
	Annual	1	4	Highest
NO_2	Annual	2.5	25	Highest

Notes:
1. All values listed in this table are micrograms per cubic meter.
2. The PSD Increments listed in this table are current at the time of publication.

Regulated NSR Pollutants

Prior to the 2002 CAA reforms, PSD applied only to those pollutants for which a NAAQS had been developed. Since the reforms, PSD applies to all regulated NSR pollutants. Regulated NSR pollutants are defined as:

- Any pollutant for which a NAAQS has been developed and any constituents or precursors identified by the USEPA;
- Any pollutant regulated under a New Source Performance Standard (NSPS);
- Any material identified as contributing to the depletion of stratospheric ozone;
- Any other material regulated under the CAA except for Hazardous Air Pollutants (HAPs).

GHGs are now regulated NSR pollutants under the CAA. GHGs are gases which trap heat in the atmosphere and are believed to be the major contributors to climate change. GHGs are an aggregate of six specific gases:

- Carbon dioxide (CO_2)
- Nitrous oxide (N_2O)
- Methane
- Hydrofluorocarbons
- Perfluorocarbons
- Sulfur hexafluoride

GHGs are regulated as CO_2e and on a mass basis. The mass basis does not incorporate greenhouse gas weighting factors (referred to as Global Warming Potentials, or GWPs).

Project

A project is defined as a physical change in, or change in the method of operation of an existing major stationary source. A project may affect one or more emissions units. Each affected emissions unit must be included in the applicability determination for that project.

Attainment Areas

Regions of the country in = which the measured air quality is meeting (i.e., having lower pollutant concentrations) the NAAQS for a criteria pollutant are referred to as attaining the NAAQS, or being in attainment. In these attainment areas, the PSD regulations prevent the degradation of air quality. To achieve this goal, new major stationary sources and major modifications at existing major sources are required to implement controls and to limit the impacts on ambient air quality to less than both the NAAQS and the PSD Increment concentrations.

> **note!**
>
> Illustrations of Michigan's attainment and non-attainment areas can be viewed at the following websites:
>
> **www.michigan.gov/air**
> (Select "Assessment and Planning" then "Attainment/Non-attainment")
>
> www.epa.gov/oaqps001/greenbk/ancl.html

Non-attainment Areas

Regions of the country in which the measured air quality has a higher pollutant concentration than the NAAQS, are referred to as not attaining the NAAQS, or being in non-attainment. The federal NSR regulations require more stringent measures in these areas because the goal is to improve the air quality.

Unclassifiable Area

Regions of the country in which the air quality is unknown, with respect to the NAAQS, are referred to as unclassifiable areas. A region may be unclassifiable due to an absence or insufficient quantity of monitored air quality data. Remote regions of the country having little or no industrial development are often unclassifiable areas due to the impracticality of maintaining air quality monitors in such locations. Unclassifiable areas are subject to the PSD program as if they were attainment areas. Currently Michigan has no unclassifiable areas.

Class I Areas

As previously mentioned, areas of the state which are meeting the NAAQS are designated as attainment areas. Attainment areas are further classified into Class I and Class II. Areas of recreational, scenic, or historic value; such as national parks and wilderness areas, are designated as Class I areas and receive special attention under the PSD regulations. New sources and major modifications at major stationary sources subject to the PSD program that may impact a Class I area are required to conduct additional environmental reviews for any such impacts and to assure that there is no degradation in visibility. Michigan currently contains two Class I areas; the Seney National Wildlife Refuge and Isle Royale National Park.

Class II Areas

All other attainment and unclassified areas are designated as Class II areas under Section 162 of the CAA. Class II areas are not regulated as stringently as Class I areas. Table 2: PSD Increment Concentration Values--contains a comparison of PSD increments for Class I and Class II areas.

Best Available Control Technologies (BACT)

BACT, in general, is an emissions limitation based on the maximum degree of reduction for each regulated new source review pollutant subject to review. A BACT analysis is conducted in a top-down manner, on a case-by-case basis. The analysis is designed to identify the best control technology for each specific pollutant. Technically infeasible control options are excluded and the remaining control options are ranked according to their control efficiency. The energy, environmental, and economic impacts of the remaining options are evaluated and the top control option is selected as BACT. This process requires a significant amount of documentation and technical evaluations.

Potential to Emit (PTE)

PTE is defined as the maximum capacity of the source to emit a pollutant under its physical and operational design. Physical or operational limits on the capacity, including the use of air pollution control equipment or operational restrictions, must be enforceable as a practical matter in order to limit the potential to emit.

Major and Minor Stationary Source

A source is classified as either a major stationary source or minor source with respect to PSD, based upon its potential to emit. New major stationary sources will be subject to PSD if their PTE is equal to or greater than 100 TPY (if one of the listed categories in Table 3: PSD Source Categories with 100 TPY Major Source Thresholds) or greater than or equal to 250 TPY. Minor sources must first become major stationary sources (or make a change that by itself is a major stationary source) before becoming subject to PSD.

A stationary source generally includes all pollutant-emitting activities which belong to the same industrial grouping, are located on contiguous or adjacent properties, and are under common control or ownership. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, or vent, or other functionally equivalent opening. Fugitive emissions are to be included in the potential to emit for the source categories listed in Table 3, any facility which is regulated by a NSPS (promulgated after August 7, 1980), or any facility which is regulated by the National Emission Standards for Hazardous Air Pollutants (NESHAP) standard promulgated after August 7, 1980.

Table 3 PSD Source Categories with 100 73< Major Source Thresholds

The following source categories are major stationary sources if emissions of any regulated New Source Review pollutants are equal to, or greater than, 100 tons per year. If the facility is not one of the listed categories, the Major Stationary Source Threshold is 250 tons per year.	
Fossil fuel-fired steam electric plants of more than 250 million BTU's per hour heat input	Coke oven batteries
Coal cleaning plants with thermal dryers	Sulfur recovery plants
Kraft pulp mills	Carbon black plants (furnace process)
Portland cement plants	Primary lead smelters
Primary zinc smelters	Fuel conversion plants
Iron and steel mill plants	Sintering plants
Primary aluminum ore reduction plants	Secondary metal production plants
Primary copper smelters	Chemical process plants
Municipal incinerators capable of charging more than 250 tons of refuse per day	Fossil fuel boilers, or combinations thereof, totaling more than 250 million BTU's per hour heat input
Hydrofluoric, sulfuric and nitric acid plants	Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
Petroleum refineries	Taconite ore processing plants
Lime plants	Glass fiber processing plants
Phosphate rock processing plants	Charcoal production plants

Contemporaneous Period

A contemporaneous period is a period of time, defined by regulation, which precedes the commencement of operation of a new or modified emissions unit. It is a period of time over which increases or decreases in emissions are quantified. A contemporaneous period is a continuous five year period that starts five years before construction is initiated and ends when the project begins operation.

Emissions Unit

An emissions unit, by definition, is "any part of a stationary source that emits or would have the potential to emit any regulated new source review pollutant and includes an electric utility steam generating unit." An emissions unit is generally a logical grouping (or groupings) of a process or process equipment which is required to produce a product or a raw material.

Significant Thresholds

The significant threshold for each regulated NSR pollutant, presented in Table 4: Significance Thresholds; is established by the regulations, as the level above which a project at an existing major stationary source will become subject to PSD. Before becoming subject to PSD, the specific project must be found to result in both a significant emissions increase and a significant net emissions increase.

In other words, if a specific project will result in an emissions increase greater than the significant threshold, then that project may be subject to PSD. However, it is not the emissions increase from the specific project alone that determines PSD applicability. Once the project has been determined to result in a significant emissions increase, the increase may be combined with other emissions increases and decreases made at the facility contemporaneously with the specific project. If the net result is greater than the significant amount, the specific project is determined to result in a significant net emissions increase, and it is subject to PSD. If the first step does not result in a significant emissions increase, then it is not necessary to determine the net emissions increase.

Table 4 Significant Thresholds

Pollutant	Quantity (TPY)
Carbon Monoxide (CO)	100
Fluorides	3
Greenhouse Gases as carbon dioxide equivalent (CO_2e)	100,000 (new sources) 75,000 (modified sources)
Hydrogen Sulfide (H_2S)	10
Lead (Pb)	0.6
Municipal Solid Waste Landfill Emissions measured as non-methane organic compounds (NMOC)	50
Municipal Waste Combustor Acid Gases measured as SO_2 and hydrochloric acid (HCl)	40
Municipal Waste Combustor Metals	15
Municipal Waste Combustor Organics measured as total tetra through octa-chlorinated dibenzo-p-dioxins and dibenzofurans	3.5×10^{-6}
Nitrogen Oxides (NOx)	40
Particulate Matter (PM)	25
PM10	15
PM2.5	10
Sulfur Dioxide (SO_2)	40
Sulfuric Acid Mist (H_2SO_4)	7
Total Reduced Sulfur (including H_2S)	10
Ozone (determined as Volatile Organic Compounds (VOCs) or NO_2)	40

<u>Allowable Emissions</u>
Allowable emissions are the level of emissions allowed to a source under the terms of its permit. This level is enforceable and therefore, becomes the potential to emit. By selecting an optimal level of allowable emissions, a source may maximize its operational flexibility and minimize the number or type of regulatory requirements that apply to avoid becoming subject to PSD.

<u>Actual Emissions</u>
Actual emissions are the level of emissions actually emitted to the air from a source. Actual emissions are used to determine the magnitude of a change made at a PSD-subject source.

Baseline Actual Emissions

Baseline actual emissions (BAE) are defined as the average rate of emissions, in tons per year, from a source that actually occurred over any consecutive 24-month period. The 24-month period must fall within a specific timeframe before the project commences construction. BAE are used as the starting point for determining the magnitude of changes in order to determine whether or not the change will be subject to PSD.

Projected Actual Emissions

Projected actual emissions (PAE) are the maximum level of emissions, over any consecutive 12-month period, associated with the level and type of business activity expected to occur after the project. The period of time for projecting emissions is either 5 or 10 years, depending on the nature of the project.

Major Modification

A major modification is a physical change, or a change in the method of operation of an existing major stationary source which would result in both a significant emissions increase and a significant net emissions increase of any regulated NSR pollutant. In determining whether a specific project would become subject to the PSD program, the modification must be determined to result in both a significant emissions increase and a significant net emissions increase.

Excludable Emissions

Excludable emissions (EE) are those emissions that the process or processes could have accommodated during the baseline period (the 24 month period used in calculating the BAE) and that are unrelated to the particular project, including any increased utilization due to product demand growth.

Pre-construction Monitoring

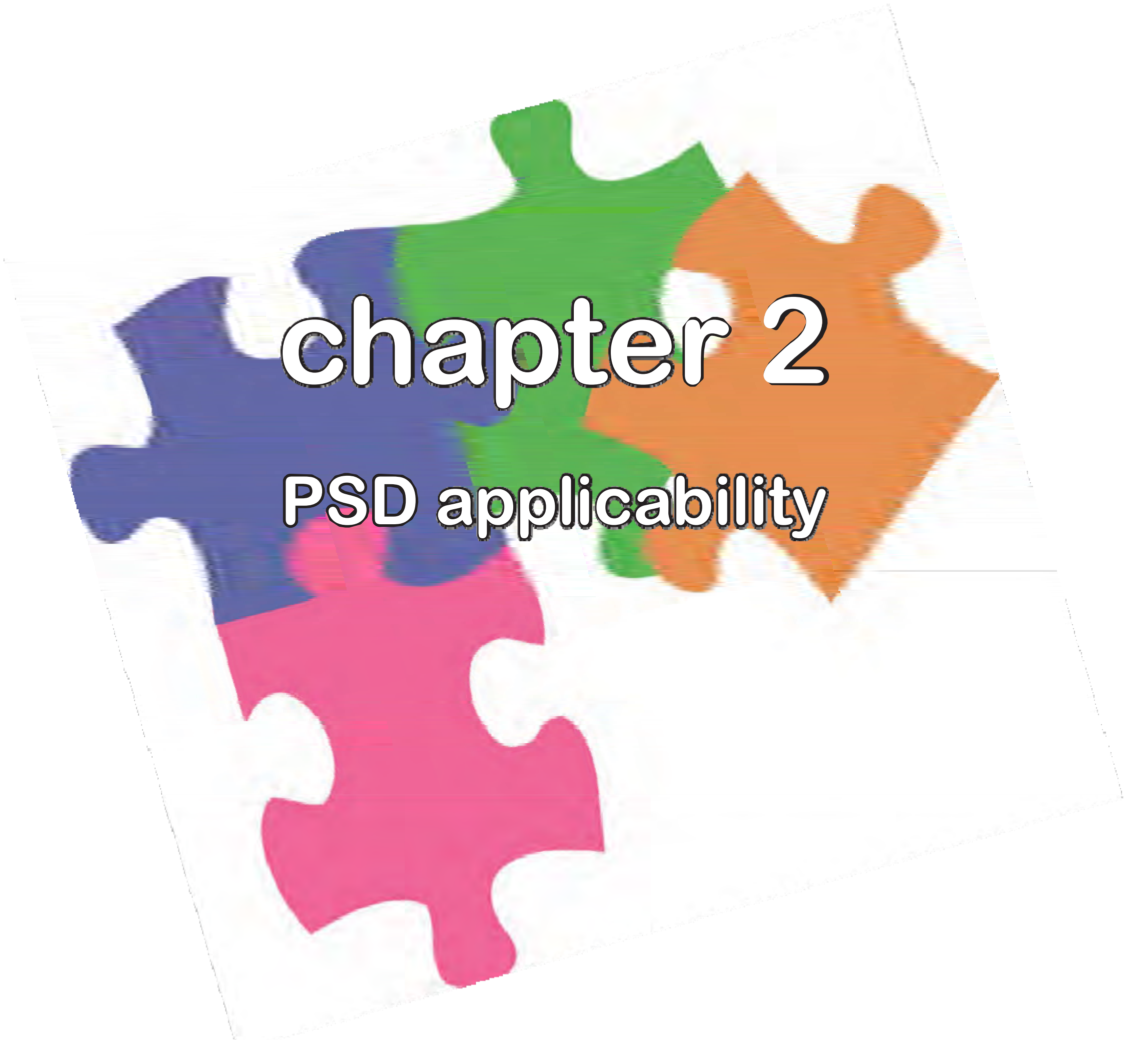
For any criteria pollutant that a major source proposes to emit in significant amounts, or for a proposed modification that involves a significant net increase, at least one year of ambient monitoring data, as measured before the permit submittal, in the affected area, is required as part of a full impact air quality analysis. The applicant would be exempt from this requirement if it can be demonstrated that the highest modeled concentration caused by the significant increase or modification for the applicable averaging time is below the significant monitoring concentrations listed in Table 5: PSD Air Monitoring Exemption Concentrations. In lieu of pre-construction monitoring, the applicant may request a waiver from the AQD.

Table 5 PSD Air Monitoring Exemption Concentrations

Pollutant	Exemption Concentration (micrograms per cubic meter)
CO, 8-hour average	575
PM10, 24-hour average	10
SO_2, 24-hour average	13
Lead, 3-month average	0.1
Fluorides, 24-hour average	0.25
Total Reduced Sulfur, 1-hour average	10
Hydrogen Sulfide, 1-hour average	0.2
Reduced Sulfur Compounds, 1-hour average	10
Nitrogen Dioxide, annual average	14

chapter 2

PSD applicability



A simple statement of PSD applicability could be as follows:

> *If a proposed new source, or modification at an existing source, causes emission increases greater than the appropriate applicable threshold, it will be subject to PSD.*

Definition of Source

Before applicability can be determined, the stationary source must be defined. A stationary source generally includes all pollutant-emitting activities which belong to the same industrial classification, are located on contiguous or adjacent properties, and are under common control.

Some industrial complexes involve more than one facility. Aggregating multiple facilities into a single stationary source may be appropriate for determining PSD applicability. It is appropriate to combine facilities into one stationary source under all of the following conditions:

- All facilities are under common ownership or common control;
- All facilities are in the same Standard Industrial Classification (SIC) major group. The SIC major group is a two digit number which describes similar industrial processes (i.e. SIC major group 49 is Electric, Gas and Sanitary Services);
- All facilities are located in a contiguous area or are adjacent to one another. "Contiguous" does not mean that the facilities have to be adjacent to one another; the facilities can be "contiguous" if they are joined by physical links such as pipelines, railways, channels, conduits, or other functional relationships that exist between the facilities.

There is one exception to the SIC criteria listed above, and that exception is for "support facilities". If one facility provides more than 50 percent of its product or raw material to another facility, the facility providing the product or raw material may be considered a "support facility" to the other, in which case the emissions from both facilities will be combined. An example of a support facility is a power plant which produces steam only, and is located adjacent to an automobile assembly plant. The power plant has a different SIC major grouping than the automobile assembly plant, is located on or next to the assembly plant's property, but is under different ownership and considered under common control than the assembly plant. All of the steam produced at the power plant is used at the automobile assembly plant. It is obvious in this example that the power plant is a support facility for the automobile assembly plant.

Major and Minor Sources

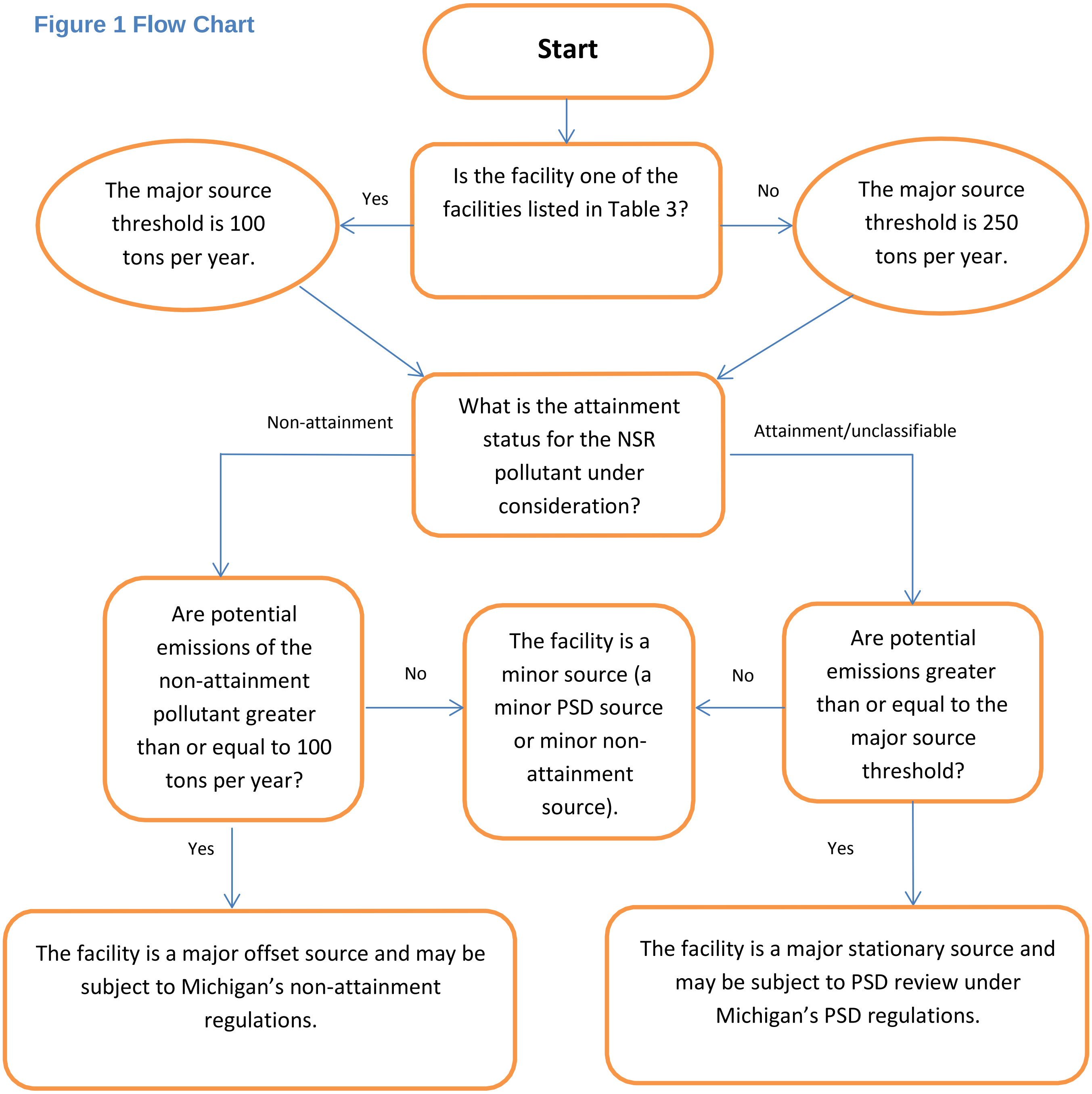
Once the stationary source has been identified and is distinguished from any others that might exist at a site, it must be determined whether or not it is a major stationary source. To be a major stationary source, it must have the potential to emit (or permitted, allowable emissions) greater than 100 tons per year, if it is one of the listed source types, or 250 tons per year if it is not one of the listed source types. Fugitive emissions are included in the potential emissions for any 100 ton per year source category, or if the source is subject to an NSPS standard or a NESHAP standard promulgated after August 7, 1980. Fugitive emissions are to be calculated to the extent that the fugitive emissions are able to be quantified.

