

STATE OF MICHIGAN  
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**PUBLIC PARTICIPATION DOCUMENTS**  
For

Waste Management of Michigan, Inc.  
(Pine Tree Acres Landfill)  
36600 29 Mile Road  
Lenox Township, Michigan

**PERMIT APPLICATION NUMBER**

**233-09**

**January 27, 2010**

## **FACT SHEET**

January 27, 2010

### **Purpose and Summary**

The Michigan Department of Natural Resources and Environment (MDNRE), Air Quality Division (AQD), is proposing to act on Permit to Install (PTI) application No. 233-09 from Waste Management of Michigan, Inc. (Waste Management). The permit application is for the proposed installation and operation of eight (8) reciprocating internal combustion engines that will be fueled by landfill gas. Each engine will drive an associated generator set for the purpose of electricity generation. Also proposed for installation and operation are two (2) enclosed flares for combusting landfill gas and one open flare which is a back-up flare that will only be operated during times of maintenance or malfunction of the other flares or engines. Included in the proposed permit are three (3) existing open flares that were previously installed but were exempt from the requirement to obtain a PTI.

The proposed project is subject to the following regulations:

- Michigan Department of Natural Resources and Environment (Department) Rules for Air Pollution Control
- Prevention of Significant Deterioration (PSD) regulations
- New Source Performance Standards (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAP) for area sources
- National Ambient Air Quality Standards (NAAQS)

Prior to acting on this application, the AQD is holding a 30-day public comment period and a public hearing to allow all interested parties the opportunity to comment on the proposed PTI. All relevant information received during the comment period and hearing will be considered by the decision maker prior to taking final action on the application.

### **Background Information**

Waste Management currently runs the Pine Tree Acres landfill located in Lenox Township, Macomb County, Michigan. Currently, Waste Management operates three (3) open flares at the landfill to combust the landfill gas, as required by the New Source Performance Standard (NSPS), 40 CFR Part 60 Subpart WWW. Waste Management treats the landfill gas to remove water and particulate matter prior to flaring the gas. Three open flares, which were previously installed but were exempt from the requirement to obtain a PTI, have been included in the flare section of the proposed permit as part of the flexible group, FGFLARES.

### **Proposed Project**

Waste Management has proposed to install eight Caterpillar Spark ignition, lean burn, reciprocating internal combustion engines (Caterpillar G3520C, rated at 2,233 brake horsepower at 100 percent load) for combusting the treated landfill gas to produce electricity. Each engine will drive an associated generator set to produce the electricity. Each generator set is rated to produce 1.6 megawatts gross electrical output. Additionally, Waste Management has proposed to install two additional enclosed flares (Flares 4 and 6) and one back-up open flare (Flare 5). The back-up flare shall only be operated when any of the other equipment is down.

**Present Air Quality**

The proposed location for this project is Lenox Township in Macomb County, Michigan. Macomb County is currently in compliance with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants except particulate matter less than 2.5 microns (PM2.5), which is designated as nonattainment.

**Key Permit Review Issues**

- **Minor Modification for Nonattainment Pollutants** - The facility is located in Macomb County which is currently designated as a nonattainment area for PM2.5. The facility is currently not a major source of PM2.5 or sulfur dioxide (SO<sub>2</sub>) (precursor to PM2.5) and the addition of the eight engines and the two flares will not exceed 100 tons per year (TPY) for either pollutant, therefore, the project is not subject to new source review for nonattainment areas under Part 19 of the Department Rules and the federal requirements as defined under 40 CFR Part 51, Appendix S.
- **Major Modification for Attainment Pollutants** - The facility is a major stationary source. This determination was made based on whether any one of the criteria pollutants emitted from the facility has the potential to be emitted at 250 TPY or more. Carbon monoxide (CO) emissions from the facility exceed 250 TPY based on the permitted limit for the existing seven engines located on site (operated by Sumpter Energy) of 224 TPY and the potential to emit of CO from the existing flares.

