

TECHNICAL FACT SHEET

June 22, 2022

Purpose and Summary

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD), is proposing to act on Permit to Install (PTI) application No. APP-2022-0004 from Marathon Petroleum Company LP (Marathon). The permit application is for the proposed optimization of sulfur production at the two sulfur recovery units (SRUs) at Marathon's Detroit Refinery. The proposed project is subject to permitting requirements of the Department's Rules for Air Pollution Control. Prior to acting on this application, the AQD is holding a public comment period and a virtual public hearing to allow all interested parties the opportunity to comment on the proposed PTI. More information on how to comment and attend the virtual hearing can be found at Michigan.gov/EGLEAirPublicNotice. All relevant information received during the comment period and virtual hearing will be considered by the decision maker prior to taking final action on the application.

Background Information

Marathon owns and operates a petroleum refinery, known as the Detroit Refinery, located at [1001 South Oakwood Boulevard in Detroit, Michigan](#). Marathon removes sulfur from various process streams and sends the sulfur to the two SRUs to be converted to elemental sulfur. Marathon's current air permit limits the sulfur production at the North Plant SRU to 260 long tons per day and limits the sulfur production at the East Plant SRU to 130 long tons per day. In the United States a *long ton* equals 2,240 pounds, where a *ton* equals 2,000 pounds. Both of these limits are based on a 12-month rolling time period.

Note; in the [current air permit](#), these SRUs are referred to as "EU72-SULRBLOCK2-S1" and "EU42-43SULRECOV-S1", respectively.

Proposed Project

Marathon determined:

- The newer North Plant SRU can produce more sulfur than currently allowed by the air permit.
- The North Plant SRU is more efficient and results in lower air pollutant emissions per long ton of sulfur produced than the older East Plant SRU.

Marathon is proposing to have a total combined sulfur production limit for the two SRUs instead of separate limits for both the North Plant and East Plant SRUs. The East Plant SRU limit will not change but the North Plant SRU limit is proposed to be replaced with a combined limit of 390 long tons per day, based on a 12-month rolling time period. The overall allowed tons of sulfur would not change and reflects the sum of the current permitted sulfur production limits. This would allow Marathon to shift up to 130 long tons per day of sulfur production from the East Plant SRU to the North Plant SRU.

This project will not increase Marathon's crude oil throughput as the throughput limit in the current permit is not being changed.

