

**ANALYSIS AND PRELIMINARY DETERMINATION
FOR THE PROPOSED CONSTRUCTION OF
A BIOGAS-FIRED ENGINE**

AND

**ANALYSIS AND PRELIMINARY DETERMINATION FOR THE
OPERATION PERMIT FOR AN ELECTRIC GENERATION FACILITY**

**FOR
EXAMPLE,
LOCATED AT
123 EXAMPLE DRIVE,
LA CROSSE, LA CROSSE COUNTY, WISCONSIN**

Construction Permit No.: 21-ABC-123
Operation Permit No.: 12345678A-F01
Facility ID No.: 123456780

This review was performed by the Wisconsin Department of Natural Resources, Air Management Program, in accordance with Chapter 285, Wis. Stats., and Chapters NR 400 to NR 499, Wis. Adm. Code.

Preliminary Determination	Signature	Date
Preliminary Determination prepared by:	/s/ Permit Writer	06/14/2021
Stationary source modeling conducted by:	/s/ Stationary Source Modeler	06/07/2021
Peer review conducted by:	/s/ Different Permit Writer	06/16/2021
Compliance review conducted by:	/s/ Compliance Inspector	06/17/2021
Regional Supervisor or Central Office Designee approved by:	/s/ Regional Supervisor	06/30/2021

Commented [DNR AM1]: The Analysis and Preliminary Determination is a technical document that explains why the permit application meets the criteria for permit approval.

The Air Management Program occasionally updates the format and content of the Preliminary Determination document. Therefore, this example may not look exactly like a document that is currently available for public comment.

Note: Copies of the permit application, the department's analysis, preliminary determination and draft permit, and other materials considered by the department when making its preliminary determination can be viewed by using the Air Permit Search Tool located at <http://dnr.wi.gov/topic/AirPermits/Search.html> or by contacting Permit Writer by e-mail at Permit.Writer@wisconsin.gov.

1 INTRODUCTION

Sections 285.60 through 285.69, Wis. Stats. and chapters NR 405 through NR 409, Wis. Adm. Code require certain types of stationary sources that emit or may emit air contaminants to obtain air pollution control permits. The Wisconsin Department of Natural Resources (hereinafter “department”) issues air pollution control permits to new and existing sources of air pollution.

Stationary sources that are not exempt from the requirement to obtain a construction permit under ss. 285.60(2g), (3), (5m) and (6), Wis. Stats. or ch. NR 406, Wis. Adm. Code may not commence construction, reconstruction, replacement, relocation or modification unless a construction permit for the project has been issued by the department. Sources that are not exempt from the requirement to obtain an operation permit under s. NR 407.03, Wis. Adm. Code, are required to obtain or renew an air pollution control permit to continue operation. Changes made at a source of air pollution may require a revision of a previously issued permit in accordance with chs. NR 406.11 and/or NR 407.11 through NR 407.14 and NR 407.16, Wis. Adm. Code.

Owners or operators subject to air pollution control permit requirements submit the appropriate permit application(s) to the department. The applications are reviewed following the provisions set forth in ss. 285.60 to 285.67, Wis. Stats. The criteria for permit approval are outlined in s. NR 285.63, Wis. Stats. and vary depending on whether the source is major or minor and whether the source is or is proposed to be located in an attainment or nonattainment area.

Prior to issuance of an air pollution control permit, the department is required to prepare an analysis regarding the effect of the proposed construction, reconstruction, replacement or modification and/or operation of the source on ambient air quality and make a preliminary determination on the approvability of the permit application based on the criteria in s. 285.63, Wis. Stats. This document is the department’s analysis and preliminary determination for the air pollution control permit action(s) described herein and sets forth the legal and factual basis for the draft permit conditions. The analysis is based on the information contained in the permit application(s) and any additional information requested by the department related to the emissions of air pollutants sufficient to verify which requirements are applicable to the source. The analysis explains why the application(s) should be approved, conditionally approved, or disapproved and identifies the department’s authority for the permit action(s) described herein. Any conditions for approval are contained in the draft permit prepared by the department. The conditions in the draft permit may be revised in any final permit issued based on comments received or further evaluation by the department.

A final decision will not be made on any permit until the applicable notification, public comment and hearing requirements in ss. 285.61 and/or 285.62, Wis. Stats. and/or ss. NR 406.11 and/or NR 407.11 through NR 407.14, Wis. Adm. Code have been met.