The criteria pollutants that will be emitted from the engines and flares will exceed the PSD significant levels. Any pollutant emitted at greater than significant levels would make this project a significant emissions increase as defined under both Part 18 of the Department Rules for PSD and the federal requirements as defined under 40 CFR Part 52.21. The table below shows that the PM, PM10, SO<sub>2</sub>, nitrogen oxides (NO<sub>x</sub>) and CO emissions are significant. Thus, the federal and state PSD requirements apply to the PM, PM10, SO<sub>2</sub>, NO<sub>x</sub> and CO emissions from the project.

<b>Proposed Emissions Increases Versus Significant Emissions Increases</b>			
<b>Pollutant</b>	<b>Potential Emissions Tons per Year</b>	<b>PSD Significant Level Tons per Year</b>	<b>Subject to PSD?</b>
PM	60.1*	25	Yes
PM10	60.1	15	Yes
SO <sub>2</sub>	99.4**	40	Yes
NO <sub>x</sub>	173.1	40	Yes
CO	801.3	100	Yes
VOC	12.4	40	No
Lead	N/A	0.6	No
H <sub>2</sub> S**	N/A	10	No
H <sub>2</sub> SO <sub>4</sub>	N/A	7	No
Fluorides	N/A	3	No
VOC – Volatile Organic Compounds; H <sub>2</sub> S = Hydrogen Sulfide; H <sub>2</sub> SO <sub>4</sub> = Sulfuric Acid * Assumes PM is equal to PM10. ** Sulfur bearing compounds are oxidized at normal engine operating temperatures forming SO <sub>2</sub> .			

Note: the back-up flare emissions were evaluated and determined to not contribute to the total increase in emissions from the project because the emissions from the back-up flare will only occur during periods of malfunction or maintenance of other equipment (as required in the permit). The criteria pollutant emissions from the back-up flare were equivalent to or less than the criteria pollutant emissions from the other equipment.

- **PSD Regulations** – The project is subject to review under the PSD regulations which require Best Available Control Technology (BACT), a source impact analysis, an air quality impact analysis, and an additional impact analysis for each regulated air pollutant for which the project will result in significant emissions.
  - PSD BACT determination for CO and NO<sub>x</sub> for the engines was based on test data for similar engines, vendor data, review of the RACT/BACT/LAER Clearinghouse and additional analysis. BACT for these engines has been determined to be an emission limitation and good combustion practices with the use of an air to fuel ratio controller. The PSD BACT limit is based on what has been demonstrated as achieved in practice and includes an adequate margin for compliance.
  - PSD BACT for PM and PM<sub>10</sub> for the engines has been determined to be an emission limitation, good combustion practices and the burning of landfill gas that has been treated according to the requirements of the NSPS, 40 CFR Part 60, Subpart WWW.
  - PSD BACT for SO<sub>2</sub> for the engines has been determined to be the addition of a sulfur removal treatment system prior to the engines burning the gas. The total reduced sulfur of the landfill gas will be monitored to determine if the sulfur removal system is maintaining the total reduced sulfur of the landfill gas to less than 165 ppmv.
  - PSD BACT for the two new enclosed flares for CO and NO<sub>x</sub> has been determined to be an emission limitation and good combustion practices for the flares. BACT for the two flares for SO<sub>2</sub> has been determined to be the addition of a sulfur removal treatment system prior to flaring the gas. The total reduced sulfur of the landfill gas will be monitored to determine if the sulfur removal system is maintaining the total reduced sulfur of the landfill gas to less than 165 ppmv. BACT for PM and PM<sub>10</sub> has been determined to be an emission limitation, good combustion practices and the burning of landfill gas that has been treated according to the requirements of the NSPS, 40 CFR Part 60 Subpart WWW.
- **Criteria Pollutants Modeling Analysis** – Modeling submitted by the applicant verified that applicable impacts are less than the National Ambient Air Quality Standard and PSD increment. Dispersion modeling was performed for emissions of CO to show compliance with the Significant Impact Levels (SILs) for CO. Because the maximum predicted impacts for CO were below their respective SILs, impacts from the engines and flares will not be considered to cause or contribute to any federal air quality violations; therefore, further National Ambient Air Quality Standards (NAAQS) analysis was not required for CO. Dispersion modeling was also performed for emissions of PM<sub>10</sub>, NO<sub>x</sub> and SO<sub>2</sub>. For NO<sub>x</sub> and SO<sub>2</sub>, the maximum impacts were well below 80 percent of PSD increment. Combined impacts for full increment and NAAQS were also well below applicable thresholds. For PM<sub>10</sub>, impacts were insignificant for annual impacts but significant for 24-hour impacts. Using the 6<sup>th</sup> highest impact over a five year period, the overall NAAQS impact was 71.3 percent of the federal 24-hour threshold. The PSD increment review indicated a potential violation of the PSD increment 24-hour threshold. These predicted impacts were caused by