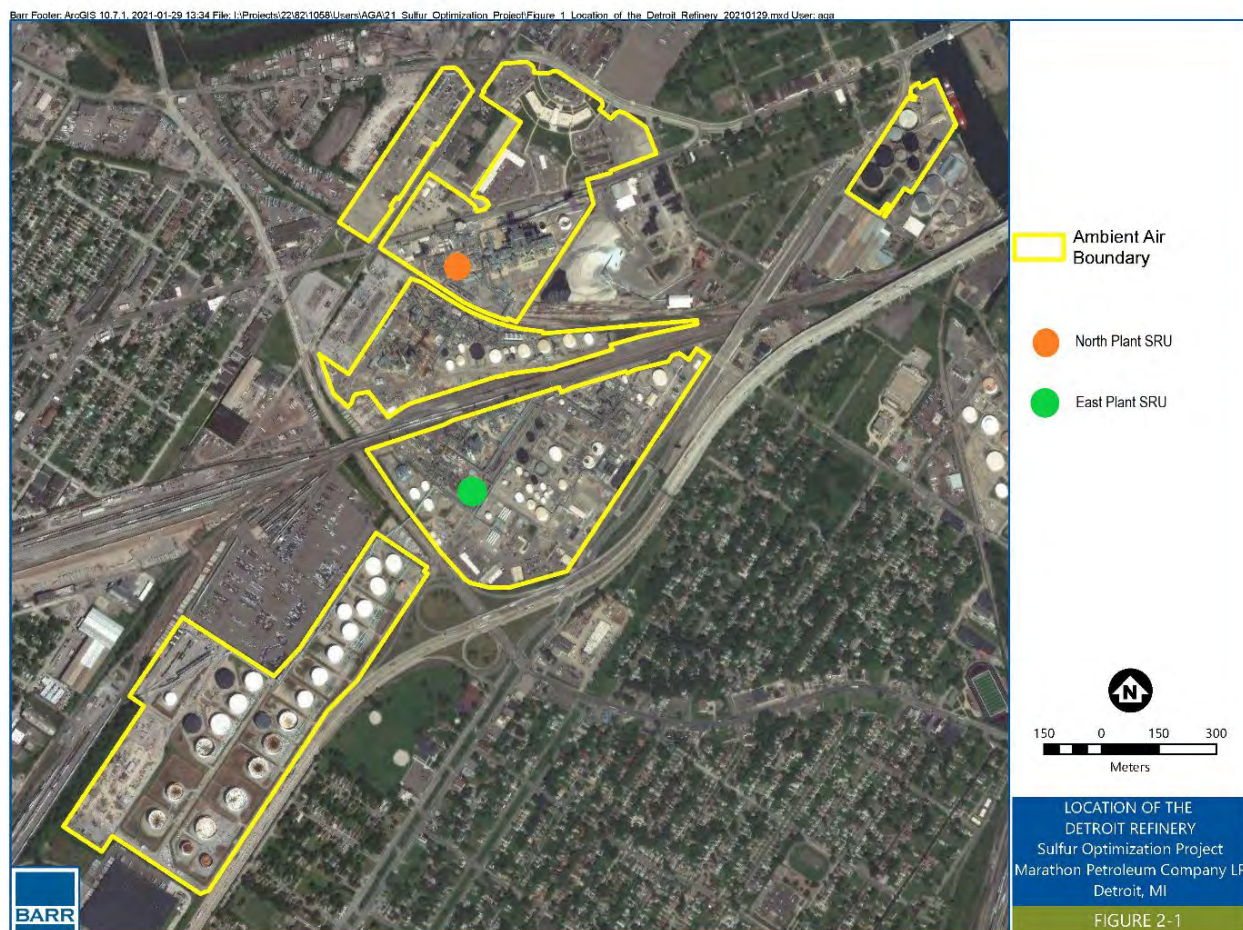


Figure 1: Location of SRUs at Marathon's Detroit Refinery

Present Air Quality

Marathon is located in the portion of Wayne County which is currently meeting all of the National Ambient Air Quality Standards (NAAQS) set by the United States Environmental Protection Agency (USEPA), except for [ozone and sulfur dioxide \(SO₂\)](#).

The [other](#) NAAQS are for particulate matter less than or equal to 10 microns in diameter (PM₁₀), particulate matter less than or equal to 2.5 microns in diameter (PM_{2.5}), carbon monoxide (CO), oxides of nitrogen (NO_x), and lead. All of the standards are set at levels designed to protect public health.

The AQD operates 11 [air monitoring stations](#) in Wayne County. The Trinity St. Marks station is one mile from Marathon and three other stations are within 2 miles of Marathon. The Trinity site measures NO₂, metals, CO, PM_{2.5}, SO₂, and black carbon. Ozone is regulated through its precursor's nitrogen oxides (NO_x) and VOCs. Marathon also operates [4 ambient air monitoring stations](#). Three are on the Marathon property and the fourth is located at Mark Twain Middle School. Marathon's monitors continuously measure SO₂, total reduced sulfur, CO, and particulate matter; VOCs are sampled every 6-days.