> **note!**
>
> If a facility exceeds a major stationary source threshold (100/250 tons per year) for **A** single NSR regulated pollutant, it becomes major for **ANY OTHER** regulated NSR pollutant emitted at or above its significant level, regardless of whether that pollutant exceeds the major stationary source threshold.

Note that the designation of major or minor status is determined on a pollutant specific basis. For PSD purposes, if a source exceeds the major stationary source threshold for one regulated NSR pollutant, it is considered major for any other regulated NSR pollutant emitted at or above its significant level.

The following flow chart illustrates how new major and minor sources are defined at greenfield sites:

Figure 1 Flow Chart



New and Existing Sources

For purposes of PSD, an existing source is defined as one that has operated for more than 24 consecutive months since the date of initial operation. Any facility that is proposed, under construction, or that has not been operational for 24 months since the date of initial operation, is considered a new source. The distinction between new and existing sources is important because it will affect the PSD applicability determination when determining baseline emissions for future projects.

Modifications vs. Excluded Changes and Projects

According to Rule 1801(aa), a major modification is any physical change in, or change in the method of operation of an existing major stationary source that causes both a significant emissions increase and a significant net emissions increase. A physical change or a change in the method of operation is not specifically defined. Instead, the regulations specifically exclude certain changes (physical and operational) from being considered modifications. Therefore, except for the following exclusions, per Rule 1801(aa)(iii)(A)-(K), any physical change in, or change in the method of operation is considered a modification:

- Routine maintenance, repair, and replacement;
- Use of alternative fuels (under certain circumstances);
- An increase in operating hours or production rate, unless either are prohibited by permit condition;
- Any change in ownership;
- Certain qualifying clean coal projects (subject to specific caveats).

Whenever a modification is occurring at an existing major stationary source, the possibility exists for more than one emission unit to be affected. The scope of the project (i.e., the list of affected emission units) must always be clearly identified at the beginning of the applicability determination.

remember!

Whenever a change is occurring, it is possible for more than one emission unit to be affected.

Determining whether or not PSD will apply at a new or existing source depends on whether a specific project (i.e., modification) will cause both a significant emissions increase by itself and a significant net emissions increase at the stationary source. The following table will help summarize PSD applicability thresholds.

Table 6 PSD Applicability Matrix

	New Facility	Existing Non-PSD Facility	Existing PSD Facility
Minor Project	No PSD, but may require a minor source Permit to Install (PTI).	No PSD, but may require a minor source PTI.	No PSD unless the project by itself exceeds the significance threshold based on potential to emit, but may require a minor source PTI.
Major Project	PSD for projects that by themselves exceed the major stationary source thresholds along with any other NSR pollutants emitted at or above significance level.	PSD for projects that by themselves exceed the major stationary source thresholds along with any other NSR pollutants emitted at or above significance level.	PSD for each NSR pollutant emitted at levels greater than the significant levels.

Significant Change

The appropriate PSD applicability threshold may be either the major stationary source thresholds or the significant thresholds (see definitions of these terms in Chapter 1), depending on whether the facility is new or existing, major or minor. The question remains as to how the magnitude of a change is determined.

There are three different ways of determining the magnitude of a change at an existing source:

1. The Actual to Potential (A2P) Applicability Test.

The A2P Test

Source Size: Major

Source Status: Existing (more than two years old)

Emissions Units: New or existing

Emission Projection Basis: Potential to emit

This applicability test involves comparing the PTE of the new emissions unit(s), or modification to the existing emissions unit(s), to the BAE from these units. BAE are determined as described in Chapter 3. If the difference is greater than significant, then the project may be subject to PSD.

2. The Actual to Projected Actual (A2A) Applicability Test.

The A2A Test

Source Size: Major

Source Status: Existing (more than two years old)

Emissions Units: Existing (more than two years old)

Emission Projection Basis: Projected actual **OR** Potential to emit

For a project that involves the modification of existing emissions units, either the A2A or the A2P test can be used. The A2A test involves comparing the PAE of the existing emissions units to the BAE from these units. BAE are determined as described in Chapter 3. If the difference is greater than the significant level for that pollutant, then the project may be subject to PSD.

3. The Hybrid Test.

The Hybrid Test

Source Size: Major

Source Status: Existing (more than two years old)

Emissions Units: New **AND** existing

Emission Projection Basis: Projected actual **AND** Potential to emit.

For a project that involves combinations of new emissions units and existing emissions units, the Hybrid Test is used. This applicability test involves using the appropriate applicability test as described above for each type of emissions unit, and then adding together the emissions increases. If the sum of the increases is greater than the significant level for that pollutant, then the project may be subject to PSD.

Determining the Net Emissions Change

As stated above, in order to be subject to PSD, a project at an existing major stationary source must result in both a significant emissions increase and a significant net emissions increase. The three methods described above allow one to determine whether the emissions increase due to the project is significant, which is the first step in determining PSD applicability.

The second step in determining PSD applicability is determining the net emissions change. Once a proposed project at an existing major stationary source has been determined to result in a significant emission increase, all other emissions increases and decreases for that pollutant that have occurred at the stationary source within the contemporaneous period are combined with the emissions increases from the proposed project. If the net result is an emissions increase less than the significant amount for each regulated NSR pollutant, then the project has "netted out" of PSD applicability. If the end result remains greater than the significant amount for any regulated NSR pollutant, then the proposed project will result in both a significant emissions increase and a significant net emissions increase and will be subject to PSD for that pollutant.

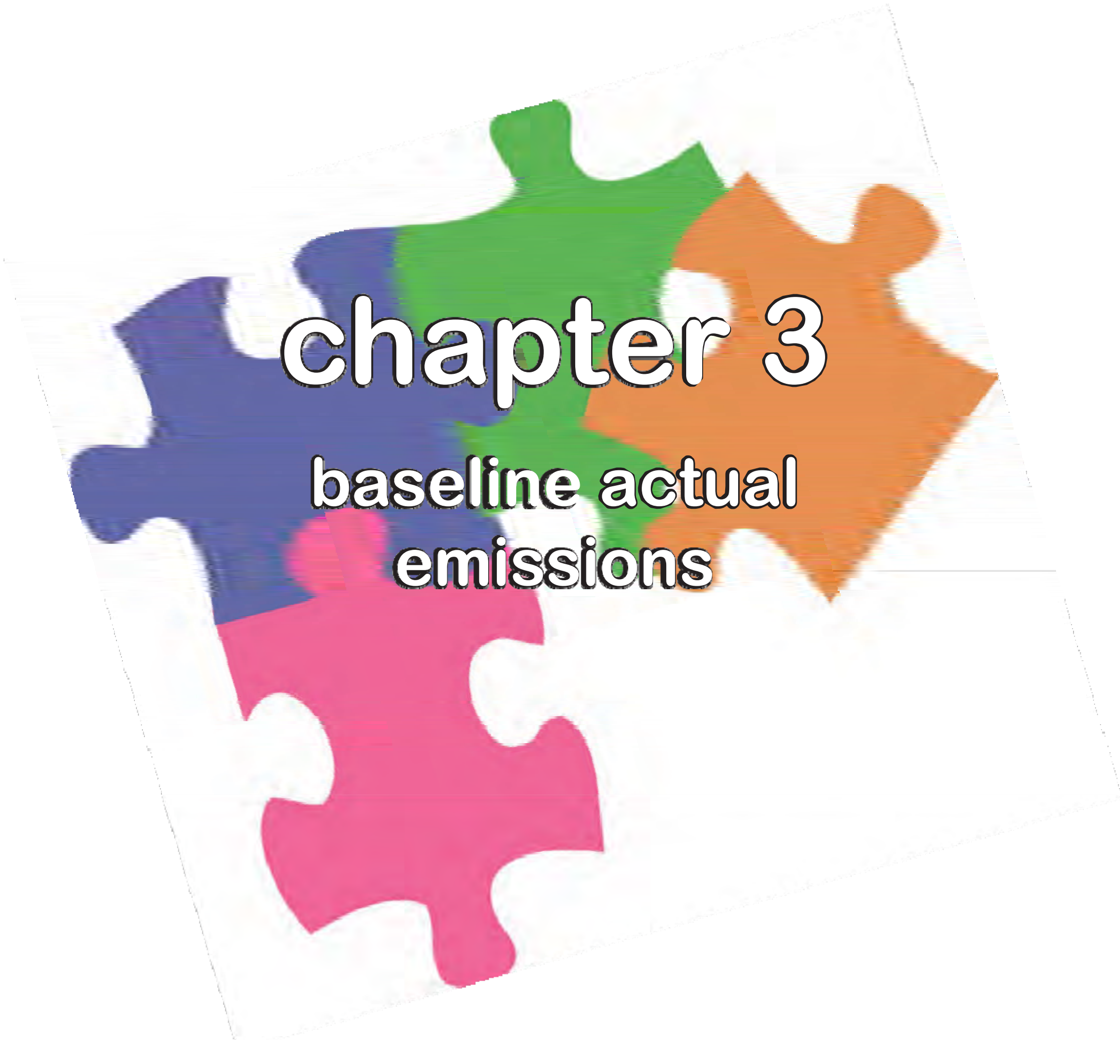
There are restrictions on the emissions increases and decreases that may be included in a netting analysis. There are also specific methodologies for determining the magnitude of any emissions increase or decrease. The appropriate procedures for conducting a netting analysis are discussed in Chapter 5.

Changes not Subject to Applicability

PSD applicability depends on whether a new source or a change to an existing source results in emissions increases above certain applicability thresholds. There are some projects that are not subject to the applicability thresholds. Proposed projects at a facility with a plant wide applicability limit (PAL) are not subject to the applicability determination procedures described above. Any proposed project at a PAL facility is excluded from PSD applicability, unless it would result in an emissions increase above the level of the PAL. PALs are discussed in Chapter 6.

chapter 3

baseline actual emissions



BAE are the starting point for PSD applicability determinations. BAE is the average rate of emissions, in tons per year, of a regulated NSR pollutant that actually occurred over a consecutive 24-month period chosen from the previous five or ten years, as described below. BAE represents the benchmark for determining the magnitude of emission changes at major stationary sources. Prior to the 2002 NSR reforms, the method for determining BAE was not defined in the PSD regulations. This chapter will describe the methodology for determining BAE.

BAE is established for three specific purposes:

- For modifications - to determine a modified emissions unit's pre-change emissions as part of a PSD applicability determination;
- For netting - to determine the pre-change actual emissions of an emissions unit that underwent an emissions increase or decrease during the contemporaneous period for a specific project (discussed in Chapter 5);
- For PALs - to establish the level of a PAL (discussed in Chapter 6).

For each of these three purposes, BAE are calculated on an emissions unit-specific basis. For different types of emissions units there are minor differences in the methodology. The USEPA has established two different methods for determining BAE for two different emissions unit types – one for Electric Utility Steam Generating Unit (EUSGU), and another method for all other types of emissions units.

Electric Utility Steam Generating Unit

Any steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW electrical outputs to any utility power distribution system for sale. Any steam supplied to a steam distribution system for the purpose of providing steam to a steam-electric generator that would produce electrical energy for sale is also considered in determining the electrical energy output capacity of the affected facility.

40 CFR 52.21(b)(31) and R 336.2801(q)

BAE for New and Existing Emissions Units

A new emissions unit is defined as a unit that is newly constructed and that has existed for less than two years from the date it first operated or units that have not been operating. An existing emissions unit is defined as a unit that is not a new emissions unit. New emissions units have not had an opportunity to develop a pattern of actual operations on which to establish baseline emissions. Therefore, the amount of emissions from a new emissions unit that can be included in BAE is defined by regulation.

New emissions units that have not yet begun normal operation, (i.e., are still under construction or are conducting initial shakedown operations) are included in the BAE at zero emissions. New emissions units that have begun normal operation are included in the BAE at their potential to emit. R 336.2801(b)(iii) states "For a new emissions unit, the baseline actual emissions for purposes of determining the emissions increase that will result from the initial construction and operation of such unit shall equal zero; and thereafter, for all other purposes, shall equal the unit's potential to emit."

BAE for EUSGU

BAE are the average actual emissions calculated over two consecutive years (i.e., 24 consecutive months) of actual operation. For an EUSGU, the applicant must identify actual emissions that occurred during any consecutive 24-month period during the five years immediately preceding the date on which construction actually begins for a specific project, or the date a permit is issued, if no construction is necessary (example – adding a fuel that doesn't require additional fuel handling equipment). Since the specific date on which construction actually begins is an estimated future date, the five year look back period must start from that estimated future date. As such, it is possible that future delays in the start of construction could require a re-evaluation of the BAE and PSD applicability.

For example, if a facility selects the 24-month period beginning exactly five years prior to the expected start of construction date, and the start of construction is delayed several months, the baseline period emissions will no longer be valid – they will lie outside of the specified five year period. However, the permitting authority (MDEQ) may exercise discretion in allowing an alternative 24-month period as the baseline period on the basis that the alternative period is more representative of normal facility operation.

> **hint!**
>
> A facility's Continuous Emission Monitoring System data or Michigan Air Emission Reporting Systems (MAERS) reports may be a good starting point to determine BAE. If the calculated BAE do not match what has been reported in MAERS, the applicant should indicate why there is a discrepancy.

In order to use a selected 24-month period, the facility must possess adequate documentation to allow the calculation of actual emissions throughout the selected period. The documentation must also allow the calculation of any required adjustments to actual emissions as discussed below. If documentation is insufficient to allow the calculation of emissions or necessary adjustments to emissions for any part of the selected 24-month period, a different 24-month period must be selected.

When a proposed project involves more than one regulated NSR pollutant (note that greenhouse gases are regulated NSR pollutants and need to be included), a different 24-month period may be selected for each pollutant. When a proposed project involves, or affects, multiple emissions units, only one 24-month period for each pollutant can be selected for the combination of all affected emissions units. This may result in the selection of a 24-month period that does not include emissions from all affected emissions units. That is, some affected emissions units may have been installed after the selected 24-month period. When a facility selects its 24-month period, this must be one of the considerations made. Any emissions unit installed after the selected 24-month period will have BAE of zero, unless the emissions unit is a new emissions unit that has begun normal operation, as described above. Any emissions during the selected 24-month period in excess of any applicable emission limit must not be included in the BAE. Additionally, fugitive emissions, if they can be quantified, must be included in the BAE.

> **hint!**
>
> Be sure to carefully define the project. Identify ALL affected emission units.

Also, emissions resulting from startup, shutdown and malfunctions must be included in the BAE. During startup, shutdown and malfunction periods, EUSGU may experience emission rates much higher than during periods of normal operation. If the emissions associated with startup, shutdown and malfunction periods are in excess of any emission limit, they must be adjusted downward so as not to include emissions in excess of allowable limits.

BAE is determined by:

1. Identifying the proper look back period for a project. For an EUSGU, this is the five year period immediately preceding the date on which construction actually begins. If no construction is necessary for the project, the permit issuance date would be considered the date construction began.
2. Selecting a 24-month period that meets all of the necessary criteria:
   - Common to all affected emissions units included in the BAE;
   - May be different for each pollutant; and
   - Sufficient documentation exists to calculate actual emissions and any adjustments to actual emissions that are necessary.
3. Calculating the annual average emission rate based on the actual emissions from all affected emissions units during the selected 24-month period.
4. Adjust the calculated emissions for non-compliant emissions, quantifiable fugitive emissions, and emissions due to startup, shutdown and malfunction.

BAE for Non-EUSGU

BAE is the average actual emissions calculated over two consecutive years (i.e., 24 consecutive months) of actual operation. A non-EUSGU must identify actual emissions that occurred during any consecutive 24-month period during the ten years immediately preceding the date on which construction actually begins for a specific project or the date on which a complete permit application was submitted for that project. The regulations preclude the use of any baseline period prior to November 15, 1990. Since PSD is a pre-construction requirement, and construction waivers are not allowed, BAE will almost always be determined from the complete application date.

In order to use a selected 24-month period, the facility must possess adequate documentation to allow the calculation of actual emissions throughout the selected period. The documentation must also allow the calculation of any required adjustments to actual emissions as discussed below. If documentation is missing or incomplete for any part of the selected 24-month period, a different 24-month period must be selected.

When a proposed project involves more than one regulated NSR pollutant, a different 24-month period may be selected for each pollutant. When a proposed project involves, or affects, multiple emissions units, only one 24-month period can be selected for the combination of all affected emissions units for each common pollutant emitted. This may result in the selection of a 24-month period that does not include emissions from all affected emissions units. That is, some affected emissions units may have been installed after the selected 24-month period. When a facility selects its 24-month period, this must be one of the considerations made. Emissions units installed after the selected 24-month period will have a BAE of zero, unless the emissions unit is a new emissions unit that has begun normal operation, as described above. Any emissions during the selected 24-month period that resulted from facility operation in excess of any applicable emission limit must not be included in the BAE.

BAE for a non-EUSGU must be further adjusted downward to exclude any emissions that would have exceeded an emission limit with which the facility must currently comply. Even though the limitation did not exist during the selected 24-month period, the actual emissions during that period must be adjusted as if the limit did exist.

Example:

A natural gas fired peaking turbine (non-EUSGU) that operates only during the summer months is subject to Rule 801 which required a nitrogen oxide (NO_X) emissions reduction from 0.40 pounds per million Btu emission rate to 0.25 pounds per million Btu beginning on April 1, 2004.

A permit application submitted in 2011, addressed a change at the facility that included this turbine. The baseline actual emissions for this unit averaged 350 tons per year during 2002 and 2003. Since Rule 801 applies to this emission unit, the 350 tons per year must be reduced as follows:

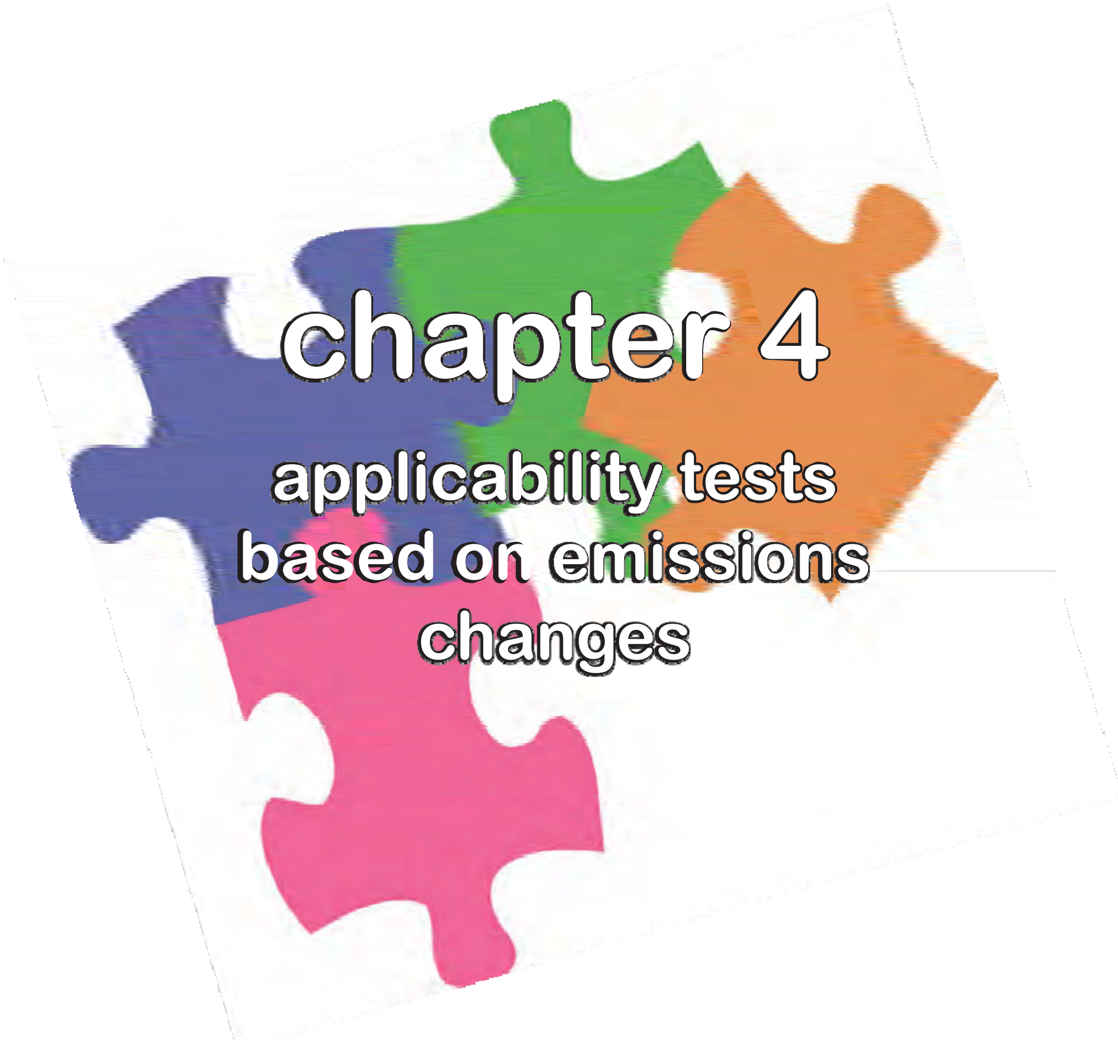
$$350 \text{ ton/yr} \times 0.25/0.40 = 218.75 \text{ ton/yr}$$

Fugitive emissions, if they can be quantified, must be included in the BAE.