landfill road fugitives. Additional analysis demonstrated that Waste Management would never contribute significantly to any receptor which showed a modeling violation. As such, Waste Management would not cause or contribute to any potential violations at these receptors. See Appendix A for air dispersion modeling results for criteria pollutants.

- **Additional Impact Analysis** - An analysis is necessary to evaluate the impacts from the proposed project for soils, vegetation, visibility and growth. The facility demonstrated that the project will not result in unfavorable secondary impacts. This was determined to be acceptable due to the fact that the impacts from the project, as determined through dispersion modeling, are below the applicable standards; therefore, it is assumed not to cause unfavorable secondary impacts.
- **Rule 225 Air Toxics** – This state only enforceable rule requires an evaluation of the emitted toxic air contaminants (TACs) to determine if their ground-level concentration meets health-based screening levels. Because of the wide range of trash that is placed in a landfill, there are many different air contaminants that can be formed by the decomposition of the trash. These air contaminants were identified and an analysis of the emissions of these air contaminants and those air contaminants that could be formed from combustion of the landfill gas were evaluated with air dispersion modeling. The modeling resulted in impacts that comply with the requirements of Rule 225 with the highest impact being 20 percent of the respective screening level. See Table 4 in Appendix A for the results of the air dispersion modeling for toxics.
- **Federal NSPS Regulations** – The engines will be subject to the New Source Performance Standards (NSPS) for Stationary Spark Ignition Internal Combustion Engines which are established under Title 40 of the Code of Federal Regulations (40 CFR) Part 60, Subpart JJJJ. Waste Management will install engines that are certified to meet the requirements of NSPS Subpart JJJJ or will be required to meet the emission limits and testing and monitoring requirements of NSPS Subpart JJJJ.
- **Federal NESHAP Regulations** – Standards for Hazardous Air Pollutants (HAPs) were established under 40 CFR Parts 61 and 63. The engines will also be subject to the NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE) located at major sources of hazardous air pollutant emissions, 40 CFR Part 63, Subpart A and Subpart ZZZZ (RICE MACT). Waste Management has chosen to purchase and install engines that will meet the requirements of NSPS Subpart JJJJ. Meeting the requirements of NSPS JJJJ ensures compliance with the major source RICE MACT.
- **Rule 702 VOC Emissions** – This rule requires an evaluation of the following four items to determine what will result in the lowest maximum allowable emission rate of volatile organic compounds (VOC):
  - a. BACT or a limit listed by the department on its own initiative
  - b. New Source Performance Standards (NSPS)
  - c. VOC emission rate specified in another permit
  - d. VOC emission rate specified in the Part 6 rules for existing sources

An evaluation of these four items determined that a VOC BACT limit (702(a)) analysis would dictate the lowest maximum allowable emission rate of VOC from the engines based on

burning landfill gas that has been treated according to the requirements of the landfill NSPS, 40 CFR Part 60, Subpart WWW.

Additionally, the two new enclosed flares meet Rule 702(b) requirements by meeting the requirements of the NSPS, 40 CFR Part 60, Subpart WWW by testing to show that the flares are achieving a minimum destruction efficiency or maximum outlet concentration for non methane organic compounds (NMOC). By achieving the minimum destruction efficiency or maximum outlet concentration of NMOCs, the resulting VOC emissions will result in the lowest maximum allowable emission rate of VOCs.