Pollutant Emissions

The following table provides the estimated emissions for the proposed project for each criteria pollutant:

Table 1 – Project Emissions Summary

Pollutant	Baseline Actual Emissions Tons per year (tpy)	Projected Actual Emissions (tpy)	Emissions Change (tpy)	Significant Emission Rate (SER) (tpy)	Emissions Change Greater than SER?
NO _x	21.0	10.6	-10.4	40	No
CO	5.5	3.3	-2.2	100	No
Particulate Matter (PM)	2.85	2.11	-0.74	25	No
PM ₁₀	5.4	3.9	-1.5	15	No
PM _{2.5}	5.4	3.9	-1.5	10	No
SO ₂	74.9	32.6	-42.3	40	No
Volatile Organic Compounds (VOCs)	0.57	0.39	-0.18	40	No
Sulfuric Acid Mist	6.56	6.12	-0.43	7	No
Hydrogen Sulfide (H ₂ S)	1.1	0.19	-0.92	10	No
Total Reduced Sulfur (TRS)	1.11	0.19	-0.92	10	No

How to evaluate this table: One thing to consider when looking at the information in this table, which may help with understanding its contents, is to look at whether the project emissions change is greater than the SER. If it is not, then that pollutant is not subject to Prevention of Significant Deterioration (PSD) or Nonattainment (NA) New Source Review (NSR). As shown in Table 1, Marathon is projecting a decrease in emissions for all criteria pollutants, so the project is not subject to PSD or NA NSR.

Key Permit Review Issues

Staff evaluated the proposed project to identify all state rules and federal regulations which are, or may be, applicable. The tables in Appendix 1 summarize these rules and regulations.

- **Minor/Major Modification Determination for Attainment Pollutants**

Marathon is in the portion of Wayne County which is currently in attainment for NO_x, CO, PM_{2.5}, PM₁₀, and lead. Marathon is an existing PSD major stationary source. If the source is modified and emissions of any regulated pollutant increase by more than the SER for that pollutant, the change will cause the project to be subject to PSD requirements for that pollutant. The proposed project is not subject to PSD because the emission change for

each regulated pollutant is less than the SER for that pollutant. Table 1 summarizes the proposed change in emissions for each regulated pollutant.

- **Minor/Major Modification Determination for Nonattainment Pollutants**

Marathon is located in the portion of Wayne which is currently nonattainment for ozone and SO₂. Marathon is a major source for VOC and NO_x, which are precursors for ozone, and SO₂. An increase in any of these pollutant emission rates above the SER results in the project being subject to major NA NSR review for that pollutant. As shown in Table 1, the proposed changes in VOC, NO_x, and SO₂ emissions due to the project are less than the SERs so the project is not subject NA NSR.

- **Federal NSPS Regulations**

New Source Performance Standards (NSPS) were established under Title 40 of the Code of Federal Regulations (40 CFR) Part 60. The SRUs are subject to the NSPS for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007, [40 CFR Part 60 Subpart Ja](#) (NSPS Ja). The proposed project will not affect the applicability of NSPS Ja. The current permit conditions for the SRUs contain the necessary conditions to ensure compliance and these conditions will not be changed. The SRUs are expected to continue to comply with NSPS Ja.

- **Federal NESHAP Regulations**

National Emission Standards for Hazardous Air Pollutants (NESHAP) were established under 40 CFR Part 61 or Part 63. The SRUs are subject to the NESHAP for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units, [40 CFR Part 63 Subpart UUU](#) (NESHAP UUU). The proposed project will not affect the applicability of NESHAP UUU. The current permit conditions for the SRUs contain the necessary conditions to ensure compliance and these conditions will not be changed. The SRUs are expected to continue to comply with NESHAP UUU.

- **Rule 224 TBACT Analysis**

Michigan Air Pollution Control Rule 224 requires Best Available Control Technology for toxic air contaminants (T-BACT). However, the requirements of Rule 224 do not apply to TACs that are VOCs and are in compliance with VOC BACT.

As discussed under “Rule 702 VOC Emissions”, the proposed project has been determined to be in compliance with Rule 702 BACT for VOCs, so the TACs that are VOCs are not subject to Rule 224.

The SRUs also emit TACs that are not VOCs: H₂S and sulfuric acid from the sulfur production and some trace metals from the combustion of natural gas in the thermal oxidizers.

The thermal oxidizers provide T-BACT for the H₂S emissions from the SRUs. No add on control is T-BACT for the relatively low emissions of sulfuric acid and non-VOC TACs related to natural gas combustion in the thermal oxidizers.