Also, emissions resulting from startup, shutdown and malfunctions must be included in the BAE. For a non-EUSGU, startup, shutdown and malfunction periods may cause emission rates much higher than during periods of normal operation. If the emissions associated with startup, shutdown and malfunction periods are in excess of any emission limit, they must be adjusted downward because credit cannot be taken for non-compliant emissions.

To summarize, for a non-EUSGU, BAE are determined by:

1. Identifying the proper look back period for a particular project. For a non-EUSGU this is the ten year period immediately preceding the earlier of the date on which construction actually begins or when a complete application is submitted.
2. Selecting a 24-month period that meets all of the necessary criteria:
   - Common to all affected emissions units included in the BAE;
   - May be different for each pollutant; and
   - Sufficient documentation exists to calculate actual emissions and any adjustments to actual emissions that are necessary.
3. Calculating the annual average emission rate based on the actual emissions from all affected emissions units during the selected 24-month period.
4. Adjusting the calculated emissions for non-compliant emissions, quantifiable fugitive emissions, startup, shutdown and malfunction emissions, and for regulations with which the facility must currently comply.



chapter 4

applicability tests based on emissions changes

The two most common PSD applicability determinations are the A2P test, and the A2A test. There is a third PSD applicability determination that is not as common and is a combination of these two tests. This third test is known as the hybrid test.

> **hint!**
>
> *Be sure to carefully define the project. Identify ALL affected emission units.*

PSD applicability for changes that involve only new emissions units is determined using the A2P test. For changes that involve only existing emissions units, PSD applicability is determined using either the A2A test or the A2P test. PSD applicability for changes that involve both new and existing emissions units can be determined using the A2P test or the hybrid test which involves combining both the A2P and the A2A tests. This chapter will focus on the A2P test and the A2A test.

The Actual to Potential Test (A2P)

The A2P test can be used for projects involving new or existing emissions units. For new emissions units, it is mandated as the only method for determining PSD applicability. The A2P test involves comparing the potential to emit of all emissions units affected by a project to the BAE from the affected emissions units; this comparison determines the emissions increase from the proposed project.

Potential to emit is defined in Rule 336.2801(hh) as:

> *"Potential to emit" means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. A physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is legally enforceable and enforceable as a practical matter by the state, local air pollution control agency, or United States Environmental Protection Agency. Secondary emissions do not count in determining the potential to emit of a stationary source.*

According to this definition, the allowable emissions of the emissions unit after the proposed project represent its potential to emit. Therefore, many facilities choose to accept permit limits in order to avoid becoming subject to PSD. Projects that take limits that are below the PSD applicability threshold or significant threshold are also referred to as "synthetic minor." Please note there are other types of synthetic minor sources which have taken limits to avoid non-attainment new source review or to opt out of Title V requirements.

If the sum of the allowable (potential) emissions for all affected emissions units exceeds the BAE by greater than the significant threshold for any regulated NSR pollutant, the proposed project may be subject to PSD. If the potential emissions of all affected emissions units after the proposed project are less than the significant threshold for all regulated NSR pollutants, no further evaluation is necessary, and the project is not subject to PSD.

A2P Example

Consider a natural gas fired boiler that emits NOx at 75 pounds per hour and has consistently operated 7200 hours per year. The BAE for this project is calculated as follows:

BAE = 75 lbs/hr of NOx * 7200 hrs/yr / 2000 lbs/ton = 270 tons of NOx per year

The permit limits allow 328.5 tons per year of NOx. If a project were to increase the NOx emission rate from 75 to 80 pounds per hour, the potential NOx emissions would increase from 328.5 tons per year to 350.4 tons per year.

For this project, using the A2P test would measure the increase as 80.4 tons per year (350.4 tons per year (potential) minus 270 tons per year (BAE)). This is a significant increase in emissions which could be subject to PSD for NOx depending on the magnitude of the net emissions increase.

The Actual to Projected Actual Test (A2A)

The A2A test was developed in an effort to evaluate PSD applicability based on the emission increases that are caused by a proposed project. Other increases, such as emission increases due to changes in business demand (i.e., capacity utilization) or process changes that are unrelated to the proposed project, are not counted toward PSD applicability. However, increases in capacity utilization or process changes that will result from the proposed project are counted. For example, when a proposed project is necessary in order to handle a projected increase in business demand, then the emissions associated with that increased capacity utilization are attributed to the project.

> **remember!**
> Properly define the project, identify ALL affected emission units.

A2A involves comparing projected actual emissions from all affected emissions units to the BAE from the affected emissions units. A2A cannot be used for new emissions units. This applicability test involves estimates of future business activity (see R 336.2801(ll)). The future business activity estimates can be available in public documents or confidential business information, on which the facility is basing business decisions. Future business activity estimates generated solely for the purposes of the applicability test are not acceptable.

The definition of projected actual emissions is set forth in the PSD regulations under R 336.2801(ll). Please note, the A2A test can also be used to determine non-attainment applicability for a source, however, this book focuses on PSD applicability but the steps are the same for either regulation.

An A2A test, as allowed in R 336.2802(4)(c), can be performed in the following eight step process, which was developed by the MDEQ.

Actual to Projected Actual Test - Step by Step

Step 1 – Determine Baseline Actual Emissions (BAE)
As described in Chapter 3, BAE is determined on a pollutant by pollutant basis.

The baseline period depends on the type of process that is being modified. For an EUSGU, the look back period is five years; for all other types of processes, the look back period is ten years. A 24-month consecutive time period must be used, but this time period can be different for each pollutant.

For a non-EUSGU, the look back period cannot begin any earlier than ten years before the date actual construction begins, or the date a complete application is received, whichever is earlier.

For an EUSGU, the period cannot begin any earlier than five years before the date actual construction begins, unless that five year period is shown to be non-representative of normal operation. However, if construction is not necessary, then the date the permit is issued is the date to be used for determining the five year look back period. The applicant may request to go beyond the five year look back period with a demonstration explaining why the time period is more representative of normal operations for the unit(s).

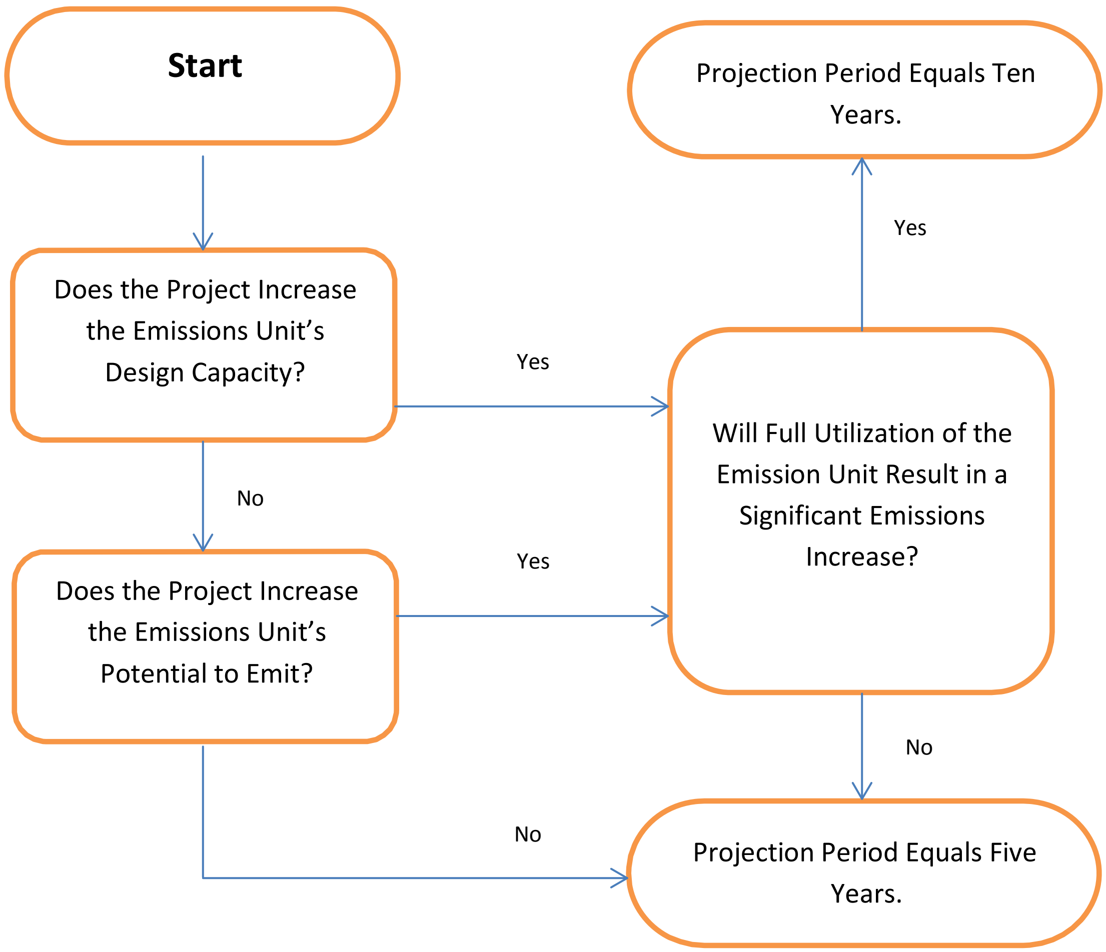
The emissions must be actual emissions which can be based on Continuous Emissions Monitoring (CEM) data, stack testing data and/or emissions previously reported to the AQD or the USEPA. The applicant may use emission factors such as those found in AP-42, MAERs or other sources, but the applicant will need to provide justification for using the emission factors. The emissions must be creditable and shall include start up and shut down emissions. Exceedances or noncompliant emissions cannot be used (i.e., only those emissions up to the allowable levels can be claimed).

Fugitive emissions, to the extent quantifiable, must also be included in determining the BAE emissions for the selected 24-month period.

Step 2 – Determine Projected Actual Emissions (PAE)
The projection period begins on the date the affected emissions unit resumes regular operation after completion of the proposed project. Typically, the projection period must encompass the first five years after resuming regular operation. Under certain circumstances, the projection period will encompass the first ten years after resuming regular operations.

The following flow chart outlines the decision-making process to determine whether the projection period will be five or ten years:

Figure 2 Flow Chart 2



Resuming regular operation means that construction and initial shakedown of the modified emissions unit has been completed. The PSD regulations, in general, allow 180 days to be counted as the initial shakedown period.

The default PAE is the potential to emit for the project, but if the applicant is not using the potential to emit, then the projection period must be determined.

Projected actual emissions are defined in R 336.2801(ll)(ii) and, as part of these calculations, the applicant must consider all relevant information, including but not limited to the following:

- Historical operational data;
- The company's own representations;
- The company's expected business activity;
- The company's highest projections of business activity;
- The company's filings with the state or federal regulatory authorities;
- Any other enforceable documentation that may include projections of business activity during the projection period (e.g., compliance plans under the state implementation plan).

The projection is an estimate of business activity. Once established, the actual annual emissions that correspond to that level of business activity must be calculated. The absence of adequate documentation will nullify the projection. In such a situation, the A2A will not be allowed and the facility must use the A2P.

The applicant may use emission factors to determine the PAE. The applicant will need to provide the basis for why the emission factor is acceptable. Fugitive emissions, if they can be quantified, must be included in the projected actual emissions. Additionally, emissions associated with startups, shutdowns and malfunctions must also be included in the projected actual emissions.

It is important to document the basis for calculating the PAE associated with the projected level of business activity (e.g., raw materials or type of fuel to be used), as these may affect the quantity of emissions that may be excluded from the PSD applicability determination as discussed below.

Step 3 – Excludable Emissions (EE)

Because PSD applicability is based on the emissions increases caused by the specific project, emissions increases that are not caused by the specific proposed project may be excluded. These emissions can be identified as those that meet all of the following:

- Could have been accommodated during the selected 24-month baseline period by the pre-modified emission units;
- Are not related to the proposed project;
- The emission unit(s) achieved this level of emissions for a minimum of 30 consecutive days or, for an average of 3 months, and is capable of accommodating that level of emissions in the future.

In the rare instance where all of the above cannot be proven in determining emissions that could have been accommodated, an alternative approach may be proposed. Use of any alternative approach in determining what emissions could have been accommodated must be justified with documentation and will be reviewed by the MDEQ on a case-by-case basis.

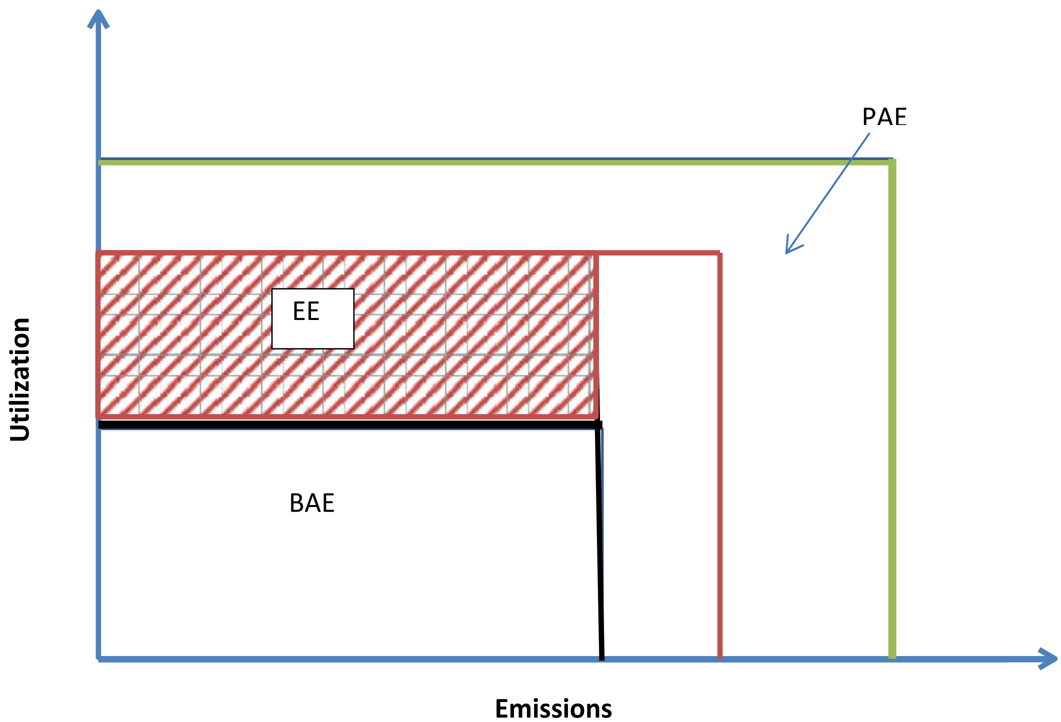
Emissions that could have been accommodated are not the allowable permit limits for the affected emissions units. They are the highest level of emissions the emissions unit operated at prior to the modification that are equivalent to or less than the projected level of business activity and are unrelated to the project. Any permit or regulatory restrictions on the operation of the affected emissions units must be taken into consideration when determining excludable emissions.

The applicant will need to provide the basis for any excludable emissions used in the analysis. The applicant must subtract out times when the emissions could not have occurred, such as times of maintenance or shutdowns of the emissions unit(s). Any emission factors used in determining the excludable emissions will also need to be justified.

Step 4–Draw Diagram (Optional)

It is helpful in demonstrating the A2A analysis to plot the emissions associated with a project on a diagram. Utilization should be plotted on the y axis of the diagram and the emission rate should be plotted on the x axis. Once the units have been defined, the applicant can plot the BAE, PAE and EE on the diagram. The units will vary based on the project, but the product of the units should equal tons per year or at least relate to the tons per year for the project.

The BAE area will represent the baseline actual emissions for the emissions unit(s) for the project. The PAE area will represent the projected actual emissions for the emissions unit(s) for the project. The excludable area will represent what the equipment could have done if demand was there, based on actual production and the actual emission rates when that production occurred.



Define X and Y axis – Units vary based on the project

The product of the chosen units should be tons per year

Plot BAE, PAE, and EE

X * Y = area

EE - What could have been done if demand was present, based upon actual production emission rates

Note: This is a sample diagram of what is typically expected to occur for an A2A demonstration. Not all diagrams will be like this.

Step 5–Determine Projected Emissions Increase (PEI)

The projected emissions increase (PEI) is the PAE minus the BAE and the EE for each pollutant:

$$PEI = PAE - BAE - EE$$

Step 6–Compare to Significant Levels for Each Pollutant

If the PEI is less than significant for each pollutant, then the project is not subject to PSD. However, if the PEI is equal to or above significant for any pollutant, then the applicant can proceed to netting or go through PSD review.

Step 7 Recordkeeping and Reporting Obligations, Rule 1818(3)

A. The following recordkeeping requirements apply to all sources subject to Rule 1818(3):

1. Document and maintain on file the following information prior to beginning actual construction on the project:
    - A description of the project;
    - Identification of each affected emission unit;
    - A description of the applicability test used; including,
        - The BAE;
        - The PAE;
        - The amount of EE;
        - The reason for excluding that amount;
        - Any netting calculations, if applicable.
2. Calculate annual emissions, in tons per year, at the end of each year following the date that normal operation resumes after completion of the project. These monitoring and emission calculation requirements shall continue for each year of the projection period.

B. The reporting requirements for projects subject to Rule 1818(3) depend on whether or not the source is an EUSGU and are outlined below:

1. Non-EUSGU Projects

For a non-EUSGU, a report is only required for those years in which actual annual emissions exceed the BAE by more than the significant threshold and differ from the pre-construction projected emissions. Such a report for a non-EUSGU must include:

- The name, address and telephone number of the facility;
- The calculated annual emissions outlined in Paragraph A.2 above; and,
- Any other information the owner or operator wishes to include in the report (e.g., an explanation why the emissions differ from the projection).

2. EUSGU Projects

For an EUSGU, the following must be submitted to the MDEQ:

- The recordkeeping information outlined in Paragraph A above. This information must be submitted to the MDEQ prior to starting construction.
- A report of each affected emission unit's annual emissions outlined in Paragraph A.2 above must be submitted to the MDEQ within 60 days after the end of each year of the projection period.

If there is a reasonable possibility that emissions could exceed significant after resuming normal operation following the completion of the project, then the facility is required to document the applicability determination and monitor future emissions of the regulated NSR pollutant. Per R 336.2818(3)(f), a "reasonable possibility" exists when:

- The projected actual emissions increase is equal to or greater than 50 percent of the applicable pollutant significant level;
- The projected actual emissions increase plus the excluded emissions is equal to or greater than 50 percent of the applicable significant level.

It should be noted, if the projected actual emissions increase plus the excluded emissions is equal to or greater than 50 per cent of the significant level, **but the projected emissions increase by itself is less than 50 percent of the applicable significant level,** then there is not reasonable possibility.

All such information, whether it is required to be submitted to the MDEQ or not, is required to be maintained on site and made available for review upon request by the MDEQ. The information shall be kept for a period of five years following resumption of regular operations after the change or for a period of ten years following resumption of regular operations after the change if the project increases the design capacity or potential to emit of that regulated NSR pollutant.

The circumstances that lead to the submittal of a report (i.e., annual emissions exceed BAE by more than the significant threshold and differ from the projection) does not automatically constitute a violation of PSD. There are circumstances under which this could occur. For example, if business growth exceeds the projected growth rate, then the fact that business turns out to be better than expected does not necessarily mean there is a violation of PSD. The growth, if it had been accurately projected, may have resulted in higher excluded emissions and the conclusion of the original PSD applicability determination might not have changed or may have changed but still have been lower than PSD significant thresholds. The submitted report will be reviewed by the MDEQ to determine if a PSD violation occurred.