### **Key Aspects of Draft Permit Conditions**

- **Emission Limits** – For each compressor engine, the proposed permit includes a concentration limit and an hourly emission limit for PSD BACT for PM, PM10, CO, and NOx. For each new enclosed flare, the proposed permit includes an hourly PSD BACT emission limit for PM10, and a PSD BACT concentration limit for CO and NOx. Hourly SO<sub>2</sub> limits for both the engines and flares are included to meet PSD BACT requirements.
- **Control Requirements** - The applicant will be required to install a sulfur removal system to pre-treat the landfill gas which will be burned in the engines and flares. This pre-treatment system is required to meet PSD BACT requirements for SO<sub>2</sub>.
- **Federal Regulations** - Emission limits for NOx, CO, and VOCs that are the equivalent or less than the NSPS limits, and testing and monitoring requirements for demonstrating initial and on-going compliance have been included in the proposed permit for each engine to comply with the requirements of the federal NSPS as specified in 40 CFR Part 60, Subpart JJJJ.
- **Federal Regulations** - Each engine must comply with the requirements of the federal NESHAP, as specified in 40 CFR Part 63, Subpart A and Subpart ZZZZ, for Stationary Reciprocating Internal Combustion Engines. The proposed permit includes requirements for demonstrating initial and on-going compliance.
- **Process/Operational Restrictions** – The applicant must submit and implement a malfunction abatement/preventative maintenance program for the engines and flares.
- **Testing** - Testing requirements have been included to demonstrate compliance with the PM, PM10, NOx, SO<sub>2</sub>, and CO emission limits for the engines. Testing requirements have also been included to demonstrate compliance with the CO and NOx emission limits for the two enclosed flares.
- **Monitoring** - The proposed permit includes a gas sampling protocol for demonstrating compliance with the SO<sub>2</sub> limits by verifying the total reduced sulfur/hydrogen sulfide content of the landfill gas. Continuous monitoring and recordkeeping requirements for landfill gas usage of the engines and flares and the hours of operation of the engines is also included.

### **Conclusion**

Based on the analyses conducted to date, staff concludes that the proposed project would comply with all applicable state and federal air quality requirements. Staff also concludes that this project, as proposed, would not violate the federal National Ambient Air Quality Standards.

Based on these conclusions, staff has developed draft permit terms and conditions which would ensure that the proposed facility design and operation are enforceable and that sufficient monitoring, recordkeeping, and reporting would be performed by the applicant 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 Mr. Jeffrey Rathbun, AQD, at 517-241-8072.

## Appendix A - Air Quality Impact Analysis

### TOPOGRAPHY AND METEOROLOGICAL DATA

The topography surrounding the Waste Management, Pine Tree Acres facility is mainly flat in nature. However there are some terrain features in the area and digital elevation model data was used to assign terrain heights to each receptor modeled. The AERMOD model was run using surface meteorological data from the Selfridge AFB (station id 14845) and upper air data from White Lake (station id 72632). For the criteria pollutants CO, NO<sub>x</sub>, SO<sub>2</sub> and PM<sub>10</sub>, five years (2004-2008) of meteorological data were used. Five years of meteorological data (2004-2008) was also used to perform generic one pound per hour modeling for the toxic air contaminant (TAC) analysis. (See Table 4)

### SIGNIFICANT IMPACT ANALYSIS

All air use permit applications for major sources or major modifications of criteria pollutants in an attainment or unclassified area must submit PSD increment modeling for NO<sub>x</sub>, SO<sub>2</sub>, and PM<sub>10</sub> along with NAAQS modeling for CO, NO<sub>x</sub>, SO<sub>2</sub> and PM<sub>10</sub>. The modeling analysis involves two phases: (1) a preliminary analysis, and (2) a full impact analysis. The preliminary analysis models only the significant increase in potential emissions from a proposed new source or the significant "net" increase from a proposed modification. If it can be demonstrated that these emissions would not increase ambient concentrations by more than the prescribed Significant Impact Level (SIL), based on the first high impact, no further modeling would be required. Modeling for the significant impact analysis showed that the operation of the engines and flares would not produce ambient concentrations of CO greater than the applicable SILs. NO<sub>x</sub>, SO<sub>2</sub> and PM<sub>10</sub> modeling were above significance; therefore, more refined modeling was performed for all. Table 1 below shows the modeled impact and the SILs for CO, NO<sub>x</sub>, PM<sub>10</sub> and SO<sub>2</sub>.