- **Rule 225 Toxics Analysis**

EGLE Rules for Air Pollution Control require the ambient air concentration of toxic air contaminants (TACs) be compared against health-based screening levels. AQD staff evaluated Marathon’s Rule 225 TAC emission information and air quality modeling.

The Rule 225 evaluation showed the proposed emission rates of most TACs are less than the Allowable Emission Rates (AERs) determined by Rule 227(1)(a) and, therefore, comply with the requirements of Rule 225.

For those TACs with proposed emission rates that exceed their AERs, Marathon conducted air dispersion modeling to determine the predicted ambient impacts (PAI) for those TACs. The AQD confirmed the results of Marathon's modeling, which showed the impacts to be less than the established health-based screening levels. Therefore, the emissions of these TACs comply with the requirements of Rule 225. Table 2 summarizes the modeling results.

Table 2 – TAC Modeling Results

TAC	Averaging Time	Screening Level (µg/m³)^A	Screening Level Type	SRU PAI (µg/m³)	Percent of Screening Level
Cadmium	Annual	0.0006	IRSL ^B	0.0000008	0.1
Sulfuric acid	1-hour	120	ITSL ^C	0.626	0.5
	Annual	1	ITSL	0.02	2.0
^A "µg/m ³ " refers to micrograms per cubic meter. ^B IRSL refers to the initial risk screening level. ^C ITSL refers to the initial threshold screening level.					

- **Rule 702 VOC Emissions**

This rule requires an evaluation of the following four items to determine which option will result in the lowest maximum allowable emission rate of VOCs:

- BACT or a limit listed by the department on its own initiative
- New Source Performance Standards (NSPS)
- VOC emission rate specified in another permit
- VOC emission rate specified in the Part 6 rules for existing sources

The evaluation determined that a Rule 702(a) VOC BACT analysis limit would dictate the lowest maximum allowable emission rate of VOC from the SRUs. The existing thermal oxidizers provide BACT for the SRUs, resulting in VOC emissions of less than one ton per year.

- **Criteria Pollutants Modeling Analysis**

Computer dispersion modeling was performed to predict how air emissions of SO₂, PM_{2.5}, and PM₁₀ from the SRUs would impact the area. Emissions were evaluated against the Significant Impact Levels (SILs), both for the currently permitted operations and for the proposed operation of the SRUs, with the North Plant SRU producing all of the sulfur. The impacts, shown in Tables 3 and 4 below, from both operating scenarios are below the SILs. Additionally, the impacts from the proposed scenario are the same as, or lower than, the current operating scenario.

For pollutants with impacts less than the SILs, the emissions are presumed to comply with the respective NAAQS and the PSD increment, and no further analysis is required. The NAAQS are intended to protect public health, including sensitive populations. PSD

increments are intended to allow industrial growth in an area, while ensuring that the area will continue to meet the NAAQS.

Table 3 – Current Operating Scenario SIL Modeling Results

Pollutant	Averaging Time	SIL ($\mu\text{g}/\text{m}^3$)	Current Predicted Impact ($\mu\text{g}/\text{m}^3$)	Percent of SIL (%)	Impact Below SIL?
SO ₂	1-hour	7.8	4.3	55.1	Yes
SO ₂	3-hour	25	4.0	16.0	Yes
SO ₂	24-hour	5	1.54	30.8	Yes
SO ₂	Annual	1	0.16	16.0	Yes
PM2.5	24-hour	1.2	0.412	34.3	Yes
PM2.5	Annual	0.2	0.056	28.1	Yes
PM10	24-hour	5	0.43	8.6	Yes
PM10	Annual	1	0.06	5.9	Yes