<u>Step 8 – Permit Conditions</u>

Facilities using the A2A test may be required to conduct monitoring, maintain emission calculations and keep these records on file if there is a reasonable possibility that the actual emissions may exceed the PAE. The PAE will not be included as an enforceable permit requirement. Other conditions may be included in the permit that are related to the assumptions used in the A2A demonstration. Additionally, if a control device is being installed and the control efficiency is the basis of the emission factors used in the A2A demonstration, then conditions related to the control device will be included in the permit (i.e. installed and operated properly). Testing may also be required to verify an emission rate used in the A2A demonstration. An emission limit (possibly the PAE) may be included in the permit conditions but will only be included if it is necessary for other regulatory reasons beyond the A2A demonstration.

If the project increases the design capacity or the potential to emit of the process, then under rule 1818(3)(c), the facility is required to calculate and record the annual emissions, in tons per year on a calendar year basis, for a period of ten years following resumption of regular operations after the change. Otherwise, the projection period will consist of five years following resumption of regular operations after the change. Conditions will be included in the permit to address these recordkeeping requirements.

Example A2A

The following is an example that follows the steps identified previously for an A2A:

Define the Project:

1. It is 2009 and an existing major stationary source wants to put low NOx burners (LNB) on two existing boilers (each is classified as a non-EUSGU).
2. The facility is also removing two existing back up boilers.
3. The facility is located in an area that is currently designated as attainment for all criteria pollutants subject to regulation under the CAA.

What is the project?

- The project is a physical change in the operation of the two boilers (Low NOx burners) which affects NOx and CO emissions. No other equipment at the facility is being modified.

What about the two back up boilers?

- The two back up boilers only come in to play if the project has to go through netting.

The two boilers that will be retrofitted with LNB have been operating for the past 20 years on a consistent basis but with the changes being made at the facility, the applicant plans to increase utilization of these two boilers.

Step1-Determine the BAE

The BAE is determined as has been previously described in Chapter 3.

Table 7 Emission Rates for Determining Baseline

NSR Pollutant	Boiler 1 (lb/MMBtu)	Boiler 2 (lb/MMBtu)
CO	0.0276	0.0276
NOx	0.33	0.33
SO2	0.923*	0.905*
VOC	0.0033	0.0033
Lead	2.3E-5	2.3E-5
PM	0.0602*	0.1016*

*Emission rates are different for each boiler.

Table 8 Baseline Period and Heat Input Values

NSR Pollutants	Baseline Period	Combined Heat Input for Boilers 1 and 2 (MMBtu)
CO	June 05 to May 07	21,622,450
NOx	May 05 to April 07	21,018,182
SO2	Mar 05 to Feb 07	21,733,961
VOC	Jun 05 to May 07	21,622,450
Lead	Mar 05 to Feb 07	21,735,961
PM	Sept 06 to Aug 08	20,064,699

In this example, notice that there are four different Baseline periods for the different pollutants but the same 24-month period for each pollutant is used for each boiler.

Sample Calculation for BAE:

Emission Rate x Heat Input/2000 = TPY

CO BAE = (0.0276 lb/MMBtu x 21,622,450 MMBtu/yr* / 2000 lb/ton)

CO BAE = 298 TPY

*This is the BAE combined heat input for the two boilers that was provided by the applicant for the two year (24 month) period for CO.

Table 9 BAE

NSR Pollutants	Time Period	Combined Heat Input for Boilers 1 and 2 (MMBtu)	BAE (tons/year)
CO	June 05 to May 07	21,622,450	298
NOx	May 05 to April 07	21,018,182	3,468
SO2	Mar 05 to Feb 07	21,733,961	10,451
VOC	Jun 05 to May 07	21,622,450	30.3
Lead	Mar 05 to Feb 07	21,735,961	0.25
PM	Sept 06 to Aug 08	20,064,699	582.2

In this example, notice that there are four different BAE time periods for the different pollutants but the same 24 month period for each pollutant is used for each boiler.

Step 2 – Determine PAE

Determine the PAE for the project:

- Project the heat input with the LNB system for a ten year period because the boilers are non-EUSGU.
- Pick the highest year – the applicant provided a ten year projection period and the highest combined heat input rate was determined to be 23,489,348 MMBtu/year in 2015.

Please note that only CO and NOx are expected to change due to the addition of the LNBs, but all pollutants emitted from the boilers must be in the demonstration because the increased utilization, due to the project, may cause a significant increase for the other pollutants emitted from the boilers.

Table 10 Future Emission Rates with LNB as Provided by the Applicant

NSR Pollutant	Boiler 1 (lb/MMBtu)	Boiler 2 (lb/MMBtu)
CO	0.17	0.17
NOx	0.30	0.30
SO2	0.923*	0.905*
VOC	0.0033	0.0033
Lead	2.3E-5	2.3E-5
PM	0.0602*	0.1016*

* Emission rates are different for each boiler.

For this project, the applicant provided the guaranteed emission rates for the boilers once the LNB systems are put in place. Notice that CO increased quite a bit over the BAE emission rate and NOx went down (slightly), as expected, but the rest of the pollutants have the same emission rates. NOx went down slightly because this was a retro-fit on some very old boilers. This reduction using LNB might not be what is typically expected to be achieved for newer boilers.

Table 11 Projected Actual Emissions

NSR Pollutants	Post-Change Emission Rates (lb/MMBtu)	Combined Heat Input for Boilers 1 and 2 (MMBtu/year) From 10 Year Projection: Used 2015	Combined PAE (Tons/yr)
CO	0.17	23,489,348	1997
NOx	0.30	23,489,348	3523
SOx	0.923, 0.905*	23,489,348	10,730
VOC	0.0033	23,489,348	38.8
Lead	2.3E-5	23,489,348	0.27
PM	0.0602, 0.1016*	23,489,348	961.7

* Emission rates are different for each boiler.

Sample Calculation for PAE:

Emission Rate x Heat Input/2000 = TPY

CO PAE = (0.17 lb/MMBtu x 23,489,348 MMBtu/yr / 2000 lb/ton)

CO PAE = 1997 TPY

Step 3 – Determine the Excludable Emissions

- The applicant projected the heat input (future boiler utilization) without the LNB systems for a ten year period. This was based on future demand per the applicant's business plan as provided with the application.
- The highest year was determined to be 2013 with a combined boiler maximum projected heat input rate of 23,408,885 MMBtu/year.
- Because future demand shows a trend towards increased utilization of the boilers and the boilers are capable of accommodating the increased heat input, the EE can be determined using the pre-LNB projected heat input and the baseline emission rates for each pollutant (except for NOx). In this example, the applicant used the fact that the future level of utilization had been achieved on a short term basis (30 consecutive days) during the baseline period (i.e. – the boilers operated at a higher heat input on a short term basis during the baseline period that is the equivalent to the maximum projected heat input on an annual basis that is unrelated to the project). This provided the demonstration that the boilers could have accommodated this level of operation and emissions.

Table 12 Level of Emissions That Could Have Been Accommodated

NSR Pollutants	Emission Rate (lb/MMBtu)	Combined Heat Input for Boilers 1 and 2 (MMBtu/year)	Could Have Accommodated (Tons/yr)
CO	0.0276	23,408,885	323
NOx	0.30	23,408,885	3511
SOx	0.923, 0.905*	23,408,885	10698
VOC	0.0033	23,408,885	38.6
Lead	2.3E-5	23,408,885	0.27
PM	0.0602, 0.1016*	23,408,885	959.4

*Different emission rates for each boiler

Sample Calculation for EE for CO:

Emission Rate x Heat Input/2000 = TPY

If project did not occur:

CO = (0.0276 lb/MMBtu x 23,408,885 MMBtu/yr / 2000 lb/ton)

CO (No Project) = 323 TPY

CO EE = 323 TPY – 298 TPY (BAE) = 25 TPY

Table 13 Excludable Emissions

NSR Pollutants	Could Have Accommodated	BAE	EE (Tons/yr)
CO	323	298	25
NOx	3511	3,468	43
SOx	10698	10,451	247
VOC	38.6	30.3	8.3
Lead	0.27	0.25	0.02
PM	959.4	582.2	377.2

Note 1 for Excludable Emissions:

The NOx emission rate used for calculating EE is not the baseline emission rate of 0.33 lb/MMBtu, but the projected actual emission rate of 0.30 lb/MMBtu, because emissions above the projected actual emission rate cannot be excluded.

Note 2 for Excludable Emissions:

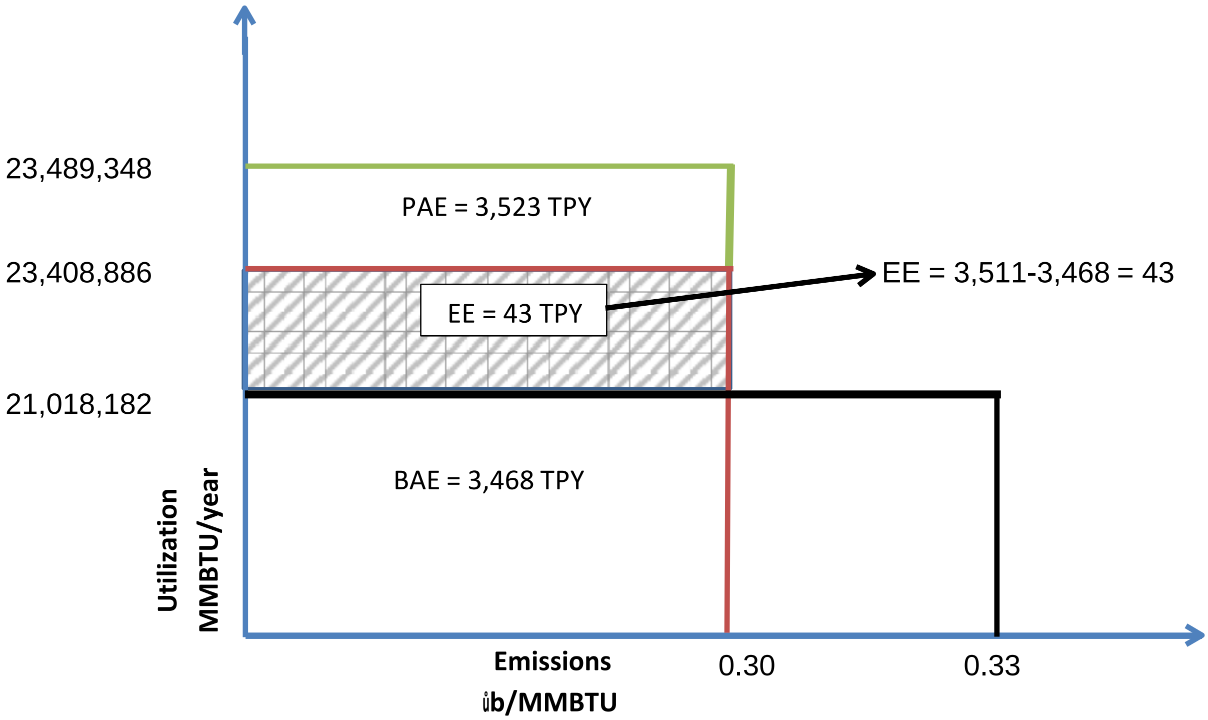
The CO emission rate is the baseline emission rate of 0.0276 lb/MMBtu because the emissions directly related to the project (increase in CO emission rate) cannot be excluded.

Step 4 - Draw a Diagram

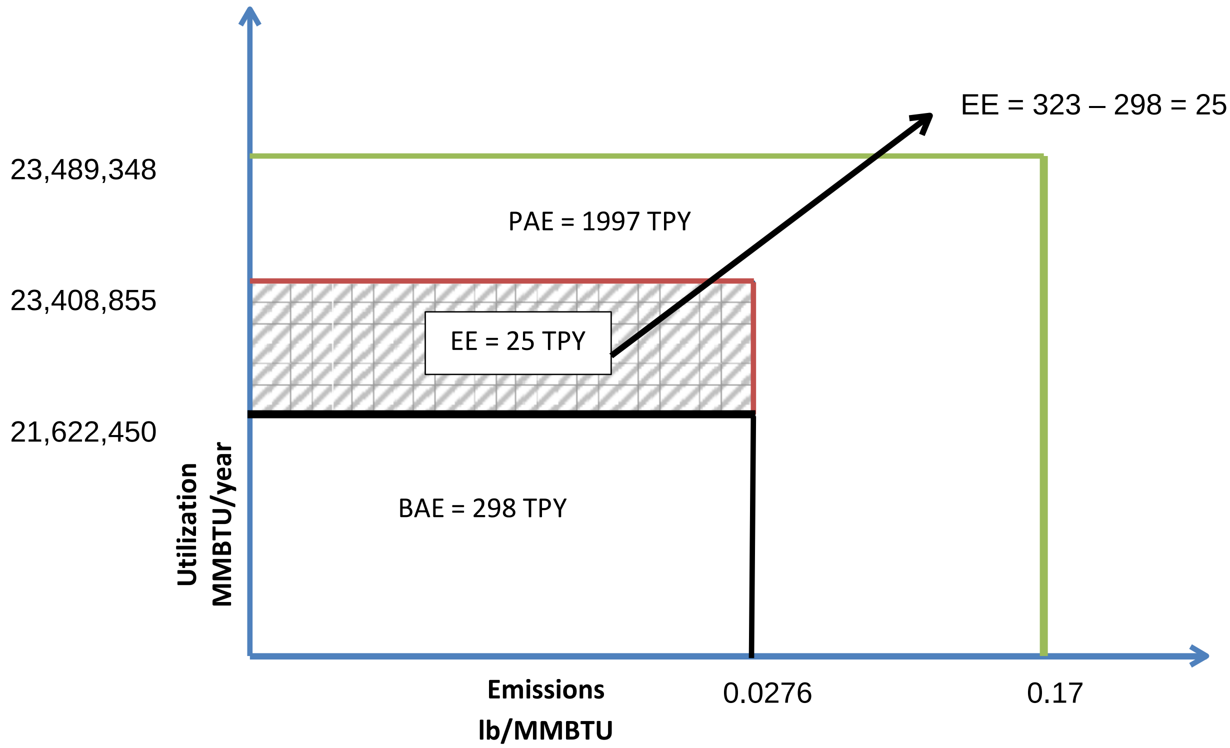
Utilization on y axis, emission rate on x axis

- Define units for x and y axis – units vary based on project; product of units is tons per year or at least relate to the tons per year for the project.
- Plot BAE, PAE and EE
- EE area = what the equipment could have emitted if demand was there, based on actual production and the actual emission rates when that production occurred.

Example1–NOx



Example 1 – CO



Step 5 - Determine the PEI

To determine the PEI, use the following equation:

PEI = PAE – BAE – EE

As previously defined:

PAE = Projected Actual emissions
BAE = Baseline Actual Emissions
EE = Excludable Emissions

Table 14 Projected Emissions Increases Compared to Significant Levels

NSR Pollutants	BAE (TPY)	EE (TPY)	PAE (TPY)	PEI = PAE – BAE – EE (TPY)	Significant Level (TPY)	Subject to PSD Review*
CO	298	25	1,997	1,674	100	Yes*
NOx	3,468	43	3,523	12	40	No
SOx	10,451	247	10,730	32	40	No
VOC	30.3	7.7	38.8	0.8	40	No
Lead	0.25	0.02	0.27	-0-	0.6	No
PM	582.2	377.2	961.7	2.3	25	No

* Provided cannot net out on a facility wide basis.

Step 6 – Compare PEI to Significant Thresholds

Conclusion:

As seen in Table 14 for Step 5, only the CO PEI is greater than significant, therefore, only CO is potentially subject to PSD review for this project.

If not for the A2A test, other pollutants would have been potentially subject to PSD review.

Step 7 – Recordkeeping and Reporting

As seen in Table 14 for Step 5, the SOx PEI is greater than 50 percent of the significant threshold, therefore, recordkeeping and reporting for SOx emissions are required as described in R 336.2818(3)(a) to (e) due to reasonable possibility as specified in R 336.2818(3)(f). All other pollutants not subject to PSD review are less than 50 percent of significant, so no additional records are required.

Step 8 - Conditions

Because SOx is greater than 50 percent of significant, a reasonable possibility exists as specified in R 336.2818(3)(f), therefore, the appropriate recordkeeping and reporting conditions will be included in the permit. Also, the addition of the Low NOx burners needs to be enforceable, per R 336.1910, therefore, conditions need to be included in the permit requiring the low NOx burners to be installed, maintained and operated properly. Additionally, permit conditions based on the results of the PSD review for CO will be required; including PSD BACT limits, and monitoring and recordkeeping requirements.

chapter 5

netting

Netting, Step by Step

If a proposed project does result in a significant emissions increase for any regulated NSR pollutant, then netting could potentially be used to “net out” of the PSD requirements for those pollutants. The process of evaluating the net emissions increase includes quantifying all recent (i.e., contemporaneous) increases and decreases in actual emissions at the facility and determining if they are creditable. The contemporaneous period is the time which precedes the commencement of construction of a new or modified emissions unit. A contemporaneous period is the five year period prior to the start of construction, plus the time it takes until completion of construction and startup has occurred. This is the period over which increases and decreases in emissions are quantified.

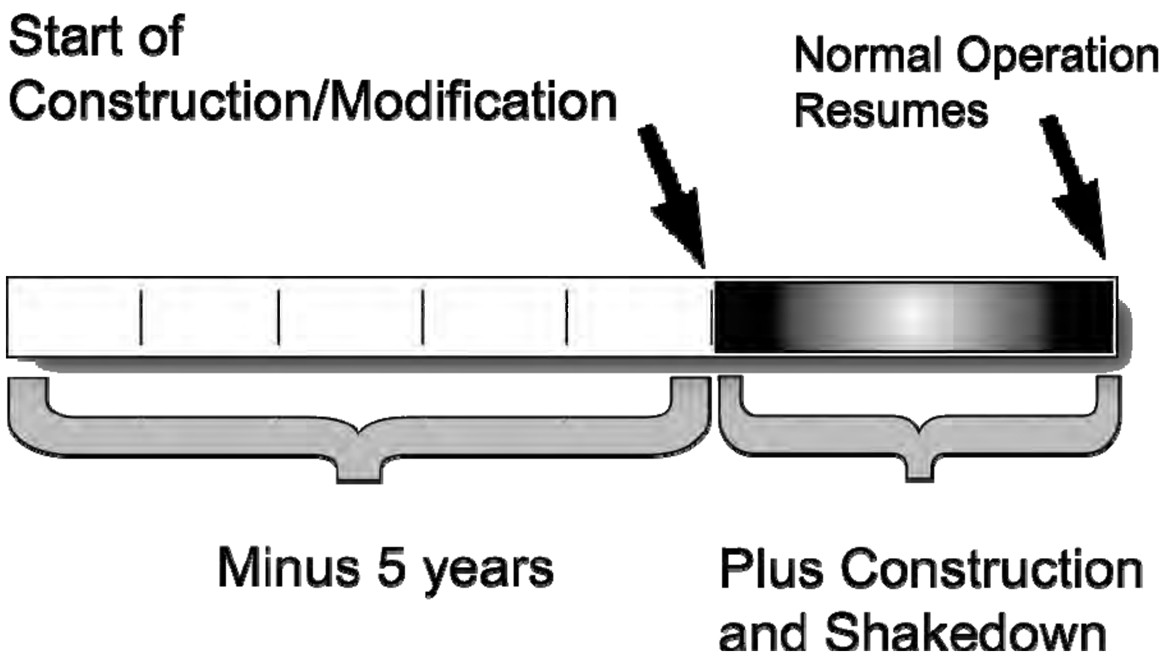
The eight steps involved in conducting a netting analysis are as follows (a separate netting analysis must be done for each regulated NSR pollutant):

1. Identify the contemporaneous period.
2. Determine each physical change, or change in the method of operation that occurred, or will occur, during the contemporaneous period with a corresponding increase or decrease in actual emissions (include the date of each change).
3. Evaluate each change on the list to identify only those that are creditable.
4. List each remaining creditable, contemporaneous change (including the date of each change).
5. Separately calculate the BAE for each creditable, contemporaneous change.
6. Identify the post-change potential emissions for each emissions unit affected by each creditable, contemporaneous change.
7. Calculate the emissions increase or decrease for each emissions unit as post-change potential minus BAE.
8. Sum all creditable emission increases and decreases with the significant emissions increase from the proposed project. If the sum is less than significant, then the project is not subject to PSD review for each regulated NSR pollutant.

The following discussion outlines the details of each of the eight steps listed above. The basis for these steps is contained in R 336.2801(ee). After this discussion, an example will illustrate a netting analysis.