**Table 1 - Significant Impact Levels**

Pollutant	Averaging Time	Significant Impact Level (µg/m <sup>3</sup> )	Modeled Impact (µg/m <sup>3</sup> )
CO	8-hr	500	200.6
CO	1-hr	2000	289.3
NO <sub>x</sub>	Annual	1	1.39
SO <sub>2</sub>	Annual	1	0.48
SO <sub>2</sub>	24-hr	5	7.14
SO <sub>2</sub>	3-hr	25	15.47
PM <sub>10</sub>	24-hr	5	8.84
PM <sub>10</sub>	Annual	1	0.54

### PSD INCREMENT ANALYSIS

PSD regulations require that facilities perform a PSD increment analysis for all post-baseline pollutant emission increases for which the impact from the proposed project exceeds the SIL. Specifically, the impact from the proposed project is combined with the impact of nearby post-baseline sources must be modeled to determine if the PSD increment levels for any pollutant will be exceeded. For the Waste Management proposed project, SO<sub>2</sub>, NO<sub>x</sub> and PM<sub>10</sub> were modeled for increment compliance.

SO<sub>2</sub>, NO<sub>x</sub> and PM<sub>10</sub> modeling was performed for the new installation at the Waste Management facility (eight engines and two enclosed flares). The predicted ambient impacts (PAI) for these sources exceed the SIL so further analysis was required. The AERMOD model was rerun with the addition of other nearby increment consuming sources to determine compliance with the SO<sub>2</sub>, NO<sub>x</sub> and PM<sub>10</sub> increments. As shown in Table 2, the predicted SO<sub>2</sub>, NO<sub>x</sub> and PM<sub>10</sub> impacts from the proposed project plus other nearby increment consuming sources do not exceed PSD increment levels for those pollutants except for the 24-hour averaging period for PM<sub>10</sub>.

Because of this, a culpability analysis was performed following the guidance outlined in the July 5, 1988 memorandum to the Director of the Air Management Division from the Director of Office of Air Quality Planning and Standards. This memo states "...a modeled violation of a NAAQS or PSD increment may be predicted within the impact area, but, upon further analysis, it is determined that the proposed source will not have a significant impact (i.e., will not be above de minimis levels) at the point and time of the modeled violation. When this occurs, the proposed source may be issued a permit (even when a new violation would result from its insignificant impact), but the State must also take the appropriate steps to substantiate the NAAQS or increment violation..." The culpability analysis detailed below was done to ensure the impacts from this proposed project are below significance at the point and time when the increment violations are occurring.

For the PM<sub>10</sub> 24-hour culpability analysis, the contributing impacts from the proposed project were examined at each receptor which exceeded the increment threshold anytime during any of the five modeled years (2004-2008). The maximum contributing impact from the proposed project to any exceeding receptor was 2.48 ug/m<sup>3</sup>, half of the significant impact threshold. As such, the proposed project would not cause or contribute to any potential violation of the PSD increment.

**Table 2 - PSD Increment Summary**

Pollutant	Averaging Time	PSD Increment (µg/m <sup>3</sup> )	PAI from Proposed Project (New Installation) (µg/m <sup>3</sup> )	PAI from Proposed Project + all Other Sources (µg/m <sup>3</sup> )
PM <sub>10</sub>	24-hr	30	8.84	79
PM <sub>10</sub>	Annual	17	0.54	8.28
NO <sub>2</sub>	Annual	25	1.39	14.01
SO <sub>2</sub>	24-hr	91	7.14	19.29
SO <sub>2</sub>	3-hr	512	15.47	49.32
SO <sub>2</sub>	Annual	20	0.48	1.87

**NAAQS ANALYSIS**

The PSD regulations require projects that are expected to result in a significant emissions increase of a criteria pollutant be modeled to determine compliance with the NAAQS. For the Waste Management project, SO<sub>2</sub>, NO<sub>x</sub> and PM<sub>10</sub> are expected to have significant emissions increases and modeling was performed. The predicted impacts for SO<sub>2</sub>, NO<sub>x</sub> and PM<sub>10</sub> were above the SIL, therefore a more detailed modeling analysis was required.