Table 4 – Proposed Operating Scenario SIL Modeling Results

Pollutant	Averaging Time	SIL ($\mu\text{g}/\text{m}^3$)	Project Predicted Impact ($\mu\text{g}/\text{m}^3$)	Percent of SIL (%)	Impact Below SIL?
SO ₂	1-hour	7.8	3.41	43.7	Yes
SO ₂	3-hour	25	3.13	12.5	Yes
SO ₂	24-hour	5	1.13	22.6	Yes
SO ₂	Annual	1	0.11	11.0	Yes
PM2.5	24-hour	1.2	0.406	33.8	Yes
PM2.5	Annual	0.2	0.04	21.2	Yes
PM10	24-hour	5	0.43	8.6	Yes
PM10	Annual	1	0.05	4.5	Yes

Key Aspects of Proposed Permit Conditions

The proposed permit conditions are based on the permit conditions for the two SRUs in Marathon's current Renewable Operating Permit, [MI-ROP-A9831-2012c](#). Only the changes proposed to the current permit conditions are discussed below.

- **Material Limits**

East Plant SRU (EU42-43SULRECOV-S1) - No changes are proposed to the sulfur production limits.

North Plant SRU (EU72-SULRBLOCK2-S1) - The sulfur production limit is proposed to be removed.

A new flexible group to combine the sulfur production limits for the two SRUs, (FGSULFURPROD-S1). This new limit, 390 long tons per day on a 12-month rolling average, is the sum of the current sulfur production limits for the two SRUs.

- **Monitoring and Recordkeeping Requirements**

The proposed permit includes the following requirements for the new flexible group (FGSULFURPROD-S1):

- Records of the long tons of elemental sulfur produced per day, on a 12-month rolling average, in FGSULFURPROD-S1 must be kept.
- Annual emissions of SO₂, VOC, and NO_x from FGSULFURPROD-S1 in tons per calendar year must be calculated and recorded. The proposed permit includes an appendix for these records.

- **Stack Restrictions**

The minimum stack height for the North Plant SRU (EU72-SULRBLOCK2-S1) was increased from 150 feet to 190 feet to reflect the actual existing stack height.

- **Reporting**

Marathon is required to submit records of the annual emissions of SO₂, VOC, and NO_x from FGSULFURPROD-S1 as required by Rule 1902(6).

Conclusion

Based on the analyses conducted to date, AQD staff concludes that the proposed project would comply with all applicable state and federal air quality requirements. AQD staff has determined that this project, as proposed, would not violate the federal NAAQS or the state and federal PSD Increments.

Based on these conclusions, AQD staff has developed proposed permit terms and conditions which would ensure the proposed facility design and operation are enforceable and sufficient monitoring, recordkeeping, and reporting would be performed by Marathon at the Detroit Refinery to determine compliance with these terms and conditions. If the permit application is deemed approvable, the delegated decision maker may determine a need for additional or revised conditions to address issues raised during the public participation process.

If you would like additional information about this proposal, please contact Andrew Drury, AQD, at 517-648-6663.