Step 1: Identify the Contemporaneous Period

The regulations define the contemporaneous period as beginning five years prior to the start of construction on the proposed project and ending when the project begins initial operation. This time frame covers an approximate five year span, but is expanded to allow inclusion of changes that occur simultaneous with the proposed project. Therefore, to be considered in a netting analysis, a change must have occurred within five years of the beginning of construction on the proposed project or after the beginning of construction and before the initial operation of the proposed project. For the purposes of the contemporaneous period, the initial operation of the project includes an initial shakedown period, not to exceed six months.



Step 2: Determine the Creditable Changes

There are restrictions regarding which contemporaneous changes can be credited in determining net emissions increases and decreases. To be creditable, a contemporaneous emissions decrease must be federally enforceable on and after the date that construction begins on the proposed project. The emissions decrease must take place prior to the emissions increase (from the project) with which it is being netted. Any emissions decrease must be permanent. To assure this, the facility must demonstrate that either: the decrease was federally enforceable at the time it occurred; or that the decrease will continue from the time it occurred and will be made federally enforceable with this permit action. An emissions reduction cannot be credited from an emissions unit that was never constructed or operated, including units that received a PSD permit.

If an emissions increase or decrease has previously been relied upon in the issuance of a PSD permit then it is not creditable.

Step 3: Evaluate the Creditable Changes

An evaluation of the changes that occurred must show that the increases and decreases occurred during the contemporaneous period, were not relied upon in the issuance of a PSD permit and are creditable (i.e., enforceable as a practical matter).

Step 4: List the Creditable Changes

Make a list of all creditable increases and decreases that have occurred during the contemporaneous period.

Step 5: Determine BAE for Creditable Changes

As described in Chapter 3, BAE are taken as the calculated annual average emission rate based on the actual emissions from the affected emissions units determined over a consecutive 24-month period during the most recent five year look back period (for an EUSGU), or ten year look back period (for a non-EUSGU). The five or ten year look back period begins at the date of each contemporaneous emissions change. Adequate documentation must exist to calculate actual emissions and any necessary adjustments to actual emissions. The emission rate must be adjusted for non-compliant emissions, quantifiable fugitive emissions and startup, shutdown and malfunction emissions. For non-EUSGU's, the emission rate must be further adjusted for regulations with which the facility must currently comply. Unlike BAEs used for determining significant emissions increases, BAE creditable, contemporaneous emission changes, are not required to use a single 24-month period when multiple emissions units are affected. Each contemporaneous change may use its own 24-month period to determine BAE and each regulated NSR pollutant emitted from each emissions unit may use a different 24-month period.

Please note if the calculated emissions from a facility do not match what has been reported to MAERs, the application must include a justification of why the emissions are different.

Step 6: Determine the Post-Change Potential Emissions for Creditable Changes

Most creditable emissions changes result from either a physical change or a change in the method of operation of one or more emissions units. In Michigan, most of these changes are required to be permitted through the PTI program. The PTIs for these changes establish the potential emissions from each emissions unit after the change. Potential emissions for changes that are not required to obtain a PTI are established by the limitations contained in Michigan's exemption rules. If not established by an exemption or a permit limit, then the emissions unit's true potential to emit is used.

Step 7: Determining the Magnitude of Each Creditable Change

The magnitude of a creditable change is the difference between the post-change potential emissions and the pre-change BAE. Using this methodology, any change where the post-change potential emissions exceed the BAE will result in a creditable emissions increase. When the post-change potential emissions are less than the BAE, a creditable emissions decrease has occurred.

Step 8: Determining the Net Emissions Change

When conducting a netting analysis, ALL creditable contemporaneous emissions increases and decreases at the stationary source for the specific regulated NSR pollutant must be used. A netting analysis cannot be based on the decreases alone. Neither can a netting analysis be based on a partial set of increases and decreases. Therefore, in order to determine the net emissions change, the emission changes from each and every creditable, contemporaneous change must be added together with the emissions increase from the project for which the netting analysis is being conducted. If the resulting emission change is less than significant for any regulated NSR pollutant, then that pollutant will not be subject to PSD.

Please note that project netting is not allowed. Project netting is when an applicant proposes to only evaluate the increases from the proposed project along with other unrelated changes that are occurring simultaneously. For example, these unrelated changes could include shutting down and removing equipment. Project netting is an attempt to create a minor modification, by only evaluating the project increase and the unrelated decrease(s), and avoiding PSD review. The emissions associated with the shutdown equipment can only be used in netting, not in the determination of the overall project emissions (i.e., – minor modification determination).

Netting Example:
An existing major stationary source (non-EUSGU) plans to modify a process (process line A) which will increase production at the facility. The increase in production will increase CO by 110 tons per year, SO_2 by 35 tons per year and NOx by 50 tons per year from the process. The application was submitted in May 2013 and construction is planned to be completed by the end of 2014.

During May 2011, the applicant removed two old boilers.

In December 2012, the company was permitted to install three process heaters with combined emissions of 8 TPY of NOx, 40 TPY of CO and 5 TPY of SO_2. The installation of the process heaters is not related to the modification of process line A. While permitted in December 2012, the applicant did not begin construction of these heaters until August 2013.

Additionally, in June 2008, the company began the process of shutting down process line B and completed the removal of the line in August 2008.

No other changes have occurred at the facility in the last 15 years and they have not had any enforcement issues.

BAE for Process Line A:

SO_2 = 90 TPY (September 2008 through August 2010)
NOx = 65 TPY (September 2008 through August 2010)
CO = 230 TPY (September 2008 through August 2010)

PAE for Modified Process Line A:

SO_2= 125 TPY
NOx = 115 TPY
CO = 340 TPY

Change in Emissions for the project:

35 TPY of SO_2, not significant
50 TPY of NOx, significant emissions increase
110 TPY of CO, significant emissions increase

<u>Step 1: Identify the Contemporaneous Period</u>
The contemporaneous period covers the five years prior to the start of construction and includes the period from the start of construction to initial operation. Construction on the project is projected to begin shortly after permit issuance on September 1, 2013. Therefore, the contemporaneous period begins on September 1, 2008.

<u>Step 2: Determine all Emission Changes during Contemporaneous Period</u>

- Removed the two boilers in 2011;
- Began installation of the three process heaters in August 2013;
- Process Line B was removed in June 2008. This removal was completed prior to the start of the contemporaneous period; therefore, this change cannot be included in the netting analysis.

Step 3: Identify Changes that Caused Creditable Emission Changes
The boilers were permanently removed from the facility in October 2011. The applicant submitted an ROP modification request to have the boilers removed from their ROP which will occur in 2014 during the ROP renewal process. Because the boilers were physically removed from the facility, this causes a creditable change in emissions.

The heaters were approved to be installed under a PTI in 2012. The installation did not go through PSD permitting because it was not a major modification. This causes a creditable change in emissions.

Step 4: List the Changes that Cause Creditable Emission Changes
In Step 3, both the removal of the boilers and the addition of the heaters were deemed creditable.

Step 5: Establish BAE for the Creditable Changes
Both of the creditable, contemporaneous changes in emissions are for non-EUSGUs. Therefore, BAE for each affected emissions unit is determined by:

1. Identifying the proper look back period for the emissions unit. For netting purposes for a non-EUSGU, this is the ten year period immediately preceding the earlier of the date on which construction actually begins or when a complete application is submitted, but cannot include any period prior to November 15, 1990.
2. Selecting a 24-month period that meets all of the necessary criteria:
    - May be different for each affected emissions unit;
    - May be different for each pollutant; and
    - Sufficient documentation exists to calculate actual emissions and any adjustments
3. Calculating the annual average emission rate based on the actual emissions from the emissions unit during the selected 24-month period.
4. Adjusting the calculated emissions for non-compliant emissions, quantifiable fugitive emissions, startup, shutdown and malfunction emissions, and for regulations with which the facility must currently comply.

Boilers
The boilers were removed October 10, 2011, so the ten year look back period begins October 10, 2001.

BAE for two Boilers for CO and NOx:
Based on actual fuel usage, from March 2009 to February 2011, emissions were determined to be 46 TPY of CO and 20 TPY of NOx. This matches what was reported to MAERs.

Process Heaters
The process heaters were installed in August 2013; therefore, they have not begun operation as of the submittal of this PTI application.

BAE needs to be determined for CO and NOx:
No baseline has been established for the process heaters because they have not yet operated therefore, the BAE for each pollutant is zero.

Step 6: Determine the Potential to Emit for Creditable Changes

Because the boilers have been removed, the potential to emit after the change to the A line for the boilers will be zero.

For the process heaters, they have not yet operated; therefore, the permitted limit is used as the PTE. In this case, the process heaters are unrestricted and are permitted to operate at their PTE.

Step 7: Calculate the Magnitude of each Creditable Change

Emissions Change for Each Creditable Change = PTE – BAE

	Boilers		Process Heaters	
	NOx	CO	NOx	CO
PTE	0	0	8	40
BAE	20	46	0	0
Emissions Change	-20	-46	8	40

Step 8: Sum All Changes with Proposed Project

For NOx:

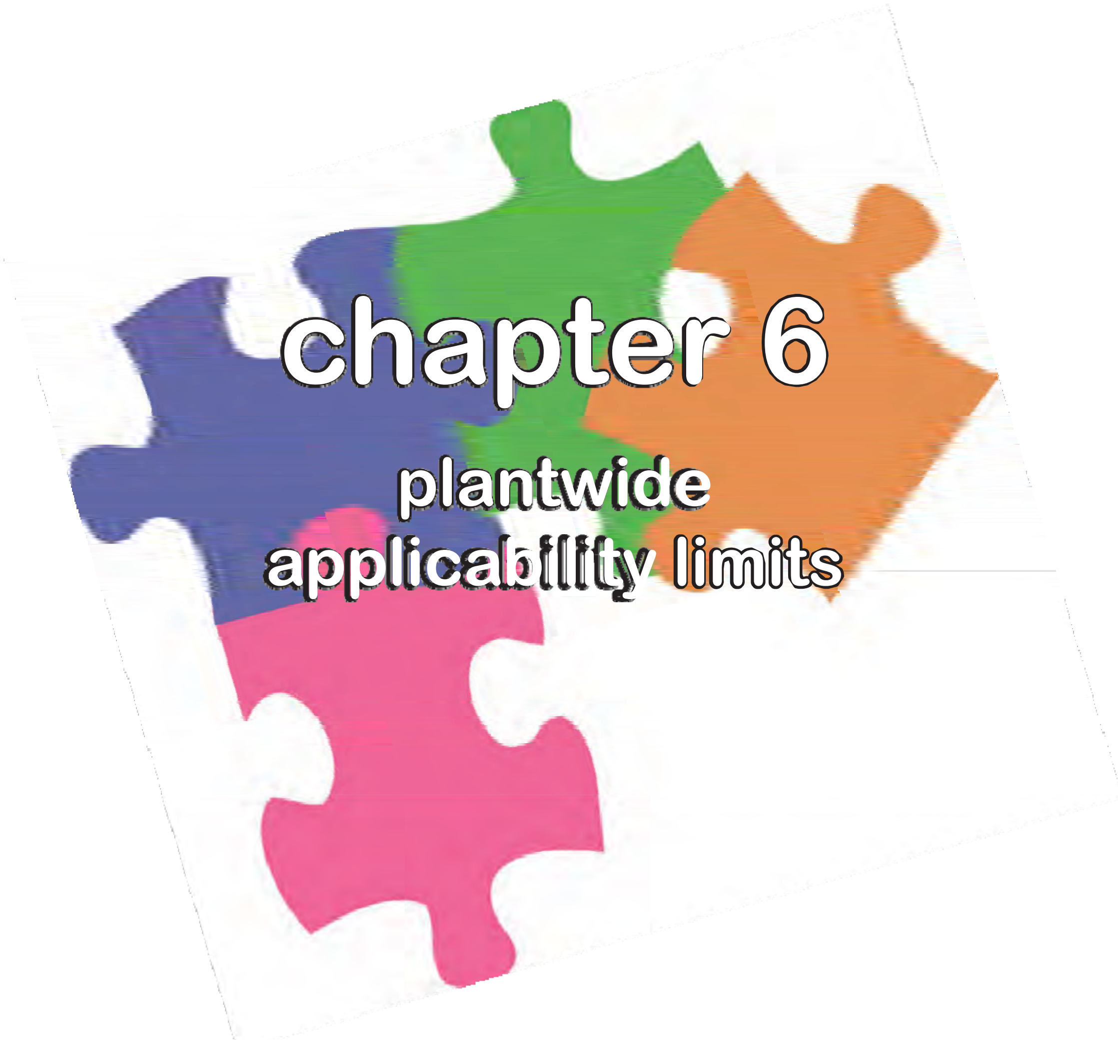
	Emissions Change
Proposed Project	50 TPY
Boilers	-20 TPY
Process Heaters	8 TPY
Net NOx Emissions Change	38 TPY

This is not a significant change in emissions, so PSD review is not required for NOx.

For CO:

	Emissions Change
Proposed Project	110 TPY
Boilers	-46 TPY
Process Heaters	40 TPY
Net CO Emissions Change	104 TPY

This is a significant change in emissions for CO; the project is a major modification for CO that is subject to PSD review.



chapter 6

plantwide applicability limits

Definition of a Plant Wide Applicability Limit (PAL)

A PAL is an optional NSR permitting approach that will provide owners or operators of major NSR stationary sources with the ability to manage source-wide emissions without triggering major NSR applicability. A PAL is pollutant specific and is approved for a ten year term. Additionally, it is an annual emission limitation (based upon a 12-month rolling time period) under which the source can make any changes without triggering major NSR applicability for that pollutant, as long as the PAL limits are not exceeded. During its effective period, the PAL is the emissions threshold that determines PSD applicability for the PAL pollutant. The authority to issue a PAL is contained in R 336.2823.

Purpose of the PAL

A PAL is intended to allow flexibility in the operation of a facility without the need to undergo major NSR permitting. A minor source PTI for any proposed changes may still be required. A PAL also encourages pollution prevention. The PAL will reward voluntary reductions in emissions with freedom from PSD applicability, as long as the PAL is not exceeded. Because a PAL is based on a facility's actual emissions, it gives constant incentive for facilities to reduce emissions from existing processes. In this way, continuing future facility changes will require the facility to self-impose emission reductions to remain below the PAL. It is believed this will yield environmental benefits while saving the industry and the regulators' time and resources. PAL permits are designed to provide a "bright-line" applicability determination for PSD. This self-motivation is intended to result in voluntary emission reductions that would not otherwise occur.

> **remember!**
> A PAL does not exempt the owner from minor source permitting.

Obtaining a PAL

To obtain a PAL permit, a number of analyses must be performed. The magnitude of the PAL must be calculated; a monitoring, recordkeeping, and reporting (MRR) plan must be developed; and a permit must be obtained that has undergone public participation consistent with the procedures outlined in Chapter 10.

Setting the PAL

The PAL is based on the facility's baseline actual emissions. The procedure for obtaining a PAL can be summarized in four steps:

Step 1: Calculate the facility's BAE for the PAL pollutant(s) consistent with the procedures outlined in Chapter 3.

Step 2: Add the permitted allowable emissions for each emissions unit that began actual construction after the selected 24-month baseline period to the BAE. These will be emissions units whose emissions were not included in the baseline actual emissions level. For these emissions units that do not have a permit limit, their potential to emit should be used. Please note, if the calculated emissions from a facility do not match what has been reported to MAERs, the application must include a justification of why the emissions are different.

Step 3: From this adjusted emissions level, subtract the emissions from any emissions unit that was permanently shut down after the selected 24-month baseline period.

Step 4: To this level of emissions as determined in Step 3, add an amount less than or equal to the significant emissions level defined in Chapter 1 for the PAL pollutant. The resulting level of emissions is the PAL. If there are any regulations that will become effective during the ten-year life of the PAL, their effect on the PAL must be accounted for. The PAL emissions level must be set to decline accordingly on the future effective date of such regulations.

PAL Permit Application

The application to obtain a PAL permit must include:

- A list of all emissions units at the source, with each designated as small, significant, or major; based on its potential to emit. This designation must follow the procedures outlined below under Increasing the Level of the PAL, Step 2.
- A list of federal or state applicable requirements, emission limitations or work practices which apply to each emissions unit.
- Calculations of the BAE (with supporting documentation). BAE shall include emissions associated not only with operation of the emissions unit, but also emissions associated with startup, shutdown, and malfunction.
- If applicable, the calculation procedures that the source proposes to use to convert monitoring system data to monthly emissions and annual emissions based on a 12-month rolling total for each month. These procedures should follow the outline for "How to Develop the PAL MRR Plan" discussed below.

Increasing the Level of the PAL

Before a source can increase the level of its PAL, it must meet several stringent criteria as specified in the steps below.

Step 1: Identify every emissions unit at the facility and quantify its potential to emit.

Step 2: Sort each of the emissions units into the following categories:

- Small: Emissions units with potential to emit less than the significant threshold for the PAL pollutant.
- Significant: Emissions units with potential to emit greater than the significant threshold for the PAL pollutant.
- Major: Emission units with potential to emit greater than the major stationary source threshold for the PAL pollutant.

Step 3: Identify each emissions unit that will cause the facility to exceed the PAL (i.e., each new and modified emissions unit).

Step 4: Subject each emissions unit identified in Step 3 to PSD and identify the allowable emissions for each. PSD applies regardless of the magnitude of the emissions increase associated with each new or modified emissions unit. By causing an increase above the PAL, these emissions units are causing an increase above baseline actual emissions by an amount greater than the significant emissions threshold.

Step 5: Perform a BACT analysis for each significant or major emissions unit that has not undergone a BACT, or LAER, analysis within the previous ten years. The BACT or LAER determinations that have been conducted within the previous ten years will be accepted as current.

Step 6: Calculate the baseline actual emissions for all small emissions units.

Step 7: Calculate the baseline actual emissions for all significant and major emissions units and adjust for the application of BACT, as necessary (consistent with Step 4), on each of these emissions units.

Step 8: Calculate the sum of the allowable emissions identified in Step 4.

Step 9: Demonstrate that the sum of the emissions from Steps 6 through 8 exceeds the current PAL.

Step 10: Set the new PAL equal to the sum of the emissions from Steps 6 through 8.

How to Develop the PAL Monitoring, Recordkeeping, and Reporting (MRR) Plan

Developing a PAL MRR plan involves identifying the MRR requirements specified in the Renewable Operating Permit (ROP) for each emissions unit or consistent with ROP MRR requirements, as specified in R 336.1213. Next, a method must be developed to convert the ROP compliance data into monthly mass emissions of the PAL pollutant. As an alternative to *converting the ROP compliance data, a new MRR plan may be proposed that will allow* determination of the monthly emissions of the PAL pollutant from the emissions unit. PAL compliance verification procedures must be based upon sound science and meet generally acceptable scientific procedures for data quality and manipulation. The procedures may use any or all of the following monitoring methods:

- Continuous Emissions Monitoring Systems
- Continuous Parameter Monitoring Systems
- Predictive Emissions Monitoring Systems
- Mass Balance Calculations
- Emission factors (Note: Emission factors used for PAL compliance purposes for emissions units classified as “significant” or “major” must be verified with emissions testing within six months of PAL permit issuance).

Next, all sources of the PAL pollutant must be identified for which the ROP does not contain MRR requirements. Compliance verification procedures must be proposed for these emissions units. Alternatively, the monthly potential to emit from these emissions units may be used for the purpose of demonstrating compliance with the PAL.

PAL Effective Period and Renewal

Each PAL permit will have an effective period of ten years. The PAL expiration date may be temporarily extended in order to allow completion of processing the renewal application.

In order to renew the PAL, the applicant must submit a timely application for renewal. A timely application is one that is submitted between 18 months and 6 months prior to the PAL expiration date. The application for renewal must contain a demonstration and recalculation of the PAL level, taking into account newly applicable requirements and the current PTE for the facility. During renewal, a re-evaluation of the level of the PAL may occur. It should be noted that under R 336.2823(10), if the actual emissions of a pollutant are 80 percent or less of the allowable PAL for that pollutant, the PAL for that pollutant may be decreased. This provision has been viewed as having a “ratcheting” effect and not providing an adequate margin for future industrial growth.

PAL RENEWAL CRITERIA:

The PAL will be renewed at a level determined to be more representative of the source’s baseline actual emissions or at a level determined to be appropriate considering:

- Air quality needs,
- Advances in control technology,
- Anticipated economic growth in the area.

As a default, the PAL can be renewed at its current level without consideration of other factors if the updated baseline actual emissions plus the PAL pollutant significant threshold is greater than 80 percent of the current PAL. The revised PAL cannot exceed the facility's potential to emit.

If the PAL expires without renewal, then the PAL will become the new allowable emissions for the facility. The applicant must submit an application with a proposed apportionment of these allowable emissions among all the emission units that are sources of the PAL pollutant. A new permit will then be issued with individual emission limits for each emissions unit.