In order to comply with the NAAQS, the proposed sources at the Waste Management facility were modeled together with all nearby sources in the area which may contribute significant impacts regardless of installation date. This combined impact was then added to background concentrations as derived from representative air monitors. The overall combined impacts for all pollutants were below applicable NAAQS thresholds for all averaging periods. Table 3 shows the modeled impact and NAAQS compliance for NO<sub>x</sub>, PM<sub>10</sub> and SO<sub>2</sub>.

**Table 3 - National Ambient Air Quality Standards (NAAQS) Summary**

<b>Pollutant</b>	<b>Averaging Time</b>	<b>PSD Increment (µg/m<sup>3</sup>)</b>	<b>PAI from Proposed Project (New Installation) (µg/m<sup>3</sup>)</b>	<b>PAI from Proposed Project + all Other Sources + Background (µg/m<sup>3</sup>)</b>
PM <sub>10</sub>	24-hr	150	8.84	106.88
PM <sub>10</sub>	Annual	50	0.54	8.28
NO <sub>2</sub>	Annual	100	1.39	40.76
SO <sub>2</sub>	24-hr	365	7.14	139.0
SO <sub>2</sub>	3-hr	1300	15.47	323.3
SO <sub>2</sub>	Annual	80	0.48	17.9

**Table 4 – Rule 225 Air Toxics Analysis**

**1.0 lb/hr Modeled Impacts**

Averaging Period	Engines	Flare4	Flare6
	Impact ( $\mu\text{g}/\text{m}^3 / 1 \text{ lb/hr}$ )	Impact ( $\mu\text{g}/\text{m}^3 / 1 \text{ lb/hr}$ )	Impact ( $\mu\text{g}/\text{m}^3 / 1 \text{ lb/hr}$ )
1 hour	17.750	0.565	0.284
8 hour	12.238	0.262	0.151
24 hour	7.361	0.111	0.173
Annual	0.459	0.006	0.010

**Ground Level Concentrations with Screening Level Comparisons**

TAC / HAP	CAS	Engines Ambient Impact ( $\mu\text{g}/\text{m}^3$ )	Flare4 Ambient Impact ( $\mu\text{g}/\text{m}^3$ )	Flare6 Ambient Impact ( $\mu\text{g}/\text{m}^3$ )	Total Ambient Impact ( $\mu\text{g}/\text{m}^3$ )	ITSL ( $\mu\text{g}/\text{m}^3$ )	Averaging Period	% of ITSL	IRSL ( $\mu\text{g}/\text{m}^3$ )	Total Annual Ambient Impact ( $\mu\text{g}/\text{m}^3$ )	% of IRSL
Acrylonitrile	107131	3.14E-02	1.74E-04	5.51E-04	3.21E-02	2	24 hour	1.6	0.01	2.00E-03	20.0
Benzene	71432	1.39E-02	7.74E-05	2.45E-04	1.43E-02	30	24 hour	0.0	0.1	8.87E-04	0.9
Carbon disulfide	75150	4.12E-03	2.29E-05	7.24E-05	4.22E-03	700	24 hour	0.0			
Carbon tetrachloride	56235								0.07	1.95E-06	0.0
Carbonyl sulfide	463581	1.72E-04	8.51E-07	2.68E-06	1.75E-04	9	Annual	0.0			
Chlorobenzene	108907	1.32E-03	2.92E-05	9.23E-05	1.45E-03	70	24 hour	0.0			
Chloroform	67663								0.4	1.14E-05	0.0
1,4-Dichlorobenzene	106467	1.45E-03	3.20E-05	1.01E-04	1.59E-03	800	24 hour	0.0	0.14	9.80E-05	0.1
1,1-Dichloroethane (Ethylidene dichloride)	75343	1.09E-02	2.41E-04	7.63E-04	1.19E-02	500	24 hour	0.0			
1,1-Dichloroethene (Vinylidene chloride)	75354	9.12E-04	2.01E-05	6.36E-05	9.96E-04	200	24 hour	0.0			
1,2-Dichloroethane (Ethylene dichloride)	107062								0.04	1.29E-04	0.3
t-1,2-Dichloroethene	156605	1.30E-02	2.86E-04	9.03E-04	1.41E-02	70	24 hour	0.0			
Dichloromethane (Methylene chloride)	75092								2	3.86E-03	0.2
1,2-Dichloropropane (Propylene dichloride)	78875	9.57E-04	2.11E-05	6.67E-05	1.04E-03	4	24 hour	0.0			
Ethylbenzene	100414	4.57E-02	2.54E-04	8.03E-04	4.68E-02	1000	24 hour	0.0	3	2.91E-03	0.1
Ethylchloride (Chloroethane)	75003	3.79E-03	8.37E-05	2.65E-04	4.14E-03	10000	24 hour	0.0			
Ethylene dibromide (Dibromoethane)	106934	8.84E-06	1.95E-07	6.16E-07	9.65E-06	9	24 hour	0.0	0.002	5.96E-07	0.0