Appendix 1
STATE AIR REGULATIONS

State Rule	Description of State Air Regulations
R 336.1201	Requires an Air Use Permit for new or modified equipment that emits, or could emit, an air pollutant or contaminant. However, there are other rules that allow smaller emission sources to be installed without a permit (see Rules 336.1279 through 336.1290 below). Rule 336.1201 also states that the Department can add conditions to a permit to assure the air laws are met.
R 336.1205	Outlines the permit conditions that are required by the federal Prevention of Significant Deterioration (PSD) Regulations and/or Section 112 of the Clean Air Act. Also, the same types of conditions are added to their permit when a plant is limiting their air emissions to legally avoid these federal requirements. (See the Federal Regulations table for more details on PSD.)
R 336.1224	New or modified equipment that emits toxic air contaminants must use the Best Available Control Technology for Toxics (T-BACT). The T-BACT review determines what control technology must be applied to the equipment. A T-BACT review considers energy needs, environmental and economic impacts, and other costs. T-BACT may include a change in the raw materials used, the design of the process, or add-on air pollution control equipment. This rule also includes a list of instances where other regulations apply and T-BACT is not required.
R 336.1225 to R 336.1232	The ambient air concentration of each toxic air contaminant emitted from the project must not exceed health-based screening levels. Initial Risk Screening Levels (IRSL) apply to cancer-causing effects of air contaminants and Initial Threshold Screening Levels (ITSL) apply to non-cancer effects of air contaminants. These screening levels, designed to protect public health and the environment, are developed by Air Quality Division toxicologists following methods in the rules and U.S. EPA risk assessment guidance.
R 336.1279 to R 336.1291	These rules list equipment to processes that have very low emissions and do not need to get an Air Use permit. However, these sources must meet all requirements identified in the specific rule and other rules that apply.
R 336.1301	Limits how air emissions are allowed to look at the end of a stack. The color and intensity of the color of the emissions is called opacity.
R 336.1331	The particulate emission limits for certain sources are listed. These limits apply to both new and existing equipment.
R 336.1370	Material collected by air pollution control equipment, such as dust, must be disposed of in a manner, which does not cause more air emissions.
R 336.1401 and R 336.1402	Limit the sulfur dioxide emissions from power plants and other fuel burning equipment.
R 336.1601 to R 336.1651	Volatile organic compounds (VOCs) are a group of chemicals found in such things as paint solvents, degreasing materials, and gasoline. VOCs contribute to the formation of smog. The rules set VOC limits or work practice standards for existing equipment. The limits are based upon Reasonably Available Control Technology (RACT). RACT is required for all equipment listed in Rules 336.1601 through 336.1651.
R 336.1702	New equipment that emits VOCs is required to install the Best Available Control Technology (BACT). The technology is reviewed on a case-by-case basis. The VOC limits and/or work practice standards set for a particular piece of new equipment cannot be less restrictive than the Reasonably Available Control Technology limits for existing equipment outlined in Rules 336.1601 through 336.1651.
R 336.1801	Nitrogen oxide emission limits for larger boilers and stationary internal combustion engines are listed.

State Rule	Description of State Air Regulations
R 336.1901	Prohibits the emission of an air contaminant in quantities that cause injurious effects to human health and welfare, or prevent the comfortable enjoyment of life and property. As an example, a violation may be cited if excessive amounts of odor emissions were found to be preventing residents from enjoying outdoor activities.
R 336.1910	Air pollution control equipment must be installed, maintained, and operated properly.
R 336.1911	When requested by the Department, a facility must develop and submit a malfunction abatement plan (MAP). This plan is to prevent, detect, and correct malfunctions and equipment failures.
R 336.1912	A facility is required to notify the Department if a condition arises which causes emissions that exceed the allowable emission rate in a rule and/or permit.
R 336.2001 to R 336.2060	Allow the Department to request that a facility test its emissions and to approve the protocol used for these tests.
R 336.2801 to R 336.2804 Prevention of Significant Deterioration (PSD) Regulations Best Available Control Technology (BACT)	<p>The PSD rules allow the installation and operation of large, new sources and the modification of existing large sources in areas that are meeting the National Ambient Air Quality Standards (NAAQS). The regulations define what is considered a large or significant source, or modification.</p> <p>In order to assure that the area will continue to meet the NAAQS, the permit applicant must demonstrate that it is installing the BACT. By law, BACT must consider the economic, environmental, and energy impacts of each installation on a case-by-case basis. As a result, BACT can be different for similar facilities.</p> <p>In its permit application, the applicant identifies all air pollution control options available, the feasibility of these options, the effectiveness of each option, and why the option proposed represents BACT. As part of its evaluation, the Air Quality Division verifies the applicant's determination and reviews BACT determinations made for similar facilities in Michigan and throughout the nation.</p>
R 336.2901 to R 336.2903 and R 336.2908	<p>Applies to new "major stationary sources" and "major modifications" as defined in R 336.2901. These rules contain the permitting requirements for sources located in nonattainment areas that have the potential to emit large amounts of air pollutants. To help the area meet the NAAQS, the applicant must install equipment that achieves the Lowest Achievable Emission Rate (LAER). LAER is the lowest emission rate required by a federal rule, state rule, or by a previously issued construction permit. The applicant must also provide emission offsets, which means the applicant must remove more pollutants from the air than the proposed equipment will emit. This can be done by reducing emissions at other existing facilities.</p> <p>As part of its evaluation, the AQD verifies that no other similar equipment throughout the nation is required to meet a lower emission rate and verifies that proposed emission offsets are permanent and enforceable.</p>