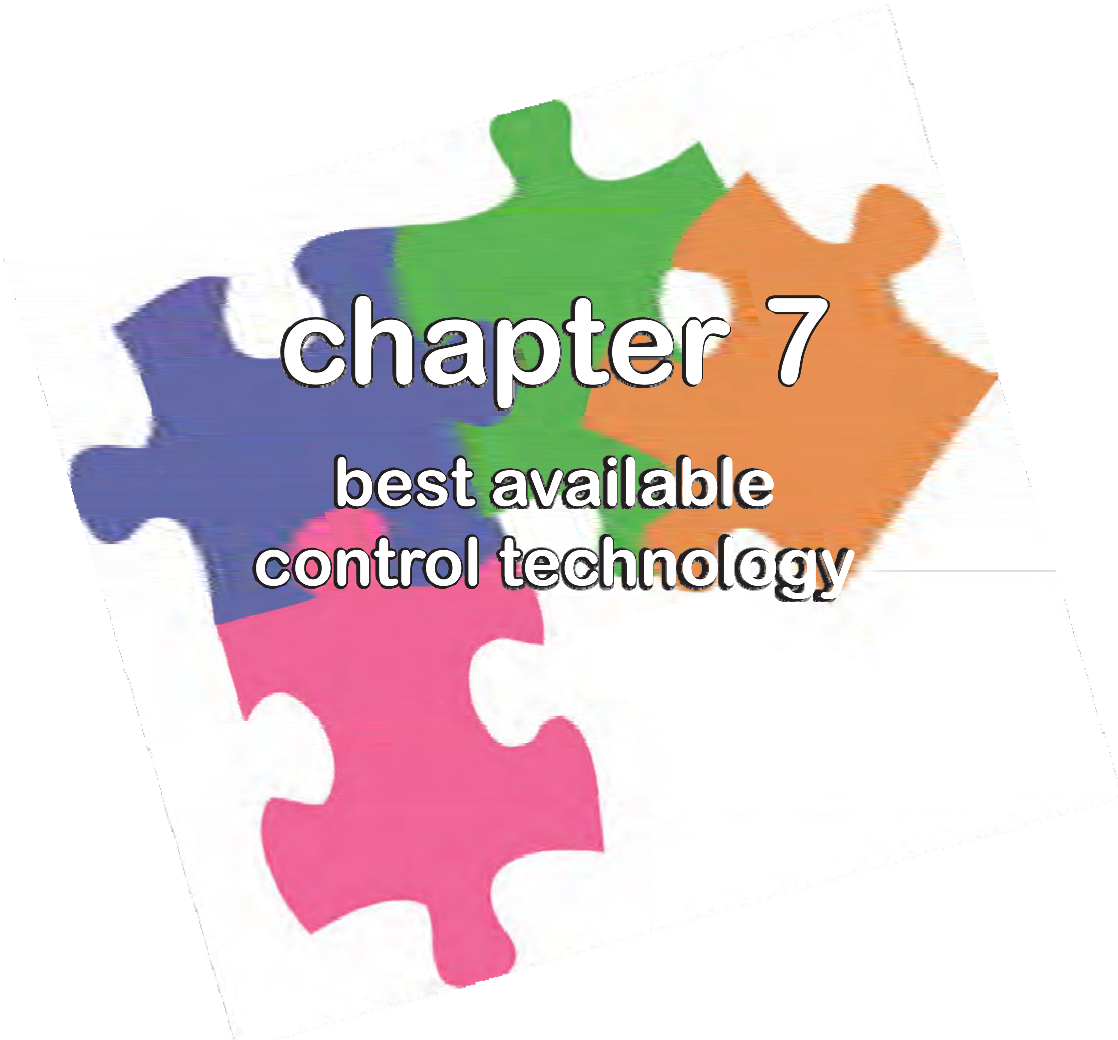
remember!

A PAL:

- Is available to **<u>existing</u>** major stationary sources.
- Is based upon facility baseline actual emissions.
- Is obtained through a Permit to Install.
- Is subject to the public participation process outlined in Chapter 10.
- Is valid for ten years and is renewable.

A PAL does not:

- Relieve the facility owner from complying with future state or federal regulations or the requirements for non-major permitting requirements.



chapter 7

best available control technology

Introduction

The Best Available Control Technology (BACT) analysis is designed to ensure that state of the art technologies are implemented in order to minimize the impact of any significant emissions increase. It may be helpful to meet with the MDEQ prior to submitting a BACT analysis to assure completeness.

> **"Best available control technology" or BACT** means an emissions limitation, including a visible emissions standard, based on the maximum degree of reduction for each regulated new source review pollutant from any proposed major stationary source or major modification which the department – on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs – determines is achievable for such source or medication through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combination techniques for control of the pollution. . ."
> R 336.2801(f)

Top-Down BACT

Any major stationary source or major modification subject to PSD must conduct a BACT analysis pursuant to R 336.2810. BACT is defined as an emission limit that is determined from a case by case review of all appropriate control options. Examples of possible control options include: add-on control equipment, lower-emitting processes, alternate materials or work practices, or a combination thereof. A "top-down" approach must be used, where all available control technologies are ranked in order of descending control effectiveness.

A BACT analysis is performed on a case-by-case basis for each regulated NSR pollutant subject to the PSD regulations, including visible emissions per Rule 336.1801(f). The BACT analysis starts with the identification of all appropriate control technologies. The control option or options which provide the greatest amount of control for the regulated NSR pollutant are evaluated first. A control option can be eliminated by demonstrating that it is not technically feasible or that energy, environmental, or economic impacts are unfavorable. Controls determined to be more stringent than BACT may be required to meet other regulatory requirements such as an exceedance of the NAAQS, consuming the available PSD increment, or non-compliance with any other applicable state or federal regulation.

> **note!**
>
> All appropriate control technologies for a regulated NSR pollutant need to be identified and discussed in a top down BACT analysis.

The top-down approach considers all available options for reducing emissions. There are five steps in the "top down" BACT approach. Each step is listed below along with a brief description. A PSD application is expected to include all of the information, assumptions, analyses, and calculations used to complete these five steps.

1. Identify all control technologies;
2. Eliminate technically infeasible options;
3. Rank the remaining control technologies by control effectiveness;
4. Evaluate the most effective controls and document the results;
5. Select BACT (e.g., the most effective option not rejected is BACT).

Step1: Identify All Control Technologies

The first step in a BACT analysis is to identify all available control options for each emission unit or for logical combinations of emission units for each regulated NSR pollutant subject to PSD. Available control options are control technologies or techniques that can be realistically installed or utilized on the process and that have the potential to reduce the regulated NSR pollutant under review. This step includes an evaluation of the characteristics of the source under review with comparable sources utilizing control.

Potential control options include add-on controls, such as scrubbers or fabric filters; lower emitting processes or work practices, such as the use of materials that result in lower emissions; or a combination thereof. Care must be used in selecting a “lower-emitting process” when evaluating control options. The purpose of a BACT analysis is not to re-define the process for which a permit is being requested. As an example, a permit applicant seeking to install a coal fired power plant should not be required to evaluate the installation of a nuclear power plant, even though it could be argued that the nuclear power plant is a lower emitting process. The USEPA guidance on performing a top down BACT analysis provides clarity on defining a lower-emitting process. The USEPA guidance suggests that lower emitting processes are those which utilize the same raw material(s) to produce the same product. Examples of lower emitting processes would be processes which utilize the raw materials more efficiently or similar raw materials which result in lower emissions, such as a spray booth which utilizes water borne coatings as compared to a spray booth which utilizes solvent borne coatings. The identification of lower emitting processes frequently has to be done on a case-by-case basis, and is dependent on how broadly (or narrowly) you define “raw material” and “product”.

To develop the list of available control technologies or techniques for the source, all demonstrated and potentially applicable control options must be identified. The applicant should review the USEPA’s RACT/BACT/LAER (RBLC) Clearinghouse (at www.epa.gov/ttn/catc/); gather information from other government agencies, environmental or industry organizations, or control technology vendors; as well as any other available information source.

The purpose of a BACT review is not to redefine the project. The MDEQ will let the applicant know when alternative processes should be evaluated.

Step2: Eliminate Technically Infeasible Options

The next step in the analysis is to determine the technical feasibility of each control option identified in Step 1. Each option that has been installed and successfully operated at a comparable source is considered to be feasible. For a control option that has not been demonstrated in practice, the applicant must determine the availability and applicability of using that control at the facility under review. An available technology is one that can be realistically installed and operated on the process in question and should be at least in the licensing and commercial demonstration stage of development. A commercially available control option is considered applicable if it can be reasonably installed on the facility under consideration. The applicant must have physical, chemical, or engineering data to demonstrate the technology would not work successfully at the facility under review. If modifications are needed to make the control compatible with the emissions unit under review, this does not necessarily mean it is technically infeasible. However, additional costs for such modifications may be considered in the economic portion of the BACT analysis discussed in Step 4. The applicant is not required to review control options with negligible cost differences and the same environmental impacts. Judgment should be used when deciding what to evaluate when comparing several types of control that achieve similar emission reductions.

Step 3: Rank the Remaining Control Technologies by Control Effectiveness

The third step involves ranking those control options that are remaining after Step 2. The control options are ranked from the most to the least effective in terms of emission reduction potential. The same units of measure should be used to compare performance levels of all options on the list. For example, control effectiveness in terms of percent of pollutant removed should not be compared with control effectiveness in terms of pounds per hour of emissions. Technologies can be ranked according to percent efficiency or as pollutant emission per unit of product produced or processed (e.g., pounds NO_X per million Btu heat input). Some control technologies have a wide range of performance levels. The applicant should use the most recent BACT decision and performance data for comparable sources. A lower level of control can be used if the applicant can demonstrate that there are source-specific factors or technical, economic, energy or environmental issues that make the highest performance level unacceptable or unachievable. A control technology that has adverse impacts at its highest performance level may be acceptable at a somewhat lower level of performance.

After listing all feasible control technologies from most effective to least effective, the applicant should also display the expected emission rate, the performance level (percentage or emissions per unit product), and expected emissions reduction (tons per year) for each control option on the list. This should be done for each emissions unit and each logical grouping of emissions units for each pollutant subject to PSD.

Step4: Evaluate the Most Effective Option

This step in the "top-down" BACT analysis involves an analysis of all energy, environmental and economic impacts associated with the list of available control technologies. Both beneficial and adverse impacts should be discussed and quantified. If the top option is selected as BACT, and there are no significant environmental impacts, then the BACT review ends. However, if adverse energy, environmental or economic impacts exist and are documented, then the control option may be eliminated and the applicant continues down the list until a control option can no longer be eliminated. At this stage in the analysis, elimination of a control alternative involves demonstrating that there are unique circumstances where adverse environmental; energy or economic consequences exist, making the control option impractical.

Energy Impacts

The applicant should determine any energy penalties or benefits that result from using each control technology. Penalties could include extra fuel or electricity required to power a control option. All penalties and benefits should be quantified. This is usually done in terms of cost. Any extra costs associated with energy penalties at a source should be included in the economic impact analysis. Only direct energy impacts should be considered in the energy analysis. Direct impacts are those that are completely associated with the addition of control, such as energy consumption to operate the control. Indirect impacts such as the energy required to create the control device should not be included. The applicant can also consider concerns over using a scarce fuel with the control option. A scarce fuel is one that is in short supply locally or not available to the source.

Environmental Impacts

Environmental impacts, under this step are impacts other than those on air quality standards (NAAQS, PSD increment, AQD health based-screening levels). Examples of environmental impacts include solid or hazardous waste generation, discharges of polluted water, visibility impacts, or emissions of non-NSR pollutants. If reduction of the pollutant under review is small compared to the collateral increase in another pollutant, the control option may potentially be eliminated for having adverse environmental impacts. However, the fact that a control could create a waste that must be disposed of, does not by itself warrant elimination. The applicant must show that there are unusual site-specific characteristics why such waste disposal or pollutant emissions are unreasonable and create greater problems at the site under review than at other sites where the control is used. The quality and quantity of water and/or solid waste should be evaluated for compliance with applicable environmental rules. The applicant should also consider whether a control option may result in irreversible environmental damages (use of scarce water resources). Other impacts that should be considered in this analysis are radiant heat or local air quality impacts. An example would be control for carbon monoxide, which causes an increase in the amount of NOx in a NOx non-attainment area. This may result in the elimination of the most stringent control device.

Economic Impacts

The economic impact analysis involves evaluating the cost to control the pollutant or pollutants at a particular facility. The cost to control the pollutant, or cost effectiveness, is measured in dollars per ton of pollutant removed and includes both the cost to install and operate the control equipment. Cost effectiveness is not meant to be an absolute standard by which the decision to use, or not use, a particular control device is made. A key question is whether the cost effectiveness is disproportionate when compared to the cost of control at other facilities. This economic evaluation does not involve determining the ability of a facility to absorb such costs. If the top BACT option is selected, and the top BACT option is technically feasible, there is no need for an economic evaluation.

The first step in the economic impact analysis is to combine the annualized capital cost of the controls with the annual operating expenses. This value is referred to as the annualized control cost. The cost of the control technology including associated equipment (i.e., ductwork, raw materials, utilities, etc.) and the basis for each should be determined. The cost analysis methods in the Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual (USEPA 453/B-96-001) may be used to assure consistency with other BACT analyses performed across the country. The applicant should document and substantiate any assumptions. Cost data should be the most accurate site-specific data available (e.g., cost of raw materials, utilities, and labor).

Quantifying the cost of control also includes identifying the design parameters and assuring that these parameters are consistent with the modeling and permit limits. Vendor data may be used to define design parameters when applicable. Actual performance test data from the source under review or a similar source may also be used.

The cost effectiveness is calculated in two ways: average cost and incremental cost. The average cost effectiveness is most often used in an economic evaluation. The average cost is the annualized control cost divided by the annual emissions reduced by the control technology.

Average Cost =

$$\frac{\text{Annualized Control Cost}}{\text{Annual emissions reduced}}$$

In developing the average cost, uncontrolled emissions are established using realistic upper boundary operating assumptions. NSPS or NESHAP requirements or added controls are not considered in the uncontrolled emissions calculation, but realistic physical or operational constraints are considered. For example, carbon monoxide emissions from a combustion turbine vary with ambient temperature. Thus, it is appropriate to use emissions at the annual average ambient temperature of the area instead of the maximum worst-case temperature. This represents a more realistic operating scenario for the turbine. The applicant can also use verified historical operating data for the source such as the number of shifts per day or limited capacity. If a source projects certain operating parameters lower than the standard practice for its industry; has specific design parameters that limit the operation; and such physical or operational parameters have a deciding role in the BACT determination; they should be included in an enforceable permit. Whatever the physical or operational parameters of the source may be, the BACT comparison should be done with other facilities that have similar operating and physical limitations as the source under review.

The incremental cost approach may be used to determine cost effectiveness for control devices if there are several types of control devices within a dominant alternative. The incremental cost analysis should be conducted in combination with the average cost. The incremental cost is the difference in cost between two control options. The incremental cost analysis should be used to analyze the difference between the dominant control options. The dominant controls are those that will buy the most emission reductions for the least cost. Incremental cost is especially useful when evaluating control options with a range of control efficiencies.

Incremental Cost =

$$\frac{\text{Annualized Control Cost of Option 1} - \text{Annualized Control Cost of Option 2}}{\text{Emissions Reduced by Option 1} - \text{Emissions reduced by Option 2}}$$

The average cost gives a picture of the costs to control emissions using a particular control technology. The incremental cost helps to identify differences in control costs between different control technologies. For example, Control Technology 1 may have an average cost of $5,200 per ton to control 102 tons per year. Control Technology 2 may have an average cost of $5,000 per ton to control 100 tons per year. Using only the average cost, it would appear that there are no significant differences between the two control options. However, the incremental cost shows a dramatic difference.

Control Technology 1 carries an annualized control cost of $530,400 (i.e., $5,200 x 102). Control Technology 2 carries an annualized control cost of $5,000 (i.e. $5,000 X 100). The incremental cost for Control Technology 1 over Control Technology 2 is $15,200 per ton (i.e., $530,400 - $500,000 / 102 - 100). This means that while Control Technology 1 controls two more tons of pollutant than does Control Technology 2, it costs, incrementally, $15,200 per ton for each of those two tons. Based on this incremental cost analysis, it may not be cost effective to select Control Technology 1.

In order to eliminate a control option on the basis of economic infeasibility, the applicant must demonstrate that the control technology is significantly more than the control costs being borne by other similar sources and that it is not cost effective in its own right. This should include all relevant site-specific differences.

<u>Step5: Select BACT</u>

The most effective control option not eliminated under Steps 1 through 4 is proposed as BACT. All assumptions and data used in making the BACT determination have to be properly documented in the permit application.

<u>Establishing BACT Limits</u>

BACT limit(s) and associated control requirements will be incorporated into the PSD permit. The BACT discussion has been primarily about the evaluation of applicable control options.

However, it is also important to note that BACT is an emission limit for each emissions unit and pollutant subject to the PSD regulations. The BACT emission limit must be met at all times, contain appropriate averaging time periods, and have proper compliance procedures and recordkeeping for the averaging period. Some situations arise where the emission limit identified as BACT for steady state operation cannot be met at all times. For example, a boiler may contain an emission limit that cannot be met during startup when conditions are not steady-state and emissions can change sporadically. In this case, it is appropriate to develop a separate BACT limit or standard applicable during startup periods. Also, recall that the definition of BACT includes operating procedures or practices if it can be shown that an emission limit is not appropriate. Using the same boiler example, it may be difficult to measure pollutant emissions during startup since most compliance methods do not work effectively outside of steady-state conditions. An emission limit is not federally enforceable if compliance cannot be determined. Therefore, compliance with the emission limit or operating practice must be determined at all times the emissions unit is operating. Compliance methods may consist of stack testing, continuous emissions monitoring, actual emissions calculations, or parametric monitoring. The compliance method must be able to measure or calculate emissions consistent with the emission limit's averaging time period (e.g., 3-hr average, 1-hr max, 24-hr average, etc…).

Parameter	Design Value
Number Of Emissions Units	**4**
Emissions Unit Identification	**New natural gas fired combustion turbine with dry low-NO_X burners; each turbine is equipped with a heat recovery steam generator and natural gas-fired duct burners**
Gas Turbine Output	**163 Megawatts**
Steam Turbine Output	**424 Megawatts**
Turbine Heat Input	**1,685 million Btu/hr**
Duct Burner Heat Input	**245 million Btu/hr**
Exhaust Temperature	**209 °F**
Turbine Hours Of Operation	**8,760 hr/yr**
Duct Burner Hours Of Operation	**4,000 hr/yr**
Uncontrolled Emissions (per turbine/duct burner)	**NO_X 200.7 tpy** **CO 262.5 tpy** **SO_2 9.3 tpy** **VOC 108.1 tpy** **PM 61.8 tpy** **GHGs 989,069** tpy

In this example, the facility is a brand new facility, and the facility has a 100 ton per year threshold; since it is one of the listed categories which have a 100 ton per year threshold. Emissions of NO_X, GHGs, CO, VOC, and PM are subject to PSD BACT since CO, NO_x, VOC, and GHG emissions make this a new major stationary source and emissions of the other pollutants are above their respective significant thresholds level. This example will focus on a BACT analysis for NO_X.

*Note – the data used in this example is for instructive purposes only and does not represent actual vendor data for the controls.

STEP 1—IDENTIFY ALL CONTROL TECHNOLOGIES

In this step, all available control technologies are listed:

- SCONOX™
- Selective catalytic reduction system (SCR)
- SCR with water or steam injection
- Selective non-catalytic reduction system (SNCR)
- Water/steam injection

STEP 2—ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

From the list above, remove the technically infeasible options and explain why the option is not feasible.

The SNCR can be eliminated as technically infeasible because the system requires a flue gas temperature of 1300 to 2100 °F, which is much higher than the temperature of the turbine exhaust.

STEP 3—RANK REMAINING CONTROL TECHNOLOGIES

The technically feasible (i.e., remaining) control options are ranked from the most to the least effective in terms of emission reduction potential. Also included is the expected emission rate, the performance level, and expected emission reduction for each control option:

Control Option	Performance Level (% Efficiency)	Emission Reduction (tpy)	Expected Emission Rate (ppm)
SCONOX™	**98**	**196.7**	**1-2**
SCR	**95**	**190.7**	**1-3**
SCR w/water or steam injection	**90**	**180.6**	**6-9**
Water/steam injection	**80**	**160.6**	**25-42**

STEP 4—EVALUTE THE MOST EFFECTIVE CONTROLS

Starting with the top BACT choice in the above table, evaluate the energy, environmental and economic impacts. If there is proper justification that adverse energy, environmental or economic impacts exist, then the control option may be eliminated and the next option evaluated. This continues until a control option can no longer be eliminated.