TAC / HAP	CAS	Engines Ambient Impact (µg/m <sup>3</sup> )	Flare4 Ambient Impact (µg/m <sup>3</sup> )	Flare6 Ambient Impact (µg/m <sup>3</sup> )	Total Ambient Impact (µg/m <sup>3</sup> )	ITSL (µg/m <sup>3</sup> )	Averaging Period	% of ITSL	IRSL (µg/m <sup>3</sup> )	Total Annual Ambient Impact (µg/m <sup>3</sup> )	% of IRSL
Hexane	110543	5.29E-02	2.94E-04	9.29E-04	5.41E-02	700	24 hour	0.0			
Hydrogen chloride (HCl)	7647010	6.24E-01	4.82E-02	1.52E-01	8.25E-01	20	24 hour	4.1			
Mercury <sup>2</sup>	7439976	2.46E-06	1.69E-07	5.33E-07	3.16E-06	0.3	Annual	0.0			
Methyl chloride (Chloromethane)	74873	2.87E-03	6.34E-05	2.00E-04	3.14E-03	90	24 hour	0.0	1.6	1.94E-04	0.0
Methyl isobutyl ketone (Hexone)	108101	1.75E-02	9.72E-05	3.07E-04	1.79E-02	3000	24 hour	0.0			
1,1,1-Trichloroethane (Methyl chloroform)	71556	3.01E-03	6.65E-05	2.10E-04	3.29E-03	6000	24 hour	0.0			
1,1,2,2-Tetrachloroethane	79345								0.02	5.92E-04	3.0
Tetrachloroethylene (Perchloroethylene)	127184								1.7	1.96E-03	0.1
Toluene	108883	3.38E-01	1.88E-03	5.94E-03	3.46E-01	5000	24 hour	0.0			
Trichlorethene (Trichloroethylene)	79016								0.6	1.18E-03	0.2
Vinyl Chloride	75014	2.16E-02	4.76E-04	1.51E-03	2.36E-02	100	24 hour	0.0	0.11	1.46E-03	1.3
Xylenes	1330207	1.20E-01	6.67E-04	2.11E-03	1.23E-01	100	24 hour	0.1			
Acetone	67641	6.32E-02	4.98E-04	5.84E-04	6.43E-02	5900	8 hour	0.0			
Bromodichloromethane	75274								0.027	1.63E-03	6.0
Butane	106978	4.54E-02	3.58E-04	4.20E-04	4.62E-02	23800	8 hour	0.0			
Chlorodifluoromethane	75456	5.29E-03	1.17E-04	3.69E-04	5.77E-03	50000	24 hour	0.0			
Dichlorodifluoromethane	75718	1.48E-01	4.64E-03	5.45E-03	1.59E-01	49500	8 hour	0.0			
Dichlorofluoromethane	75434	2.11E-02	6.60E-04	7.74E-04	2.25E-02	400	8 hour	0.0			
Dimethyl sulfide (methyl sulfide)	75183	2.83E-03	1.40E-05	4.42E-05	2.89E-03	7	Annual	0.0			
Ethanol (ethyl alcohol)	64175	9.80E-02	3.07E-03	3.60E-03	1.05E-01	19000	8 hour	0.0			
Ethyl mercaptan (Ethanethiol) <sup>1</sup>	75081								0.1	8.43E-04	0.8
Hydrogen sulfide	7783064	1.13E-01	6.28E-04	1.98E-03	1.16E-01	2	24 hour	5.8			
Methyl ethyl ketone	78933	4.78E-02	2.65E-04	8.39E-04	4.89E-02	5000	24 hour	0.0			
Methyl mercaptan	74931	2.70E-02	3.16E-04	3.23E-04	2.76E-02	10	1 hour	0.3			
Pentane	109660	3.69E-02	2.90E-04	3.41E-04	3.75E-02	17700	8 hour	0.0			
2-Propanol (Isopropyl alcohol)	67630	2.81E-01	1.56E-03	4.94E-03	2.88E-01	220	24 hour	0.1			
Trichlorofluoromethane	75694	1.18E-02	5.51E-04	5.63E-04	1.30E-02	56200	1 hour	0.0			