FEDERAL AIR REGULATIONS

Citation	Description of Federal Air Regulations or Requirements
Section 109 of the Clean Air Act – National Ambient Air Quality Standards (NAAQS)	<p>The United States Environmental Protection Agency has set maximum permissible levels for seven pollutants. These NAAQS are designed to protect the public health of everyone, including the most susceptible individuals, children, the elderly, and those with chronic respiratory ailments. The seven pollutants, called the criteria pollutants, are carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter less than 10 microns (PM10), particulate matter less than 2.5 microns (PM2.5), and sulfur dioxide (SO₂). Portions of Michigan are currently non-attainment for either ozone or SO₂. Further, in Michigan, State Rules 336.1225 to 336.1232 are used to ensure the public health is protected from other compounds.</p>
40 CFR 52.21 – Prevention of Significant Deterioration (PSD) Regulations Best Available Control Technology (BACT)	<p>The PSD regulations allow the installation and operation of large, new sources and the modification of existing large sources in areas that are meeting the NAAQS. The regulations define what is considered a large or significant source, or modification.</p> <p>In order to assure that the area will continue to meet the NAAQS, the permit applicant must demonstrate that it is installing BACT. By law, BACT must consider the economic, environmental, and energy impacts of each installation on a case-by-case basis. As a result, BACT can be different for similar facilities.</p> <p>In its permit application, the applicant identifies all air pollution control options available, the feasibility of these options, the effectiveness of each option, and why the option proposed represents BACT. As part of its evaluation, the Air Quality Division verifies the applicant's determination and reviews BACT determinations made for similar facilities in Michigan and throughout the nation.</p>
40 CFR 60 – New Source Performance Standards (NSPS)	<p>The United States Environmental Protection Agency has set national standards for specific sources of pollutants. These New Source Performance Standards (NSPS) apply to new or modified equipment in a particular industrial category. These NSPS set emission limits or work practice standards for over 60 categories of sources.</p>
40 CFR 63— National Emissions Standards for Hazardous Air Pollutants (NESHAP)	<p>The United States Environmental Protection Agency has set national standards for specific sources of pollutants. The National Emissions Standards for Hazardous Air Pollutants (NESHAP) (a.k.a. Maximum Achievable Control Technology (MACT) standards) apply to new or modified equipment in a particular industrial category. These NESHAPs set emission limits or work practice standards for over 100 categories of sources.</p>
Section 112 of the Clean Air Act Maximum Achievable Control Technology (MACT) Section 112g	<p>In the Clean Air Act, Congress listed 189 compounds as Hazardous Air Pollutants (HAPS). For facilities which emit, or could emit, HAPS above a certain level, one of the following two requirements must be met:</p> <ol style="list-style-type: none"> 1) The United States Environmental Protection Agency has established standards for specific types of sources. These Maximum Achievable Control Technology (MACT) standards are based upon the best-demonstrated control technology or practices found in similar sources. 2) For sources where a MACT standard has not been established, the level of control technology required is determined on a case-by-case basis.

Notes: An "Air Use Permit," sometimes called a "Permit to Install," provides permission to emit air contaminants up to certain specified levels. These levels are set by state and federal law, and are set to protect health and welfare. By staying within the levels set by the permit, a facility is operating lawfully, and public health and air quality are protected.

The Air Quality Division does not have the authority to regulate noise, local zoning, property values, off-site truck traffic, or lighting.

These tables list the most frequently applied state and federal regulations. Not all regulations listed may be applicable in each case. Please refer to the draft permit conditions provided to determine which regulations apply.