Top choice—SCONOX™

There is little operational experience with this technology on turbines greater than 32 megawatts. There have been many technical concerns raised about its operation on large turbines. Other impacts associated with this technology include the increased use of natural gas, reduced power output for the turbine, an increase in water use, and additional wastewater generation. Although SCONOX™ can achieve slightly better emission levels than SCR, it is much more costly than SCR equipment (about 3 times greater). This choice can be eliminated since it is economically infeasible

Example continued:

2nd choice – SCR

SCR is a demonstrated and proven technology that has been applied safely and effectively on hundreds of combined-cycle turbines nationwide. This system uses ammonia to react with NOx in the presence of a catalyst to create nitrogen and water. Any non-reacted ammonia is emitted to the air. The collateral environmental impact from ammonia emissions is around 5-10 ppm while NOx reductions are on the order of about 95 percent. Therefore, the environmental impacts are not considered adverse or a cause for elimination of the SCR system. There may also be an increase in particulate emissions while using an SCR system due to the potential formation of ammonia sulfates. However, this increase is minimal when compared to the decrease in NOx emissions. The cost analyses for SCR and SCONOx™ are listed below.

	SCONOx™	**SCR**
Direct capital cost	**$15,000,000**	**$4,000,000**
Indirect capital cost	**$2,400,000**	**$800,000**
Total capital investment	**$17,400,000**	**$4,800,000**
Direct annual cost	**$3,680,000**	**$1,000,000**
Indirect annual cost	**$1,500,000**	**$500,000**
Total annual cost	**$5,180,000**	**$1,500,000**
Tons NO_X reduced	**196.7**	**190.7**
$/ton reduced	**$26,335**	**$7,865/ton**

The analysis can stop here since it is shown that SCR is the best choice for BACT. It is not worth looking at less efficient control options for NOx since the SCR system is the most cost effective.

STEP 5—Select BACT

BACT for the turbine project is determined to be the SCR system with a NOx limit.

chapter 8

air quality

Introduction

Air 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. When an applicant is subject to PSD, modeling is required and must be submitted by the applicant.

The concentration of an air pollutant released from a source is affected by physical dispersion, dilution and decay. Models attempt to simulate conditions which determine these factors. Such scenarios include emission and flow rates, angle of release, exhaust temperature, wind speed, wind direction, ambient temperature, atmospheric stability, chemical transformation rates, and physical removal rates. The resultant ground level concentration is then compared to the NAAQS or PSD Increments.

In the 1977 CAA, Congress mandated such reviews and encouraged the standardization of model applications, ensuring that air quality control agencies and the general public have a common basis for estimating pollutant concentrations, assessing control strategies and specifying emission limits.

Air Quality Models

The PSD regulations require that modeling for increments and NAAQS must be included in order for the application to be considered complete. The MDEQ air dispersion modelers will review and verify the modeling conducted by an applicant, or by a consultant on behalf of an applicant, but will not perform the modeling.

Model Suitability

The extent to which a specific air quality model is suitable for the evaluation of source impact(s) depends upon several factors:

1. Meteorological and topographic complexities of the area source configuration;
2. Level of detail and accuracy needed for the analysis;
3. Technical competence of those undertaking such modeling; available resources;
4. Detail and accuracy of the emissions inventory database, meteorological data and air quality data.

Computer modeling programs are highly specialized tools. A modeling program, when applied improperly, or with inappropriately chosen data, can lead to serious misjudgments regarding the source impact or the effectiveness of a control strategy. In general, the more parameters a model includes, the more accurately the result will represent the real situation.

If the parameters necessary for a particular model are unknown, that model should not be used. The procedures and techniques for determining the acceptability of a model for an individual case are contained in the document entitled Interim *Procedures for Evaluating Air Quality Models,* USEPA 450/4-84-023 or NTIS document PB84-106060, and is also discussed in R 336.1240 entitled "Required Air Quality Models."

Models sanctioned by the USEPA are promulgated in the *Guideline on Air Quality Models* (Guideline) (Appendix W of 40 CFR 51). The Guideline addresses the regulatory application of air quality models for accessing criteria pollutants under the CAA. Appendix A of the Guideline details the USEPA's "preferred models" for refined modeling. In most cases, the MDEQ will default to Appendix A for the preferred models for PSD permit applications.

Appendix B of the Guideline, which lists "alternative models," is located at the USEPA's Support Center for Regulatory Air Models (SCRAM) web page. Alternative models may be used on a case-by-case basis with prior approval of the MDEQ. See the following web links:

Appendix W Guideline: www.epa.gov/scram001/guidance/guide/appw_03.pdf

Alternative Models: www.epa.gov/ttn/scram/dispersion_alt.htm

Levels of Model Sophistication

The methods for air quality dispersion modeling may be performed on two levels:

1. Screening techniques;
2. Refined dispersion models.

Screening techniques are relatively simple calculations that provide conservative estimates of the ambient impact from a specific source. The purpose of screening is to eliminate the need for further detailed modeling for sources that clearly will not cause or contribute to ambient concentrations in excess of specific air quality criteria. If the predicted maximum impact from the screening model exceeds the specified criteria, more sophisticated models will need to be applied.

Refined models consist of analytical techniques that provide more detailed treatment of physical and chemical atmospheric processes. These models require more detailed and precise input data, and provide more specialized output concentration estimates. Theoretically, refined models give a more accurate estimate of source impact and the effectiveness of control strategies. These models can also be used to evaluate engineering changes (e.g., stack height or location) that may be necessary to bring the source into compliance with ambient air quality standards.

The MDEQ highly recommends a pre-application meeting to discuss modeling methods in advance of performing a complex modeling analysis. The USEPA's *Air Quality Analysis Checklist* provides details for PSD modeling concerns. See the following web link for the modeling checklist:

www.epa.gov/scram001/guidance/guide/checklist.pdf

MDEQ Preferred Screening Model: AERSCREEN

The AERSCREEN model retains many of the simplicities of its predecessor, SCREEN3, while including many of the more sophisticated features found in the USEPA's preferred refined model, AERMOD. AERSCREEN is an interactive program which can quickly perform single source, short-term calculations, including:

- Estimated ground-level concentrations resulting from point, area, volume, or flare sources of emissions;
- Choice of English or metric units for input parameters;
- Building wake effects for either building attached or detached stacks;
- Incorporate the effects of building downwash on the maximum concentrations for both the near wake and far wake regions;
- Site specific meteorology based on surrounding surface characteristics;
- Site specific terrain elevations based on Digital Elevation Maps (DEM);
- Overall maximum impact as a function of linear distance; and
- Automatic scaled impacts for 3-hour, 8-hour, 24-hour and annual averages

Sources that emit the same pollutant from several stacks with similar parameters that are within near proximity of each other may be analyzed by treating all of the emissions as coming from a single representative stack. See the following link for information on screening models: www.epa.gov/ttn/scram/dispersion_screening.htm

MDEQ Preferred Refined Models

AMS/EPA Regulatory Model – (AERMOD)

The American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) was formed to introduce state-of-the-art modeling concepts into the USEPA's air quality models. The resulting model, AERMOD, is a steady-state plume 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 located in rural or urban areas, and receptors may be located 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 concentrations for averaging times ranging from one hour to one year.

AERMOD is applicable to continuous releases of primary air toxics and HAPs. Chemical transformation for some pollutants is treated by simple exponential decay. Additional chemistry was added in later versions to account for ozone limiting during atmospheric NO to NO_2 conversion.

AERMOD requires the use of several pre-processor modules to develop the necessary components of the model:

- AERMET (AERMOD Meteorological Pre-processor): The AERMET module is the meteorological pre-processor for the AERMOD program. Input data can come from hourly cloud cover observations, surface meteorological observations and twice-a-day upper air soundings. AERMET is a general purpose meteorological pre-processor for organizing available meteorological data into a format suitable for use by the AERMOD air quality dispersion model. National Weather Service (NWS) hourly surface observations, twice-daily upper air soundings and on-site meteorological data can be processed in AERMET. As modeling results can be significantly altered by modifying surface characteristics, the MDEQ provides pre-processed AERMET data (including 1-minute AERMINUTE data) to provide consistency. If the applicant chooses to provide independent AERMET data, the modeling analysis will need to include a defense of the choice of values to prevent "engineering" desired impacts.
- AERSURFACE (AERMET Meteorological Pre-Processor): AERSURFACE is a tool that processes land cover data to determine the surface characteristics for use in AERMET. The applicant should contact the MDEQ-AQD modeling staff to discuss the appropriate use of surface characteristics around the met data tower rather than the project site before initiating modeling.
- AERMAP (AERMOD Terrain Pre-Processor): The AERMAP module is a terrain pre-processor designed to simplify and standardize the input of terrain elevation data for the AERMOD program. Since a flat terrain option is available, applicants should contact the MDEQ-AQD modeling staff to discuss its appropriate use. See the following web links for additional technical information regarding the USEPA's preferred dispersion models:

  AERMOD model - www.epa.gov/ttn/scram/dispersion_prefrec.htm#aermod

  AERMET - www.epa.gov/ttn/scram/metobsdata_procaccprogs.htm#aermet

  AERSURFACE - www.epa.gov/ttn/scram/dispersion_related.htm#aersurface

  AERMAP - www.epa.gov/ttn/scram/dispersion_related.htm#aermap

<u>CALPUFF</u>

CALPUFF is an advanced non-steady-state meteorological and air quality modeling system that simulates pollution releases as a continuous series of puffs. The model has been adopted by the USEPA in its Guideline as the Appendix A "preferred" model for assessing the following:

- Near-field impacts in complex flow or dispersion situations;
  - complex terrain;
  - stagnation, inversion, recirculation, and fumigation conditions;
  - overwater transport and coastal conditions;
  - light wind speed and calm wind conditions.
- Long range transport;
- Visibility assessments and Class I area impact studies;
- Criteria pollutant modeling, including application to SIP development;
- Secondary pollutant formation and PM modeling;
- Buoyant area and line sources (e.g., forest fires and aluminum reduction facilities).

The MDEQ recommends the use of CALPUFF for predicted impacts greater than 50 kilometers (km) from the release point or for impacts in regions where complex terrain wind channeling can effect overall dispersion. See the following web link for additional information on the CALPUFF model:

www.epa.gov/ttn/scram/dispersion_prefrec.htm#calpuff

PSD Modeling for Criteria Pollutants

An applicant for a PSD permit is required to conduct an air quality analysis of the ambient impacts associated with the 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 emissions increases and decreases from existing sources, will not cause or contribute to a violation of any applicable PSD Increments or NAAQS.

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

- PM10
- PM2.5
- SO_2
- NO_2
- Ozone: O_3
- CO
- Pb

The applicant must demonstrate that a proposed source will:

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

Each modeling analysis will be unique due to the variety of sources and meteorological 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.

Significant Impact Level

The first step in the modeling analysis is to determine the predicted impacts from the proposed project. If the predicted net project impact is less than the PSD Significant Impact Levels (SILs), the emissions of that pollutant will not be considered to cause or contribute to any violation of federal criteria pollutant standards.

Pollutants with predicted net project impacts greater than the SIL require further analysis. If predicted impacts are less than the SILs, no further modeling analysis is generally required for that pollutant. Legal challenges, however, have provided justifications for full refined modeling, in some cases, even if project impacts are less than significant but could lead to a violation of any applicable regulatory threshold.

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 that 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 of the PSD Increment is consumed.

The CAA of 1977 established pollutant increments for the prevention of significant deterioration of ambient air. Currently, increments exist for SO_2, NO_2, PM2.5, and PM10. When modeling for compliance with the PSD increments, it is necessary to demonstrate that the impact of the proposed source *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 post-baseline emissions;
- Increment consuming emissions from existing on-site and off-site sources which have a significant concentration gradient overlapping the proposed project.

All sources (major and minor) installed after the applicable baseline date consume increment. Emissions from units which existed before the baseline date, but have been permanently removed within the past five years, may be considered to “free up” increment and may be “netted-out” as negative emissions during the increment analysis (i.e., modeled as a negative emission rate). The MDEQ maintains all statewide baseline dates as part of their internet web page service. Emissions inventories of off-site sources are available, upon request, from the MDEQ.

The 1-hr, 3-hr, 8-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 SO_2, the high-second-high concentrations (non-annual) predicted for any of the five calendar years modeled, should be used as the estimate. Annual NO_X or PM2.5 increments can never be exceeded.

For minor sources which consume increment, the highest concentration predicted from one year of modeling can be used for all averaging times.

NAAQS Analysis

Modeling to demonstrate compliance with the NAAQS is conducted in a similar manner as is PSD Increment modeling, but with two important differences. The first difference is that compliance with the NAAQS is based upon the *total* modeled air quality impact rather than just the post-baseline net increase. In other words, the 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 the modeled impact. Therefore, if a NAAQS analysis is needed, the following additional modeling elements are required to complete the review for each applicable pollutant:

- Proposed maximum new emissions;
- Emissions of all existing sources which have a significant concentration gradient overlapping the proposed project;
- Background concentrations based on representative monitoring data.

Background concentrations and emissions inventories of nearby sources are available, upon request, from the MDEQ.

Similar to PSD Increments, original 1-hr, 3-hr, 8-hr, and 24-hr NAAQS for criteria pollutants were deterministic standards. That is, they cannot be exceeded more than once per calendar year. PM10 is different, however, as the 24-hr standard is based on the 6th highest value at any receptor over a five-year period.

Annual NO_2 or PM2.5 NAAQS can never be exceeded.

Recently promulgated standards (i.e. 1-hr NO_2/SO_2 and 24-hr PM2.5) use a statistically based NAAQS modeled over a five year period. For these pollutants, compliance is demonstrated by a five 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 the multiyear average of the 98th percentile (NO_2) or 99th percentile (SO_2) of the annual distribution of daily maximum 1-hour values. Similarly, 24-hr PM2.5 is based on the multi-year average of the 98th percentile of the annual distribution of daily 24-hr averages.

Nearby Source Emissions Inventory

An emissions inventory of nearby sources can be requested from the MDEQ. Available information includes a list of facilities with overlapping significant concentration gradients, company names, permitted emissions (or maximum actual emissions, if no permit exists), permit numbers, Universal Transverse Mercator (UTM) coordinates, and stack parameters. To obtain this information, provide the following complete detailed information:

- The company's name, address, and phone number;
- Plant name, address, county, and UTM coordinates;
- List of pollutants;
- Other relevant details.

Other area facilities, which do not have overlapping significant concentrations gradients, are not explicitly modeled and are assumed to be part of the background concentration.

Background Concentration Pre-Construction Monitoring

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 is required per R 336.2813.

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 natural and distant man-made sources.

If the applicant believes sufficient data exists to provide representative regional background concentrations, they should appeal to the agency to provide a pre-construction monitoring waiver. The written waiver request can be made in the form of a stand-alone letter or part of a modeling protocol.

The MDEQ maintains a database of area monitor concentrations which could potentially be used to determine current representative background concentrations.

Representative existing data should provide a reasonable estimate of the upwind background air concentration that would be flowing into an area not influenced by the major source or the additional nearby sources that would be explicitly modeled in the impact analysis. In most cases, a monitor from the AQD's extensive statewide monitoring network can be used to obtain representative background pollutant concentrations for use in the analysis.

To use existing monitoring data in an analysis, it is recommended that all major new or modified sources that are required to conduct a full impact analysis request a pre-construction monitoring waiver from the AQD. In most cases, adequate representative existing monitoring data exists such that a monitoring waiver can be granted by the MDEQ.

Secondary Pollutant Impacts

The USEPA requires a formal evaluation of secondary pollutants during Increment and NAAQS air impact reviews. However, there are no USEPA promulgated tools currently available to accomplish this review. Understanding that deficiency, the USEPA has issued draft guidance for addressing secondary impacts of PM2.5 resulting from significant SO_2 and/or NO_2 emissions.

The guidance indicates that if proposed emission increases of SO_2 and/or NO_2 are significant (i.e. > 40 tpy), then resulting impacts from secondary PM2.5 must be addressed, in addition to significant primary PM2.5. Since AERMOD does not support atmospheric chemistry, the USEPA recommends three potential methods to address secondary impacts of PM2.5:

- Qualitative in nature;
- A hybrid of qualitative and quantitative assessments utilizing existing technical work;
- A full quantitative photochemical grid modeling exercise. However, the USEPA anticipates only a few situations would require explicit photochemical grid modeling.

Although the current draft guidance was specifically written to address secondary PM2.5 impacts, the USEPA has indicated that the same methodology should also be applied to secondary pollutants which could yield potential ozone formation. The web link for the current draft guidance for secondary PM2.5 is as follows:

www.epa.gov/ttn/scram/guidance/guide/Draft_Guidance_for_PM25_Permit_Modeling.pdf

Applicants with significant precursor emissions increases should submit an additional demonstration to show that total impacts, including potential secondary impacts, will not cause or contribute to a PM2.5 or ozone violation. Given the technical issues that arise in the context of demonstrating compliance with secondary impacts, the MDEQ strongly encourages applicants to propose their methodology within a modeling protocol and receive approval prior to application submittal.

Modeling Protocol Submittal

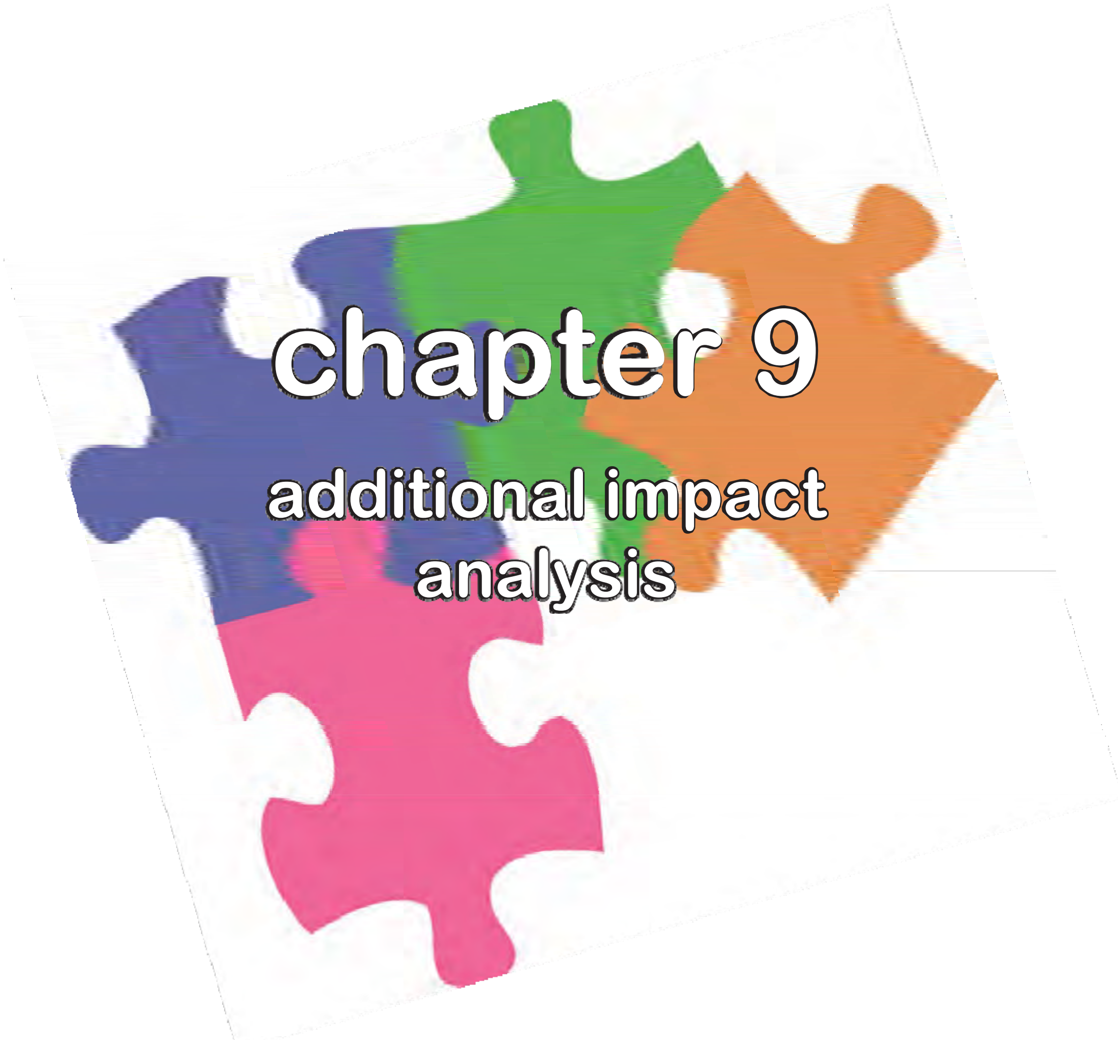
Because of the complex character of the air quality analysis and the site-specific nature of the modeling techniques involved, applicants for PSD permits are advised to review the details of their proposed modeling analysis with the MDEQ before a PSD application is submitted. This is best done using a modeling protocol. The modeling protocol should be submitted to the MDEQ for review and approval prior to commencing any extensive analysis. The protocol should, at a minimum, contain the following:

- The proposed model, including version date;
- Proposed meteorological data location and dates;
- Proposed receptor locations;
- All sources to be modeled;
- Pre-construction monitoring waiver request for all significant criteria pollutants unless monitoring is proposed;
- Use of any special non-default options (i.e. use of the Ozone Limiting Method (OLM) or Plume Volume Molar Ratio Method (PVMRM) options, as well as a discussion of related modeling parameters);
- Scaled plot plans clearly denoting north, property lines, building dimensions and stack locations.