<sup>1</sup> A screening level has not been derived, default value has been used.

<sup>2</sup> There is not a screening level for mercury. EPA's RfC value is used for this analysis.

**Appendix B  
 STATE AIR REGULATIONS**

State Rule	Description of State Air Regulations
<b>R 336.1201</b>	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 R 336.1279 through R 336.1290 below). R 336.1201 also states that the Department can add conditions to a permit to assure the air laws are met.
<b>R 336.1205</b>	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.)
<b>R 336.1224</b>	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.
<b>R 336.1225 to R 336.1232</b>	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.
<b>R 336.1279 to R 336.1290</b>	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.
<b>R 336.1301</b>	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.
<b>R 336.1331</b>	The particulate emission limits for certain sources are listed. These limits apply to both new and existing equipment.
<b>R 336.1370</b>	Material collected by air pollution control equipment, such as dust, must be disposed of in a manner, which does not cause more air emissions.
<b>R 336.1401 and R 336.1402</b>	Limit the sulfur dioxide emissions from power plants and other fuel burning equipment.
<b>R 336.1601 to R 336.1651</b>	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 R 336.1601 through R 336.1651.
<b>R 336.1702</b>	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 R 336.1601 through R 336.1651.
<b>R 336.1801</b>	Nitrogen oxide emission limits for larger boilers and stationary internal combustion engines are listed.
<b>R 336.1901</b>	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.

**STATE AIR REGULATIONS**

State Rule	Description of State Air Regulations
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.
<p>R 336.2801 to R 336.2804  <b>Prevention of Significant Deterioration (PSD) Regulations</b></p> <p><b>Best Available Control Technology (BACT)</b></p>	<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
<p><b>Section 109 of the Clean Air Act – National Ambient Air Quality Standards (NAAQS)</b></p>	<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 or equal to 10 microns (PM10), particulate matter less than or equal to 2.5 microns (PM2.5), and sulfur dioxide. Portions of Michigan are currently non-attainment for either ozone or PM2.5. Further, in Michigan, State Rules 336.1225 to 336.1232 are used to ensure the public health is protected from other compounds.</p>
<p><b>40 CFR 52.21 – Prevention of Significant Deterioration (PSD) Regulations</b></p> <p><b>Best Available Control Technology</b></p>	<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</p>

**FEDERAL AIR REGULATIONS**

Citation	Description of Federal Air Regulations or Requirements
<b>(BACT)</b>	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. 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.
<b>40 CFR 60 – New Source Performance Standards (NSPS)</b>	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.
<b>Section 112 of the Clean Air Act</b>  <b>Maximum Achievable Control Technology (MACT)</b>  <b>Section 112g</b>	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: 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.