The USEPA mandates their review and approval of any submitted modeling protocol if the suggested methodology involves any deviation from AERMOD default settings.

chapter 9

additional impact analysis



Introduction

All PSD permit applicants must prepare an additional impacts analysis for each pollutant subject to PSD review. This analysis assesses the impacts of air contaminants from the source or modification under review on ground, water, soils, vegetation, and visibility. 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 document all sources of information and all underlying assumptions made as a part of the analysis.

The additional impacts analysis generally has three parts, as follows:

- Growth;
- Soil and vegetation impacts;
- Visibility impairment.

Growth Analysis

The elements of a growth analysis include:

- A projection of the associated industrial, commercial, and residential growth that will occur in the area due to the proposed project;
- An estimate of the air emissions generated by the growth.

Soils and Vegetation

The analysis of impacts on soils and vegetation should be based on an inventory of the soil and vegetation types found in the impact area. This inventory should include all vegetation with any commercial or recreational value and may be available from several sources (i.e. conservation groups and/or universities). For most types of soil and vegetation, ambient concentrations of criteria pollutants below the NAAQS will not result in harmful effects. However, there are sensitive vegetation species, which may be harmed by long-term exposure to low concentrations of pollutants for which there are no NAAQS. Good references for applicants and reviewers alike include:

- The USEPA's Air Quality Criteria Documents;
- Impacts of Coal-Fired Plants on Fish, Wildlife, and Their Habitats (U.S. Department of the Interior);
- A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas (US Forest Service: www.fs.fed.us/ne/newtown_square/publications/technical_reports/pdfs/scanned/gtr151.pdf);
- Air Quality in the National Parks (National Park Service: www.nature.nps.gov/air/Pubs/pdf/aqNps/aqnps.pdf).

Visibility

A visibility impairment analysis consists of an evaluation of impacts that occur within the area affected by the proposed project. Note that the visibility analysis required here is distinct from the Class I area visibility analysis requirement. The suggested components of a visibility impairment analysis include:

- A determination of the visual quality of the area;
- An initial screening of emission sources to assess the possibility of visibility impairment;
- If warranted, a more in-depth analysis involving computer models.

To complete a visibility impairment analysis, the applicant is referred to the USEPA's "Workbook for Plume Visual Impact Screening and Analysis", USEPA-450/4-88-015 (9/88). The workbook outlines a screening procedure designed to expedite the analysis of emissions impacts on the visual quality of an area. The workbook was designed for Class I area impacts, but the outlined procedures are generally applicable to other areas.

Class I Areas Impact Analysis

Geographic areas of the state which are in attainment with the NAAQS are categorized as either a Class I area or a Class II area. Class I areas are areas of national or regional natural, scenic, recreational, or historic value for which the PSD regulations provide special protection as well as additional protection of visibility values. Class II areas are those areas which do not have national or regional natural, scenic, recreational, or historic value. Class I areas allow a lower increase in concentrations of pollutants (increment) above baseline concentrations than Class II areas.

Michigan currently has two Class I areas:

1. Seney National Wildlife Refuge;
2. Isle Royale National Park.

The visibility regulations, outlined in R 336.2816(2) and (3), require a visibility impact analysis for major new sources or major modifications that have the potential to impair visibility in any Class I area. Visibility in the regulations is for special protection and enhancement in accordance with the national goals of preventing any future visibility impairment and improving any existing visibility impairment in Class I areas caused by man-made air pollution.

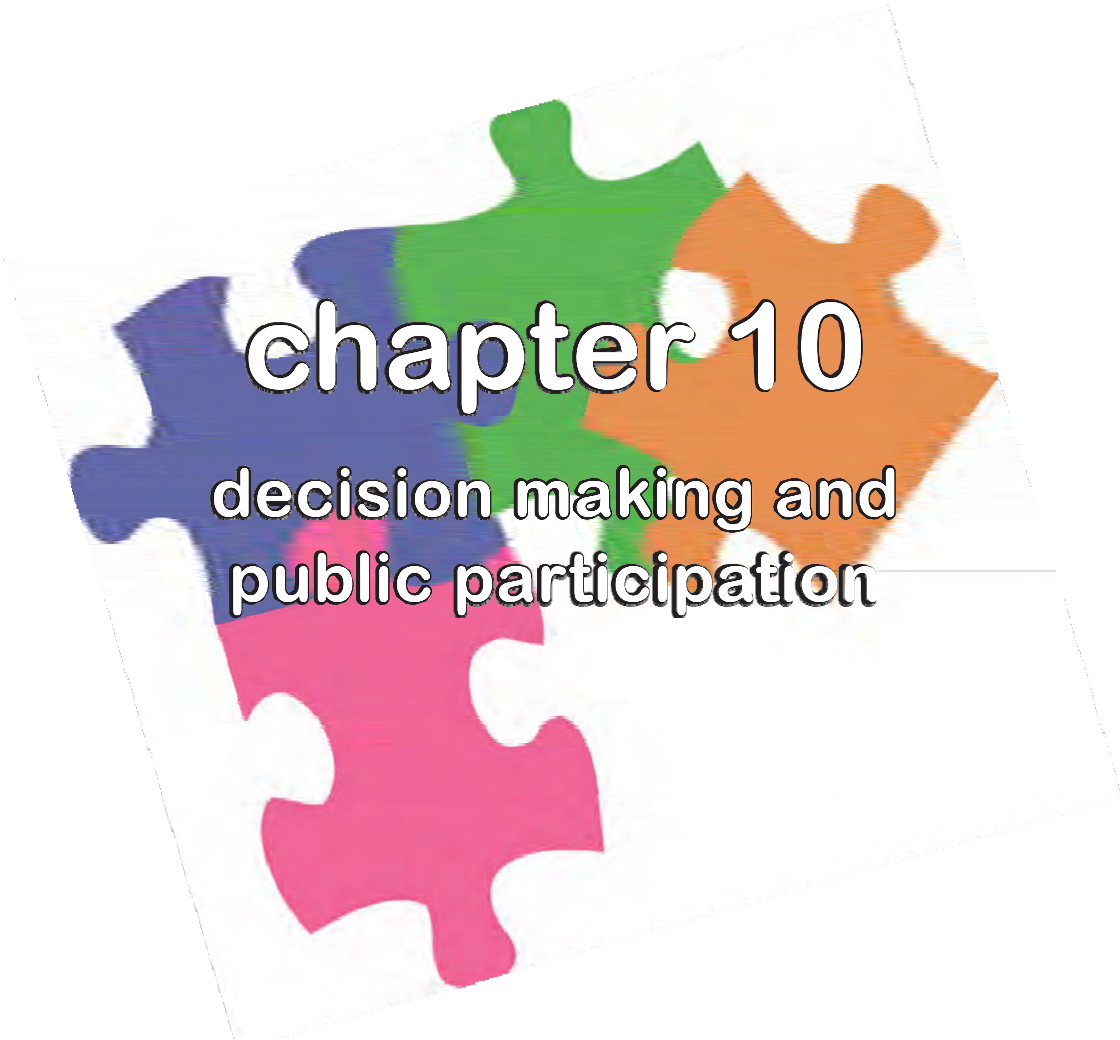
In addition to the two Class I areas listed above, there are currently three other Class I areas near Michigan's boundaries which would have to be addressed by sources proposing to locate within 250 km of the Class I area. These areas are the Forest County Potawatomi Community in Forest County, Wisconsin; the Boundary Waters Canoe Area Wilderness in Minnesota, and the Rainbow Lake Wilderness area in Wisconsin.

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 increments. As described in Chapter 8, increments are the maximum increases in ambient pollutant concentrations allowed over these baseline concentrations specified in Table 183 of R 336.2816(4)(a). The Class I increments are more restrictive than the Class II increments in allowing increases in ambient concentrations allowed over baseline concentrations. Similar to PSD Increment analyses elsewhere in the state, increment consumption 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.

Information on screening models available for visibility analysis can be found in "Workbook for Plume Visual Impact Screening and Analysis," USEPA-450/4-88-015 (9/88).

chapter 10

decision making and public participation



Introduction

Obtaining public input is a key step in the decision-making process. Michigan is a federally SIP-approved state which administers its own PSD program and has adopted regulations which address public participation for PSD sources. All PSD permit applications are subject to the requirements for public participation which are contained in R 336.2817. The procedures are prescriptive on what must occur prior to the public comment period, during the public comment period, at the point of permit decision, and, if applicable, following the decision. The regulations promulgated pursuant to Act 451, Part 55, provide specific requirements with regard to public notice and public hearings. The public participation process is outlined below.

Prior to the public comment period, the following documents are developed by the MDEQ staff:

- Draft Conditions
- A Notice of Public Hearing
- Fact Sheet
- Letters to Company and Interested Parties

Draft Conditions

Once an application is both administratively and technically complete, and the technical review is concluded, a draft permit is developed. The draft contains conditions necessary to assure the process or process equipment, if approved, would operate in compliance with all applicable state and federal requirements. The draft conditions are shared with the applicant for concurrence. Typically, there is agreement on the draft conditions between the applicant and the MDEQ before proceeding with the public participation process.

Notice of Hearing and Fact Sheet

A notice of hearing and fact sheet is prepared by the MDEQ for each draft PSD permit. The fact sheet provides a description of the proposed process, the issues considered in preparing the draft permit, and other items of interest. Information that is included consists of, but is not limited to, the following:

- A brief description of the proposed project and the present air quality of the area;
- The type and quantity of emissions;
- A brief summary of the basis for the draft permit conditions including references to the state and federal requirements;
- The reasons any requested variances or alternatives to the required standards do, or do not, appear justified;
- A discussion of the NAAQS and how compliance with the NAAQS will be maintained;
- A discussion of PSD increment consumption, demonstrating how the increment will not be exceeded.

In addition, the complete permit application file is available for review during the public comment period at both the Lansing office and the appropriate district office.

Notification

Effectively notifying all interested parties of a public comment period, and the opportunity for a hearing, is a vital component of the public participation process. Specific federal and state requirements are followed.

The MDEQ is required to provide legal notice of the proposed permit action in a local paper of general circulation. In addition, electronic communication is used. Copies of public participation documents are placed on the MDEQ web page. A notice of the pending permit action is also placed in the MDEQ calendar, which is sent to a large distribution list, on a bi-weekly basis.

The public participation documents are sent to persons on general and area mailing lists either via direct or electronic mail. These mailing lists include those who have been involved in previous public comment periods for sources in the area, local and state officials, applicable tribal entities, the USEPA, and depending upon the location of the facility, Canada, Illinois, Indiana, Ohio, and/or Wisconsin officials as well.

While not all permit applications are subject to the public participation process, a list of all applications under review at any given time is available by electronic query at the MDEQ web site www.MDEQ.state.mi.us/aps/PendApps.asp. This list is sent monthly to each board of County Commissioners.

Content of a Public Notice

The MDEQ issues one notice that covers the details of the proposed action, the public comment period, and the public hearing. The public notice includes the following information:

- Name and address of the facility;
- A brief description of the activity described in the permit application;
- Name, address, and telephone number of a person from whom interested persons may obtain further information, including copies of the draft permit, fact sheet, and application;
- A brief description of the comment procedures and the time and place of any hearing that will be held, including a statement of procedures to request a hearing if one has not already been scheduled, and other procedures by which the public may participate in the final permit decision;
- A brief description of the nature and purpose of the hearing.

Public Comment Period

The public is provided the opportunity to present input on the proposed draft permit, in writing, during the public comment period and verbally at a public hearing, if one is held. All substantive air quality-related comments received during the comment period and at the hearing, if held, are considered by the decision maker prior to a final permit action.

> **Public Input Process**
>
> Following are the components of the public input portion of the decision making process:
> - Public Comment Period
> - Public Hearing
> - Receipt of Public Comments
> - Informational Meetings

A public comment period lasts a minimum of 30 days. This time frame may be extended due to the complexity of the source, a request for a hearing, or the timing of the close of the comment period or hearing (i.e., if the 30th day falls on a Saturday, the comment period would end on the following Monday). All comments must be received by the MDEQ prior to the close of the comment period.

Informational Meetings

An informational meeting may be held to provide interested parties with the opportunity to ask questions of the MDEQ staff. Questions can range from the toxicological effects of the emissions to how often the company will be required to submit records to the MDEQ. The informational meeting may be held immediately preceding the hearing or on another day, depending upon the interest of the local community. The format can be a panel question and answer session or an open house format. Notice of the informational meeting is provided when the public comment period is announced.

Public Hearings

Public hearings provide the public with the opportunity to submit verbal testimony directly to the decision maker. Michigan administrative R 336.2817(2) requires that an opportunity for a public hearing be provided.

A minimum 30-day notice is required for a public hearing. The MDEQ will announce the date and time of the public hearing at the same time the comment period is announced. However, for the majority of the draft permits requiring public participation, the public hearing is announced with the phrase "if requested by [specific date]" and is held only if a written request for a hearing is received. In these cases, the hearing date is typically two or more days after the noticed close of the public comment period. This extension allows all interested parties to learn if a hearing request is received and if a hearing will be held. In instances where a hearing is held, the public comment period is automatically extended to the close of the public hearing.

The location for a public hearing is selected based upon many factors including the proximity to the facility, the size of the auditorium or room, and accessibility. A hearing officer oversees the public hearing. Per state requirements, a hearing officer must be a neutral and technically qualified person. The hearing officer is usually a MDEQ employee of another division or a MDEQ employee from another district or section. The decision maker for the permit is also in attendance.

At the public hearing, any person may submit oral or written statements concerning the draft permit. During the public hearing, the MDEQ will only receive comments on the proposed project. The MDEQ staff is available to answer questions if an informational meeting is held prior to the hearing. The MDEQ staff is also available to answer questions outside the hearing room during the hearing. Depending on the proposed project, representatives from other divisions within the MDEQ or other state and local agencies may also be in attendance.

The MDEQ asks each person attending the public hearing to fill out an attendance card. The purpose of the attendance card is to identify anyone who wishes to make a verbal statement on the record, to develop the mailing list of interested parties, and to notify those interested parties of the final decision.

During the public hearing, individuals are called by name to provide their testimony. A time limit may be imposed to ensure everyone who wishes to speak has the opportunity. Once all present have had the opportunity to place public comments on the record, the individuals who need more time will be allowed to continue their testimony. The public hearing is not closed until all individuals in attendance who wish to place public comment on the record have done so. All public hearings are recorded. The recording is kept on file and copies are available upon request.

Responding to Comments

The MDEQ considers all written comments submitted during the public comment period, as well as all comments provided at the public hearing. All of the written and verbal comments are reviewed to identify all significant air quality related comments. These comments may generate additional questions to be answered by the applicant, or additional technical review by staff.

All significant air quality comments are addressed in a response to comment (RTC) document. The purpose of the RTC document is to provide a response for all air quality related issues which were submitted during the public comment period, and whether the submitted comments resulted in changes to the permit conditions. The RTC document also identifies any additional technical analyses completed in response to comments received.

Permit Decision

After the close of the public comment period and the review of all comments received, a final permit decision is made by the decision-maker. The decision-maker will take one of the following actions:

- Deny the permit;
- Approve as drafted;
- Approve with amendments.

All interested parties, including those who were on the original mailing list, anyone who provided comments during the public comment period, and anyone who attended the public hearing and provided contact information, are directly notified of the decision. Whether the decision is to approve, approve with amendments, or deny, the action taken on the application is final and has immediate effect.

Appeals

In Michigan, a decision on a PSD permit may be appealed in one of two ways, depending on whether the source is new or existing.

For a new source, any person who is aggrieved by the issuance or denial of a PTI has the ability to appeal that action under section 324.5505(8) of Part 55 of the Natural Resources and Environmental Protection Act (NREPA), Act 451 of 1994 (as amended). Section 5505(8) states that,

> *"Any person may appeal the issuance or denial of a permit to install, a general permit, or a permit to operate authorized in rules promulgated under subsection (6), for a new source in accordance with section 631 of the revised judicature act of 1961, 1961 PA 236, MCL 600.631. Petitions of review shall be the exclusive means to obtain judicial review of such permit and shall be filed within 90 days after the final permit action, except that a petition may be filed after that deadline only if the petition is based solely on grounds arising after the deadline for judicial review. Such a petition shall be filed no later than 90 days after the new grounds for review arise."*

In essence, an appeal of a permit decision on a new source must be filed with the circuit court within the timeframes specified in section 5505(8).

For an existing source, any person who is aggrieved by the issuance or denial of a PTI has the ability to appeal that action under section 324.5506(14) of Part 55 of the Natural Resources and Environmental Protection Act (NREPA), Act 451 of 1994 (as amended). Section 5506(14) states that,

> *"A person who owns or operates an existing source that is required to obtain an operating permit under this section, a general permit, or a permit to operate authorized under rules promulgated under section 5505(6) may file a petition with the department for review of the denial of his or her application for such a permit, the revision of any emissions limitation, standard, or condition, or a proposed revocation of his or her permit. This review shall be conducted pursuant to the contested case and judicial review procedures of the administrative procedures act of 1969, Act No. 306 of the Public Acts of 1969, being sections 24.201 to 24.328 of the Michigan Compiled Laws.*
> *Any person may appeal the issuance or denial of an operating permit in accordance with section 631 of the revised judicature act of 1961, Act No. 236 of the Public Acts of 1961, being section 600.631 of the Michigan Compiled Laws. A petition for judicial review is the exclusive means of obtaining judicial review of a permit and shall be filed within 90 days after the final permit action. Such a petition may be filed after that deadline only if it is based solely on grounds arising after the deadline for judicial review and if the appeal does not involve applicable standards and requirements of the acid rain program under title IV. Such a petition shall be filed within 90 days after the new grounds for review arise."*

The applicant may file an appeal of a permit decision on an existing source first with the department under the contested case provisions of Act 306, and then if further challenge is warranted, with the circuit court. Appeals must be filed within the timeframes specified in section 5506(14).

Any person may appeal the decision to issue or deny a PTI for an existing source to the circuit court within the timeframes specified in section 5506(14).


appendix

Appendix
Acronyms

A2A	Actual to Actual
A2P	Actual To Potential
AQD	Air Quality Division
BACT	Best Available Control Technology
BAE	Baseline Actual Emissions
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
MDEQ	Department of Environmental Quality
EE	Excludable Emissions
EUSGU	Electric Utility Steam Generating Unit
GHGs	Greenhouse Gases
GWP	Global Warming Potential
HAP	Hazardous Air Pollutants
H_2S	Hydrogen Sulfide
H_2SO_4	Sulfuric Acid Mist
LAER	Lowest Achievable Emission Rate
LNB	Low NOx Burner
MAERS	Michigan Air Emission Reporting Sytem
MRR	Monitoring, Recordkeeping, and Reporting
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Pollutants
NMOC	Non-methane Organic Compounds
NOx	Nitrogen Oxides
NO_2	Nitrogen Dioxide
N_2O	Nitrous Oxide
NREPA	Natural Resources and Environmental Protection Act
NSPS	New Source Performance Standard
NSR	New Source Review
OAQPS	Office of Air Quality Planning and Standards
OEA	Office of Environmental Assistance
OLM	Ozone Limiting Method
PAE	Projected Actual Emissions
PAL	Plant Wide Applicability Limit
Pb	Lead
PEI	Projected Emission Increase
PM10	PM with Aerodynamic Diameter ≤10 microns
PM2.5	PM with Aerodynamic Diameter ≤ 2.5 microns
ppb	Parts Per Billion
ppm	Parts Per Million
ppmv	Parts Per Million on a Volume Basis
PTE	Potential To Emit

PTI	Permit to Install
RACT	Reasonably Available Control Technology
RBLC	RACT/BACT/LAER Clearinghouse
ROP	Renewable Operating Permit
SCRAM	Support Center for Regulatory Air Models
SIC	Standard Industrial Classification
SIL	Significant Impact Level
SIP	State Implementation Plan
SNCR	Selective Non-catalytic Reduction
SO_2	Sulfur Dioxide
TPY	Tons per year
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
VOCs	Volatile Organic Compounds