2 GENERAL APPLICATION INFORMATION

Owner/Operator: EXAMPLE
123 Example Drive,
City, County, WI

Responsible Official: Jane Doe, CEO
123 Example Drive, City, County, WI
(555) 555-5555
jane.doe@example.org

Application Contact Person: John Smith, Environmental Manager
(555) 555-6666
john.smith@example.org

Commented [DNR AM2]: Much of the information included in the Preliminary Determination document is standard language describing DNR’s air pollution regulating authority and the Air permit application review process.

The sections that are most helpful to someone wanting to understand how a specific source is regulated and the impacts it may have on air quality are the Permit Description, Emission Calculations, Applicable Requirements, and Air Quality Review.

Application Submitted By: Consultant Name, Consulting Firm
(444) 444-4444
consultantname@consultingfirm.com

Application submittal date: April 5, 2021

Additional Information Submitted: May 5, 2021

Date of Complete Application: May 21, 2021

3 PERMIT DESCRIPTION

This analysis and preliminary determination includes the review of air pollution control construction permit 21-ABC-123 and original synthetic minor, non-Part 70 source air pollution control operation permit 12345678A-F01.

3.1 Construction Permit 21-ABC-123

The EXAMPLE facility proposes to construct the new emissions unit described below:

- A new 676 kW non-emergency biogas and/or natural gas fired engine generator (process P01). Process P01 is intended to operate continuously to allow the facility to move toward being energy neutral.

This project requires a construction permit because the proposed source is not one of the specific categories of sources exempt from construction permitting listed in s. NR 406.04(1), Wis. Adm. Code and because regulated air contaminant emissions from the proposed operation of the processes exceed the exemption thresholds in s. NR 406.04(2), Wis. Adm. Code. Maximum theoretical emissions of sulfur dioxide and carbon monoxide exceed 9.0 pounds per hour.

3.2 Operation Permit 12345678A-F01

This construction permit will also be processed with the facility's original source-specific operation permit, 12345678A-F01, which covers operations at the entire facility. The facility will be a synthetic minor, non-Part 70 source.

4 SOURCE DESCRIPTION

The EXAMPLE facility includes a proposed 676-kW non-emergency biogas and/or natural gas fired engine generator that will provide power to the facility.

4.1 Description of New Units

The following are the new emission units whose construction will be authorized by construction permit 21-ABC-123:

Summary of New Emissions Units						
Process, Stack	Process Description	Capacity	Control Device	Control Device Description	Installed/Last Modified	Construction Permit Requirements
P01, S01	Biogas and/or natural gas non-emergency engine generator (Siemens)	676 kW	N/A	N/A	Proposed 2021	21-ABC-123

Commented [DNR AM3]: The Permit Description section explains why the source submitted an air permit application.

If the source is existing, this section lists the changes that will be made to the source's existing air permit.

If the source is a new source, this section lists what type of emission units will be installed at the source.

Emissions Units, Operations and Activities Listed under s. NR 407.05(4)(c)9.:*

Maintenance of grounds, equipment, and buildings (lawn care, painting, etc.)
 Boiler, turbine, and HVAC system maintenance
 Pollution control equipment maintenance
 Internal combustion engines used for warehousing and material transport
 Fire control equipment
 Janitorial activities
 Office activities
 Convenience water heating
 Convenience space heating (< 5 million Btu per hour burning gas, liquid, or wood)
 Fuel oil storage tanks (< 10,000 gallons)
 Demineralization and oxygen scavenging of water for boilers
 Purging of natural gas lines
 Sanitary sewer and plumbing venting

5 EMISSION CALCULATIONS

This section provides information describing how air pollution emissions from the source have been determined. It describes the source of the emission estimates, references emission factors and equations used and/or describes the engineering judgement used to determine emissions. This information provides the department's legal and factual basis for how the emission estimates support the draft permit conditions. As required by 40 CFR s. 70.5(c)(3)i., these emission estimates are sufficient to verify which requirements are applicable to the source. Refer to the Applicable Requirements and Compliance Demonstration section for details regarding how the emission estimates are used to determine the applicable requirements for the source.

5.1 P01: Biogas Generator

Process P01 will be a non-emergency engine generator. The primary fuel combusted in the generator will be treated biogas. The backup fuel will be natural gas. The engine will be subject to the emission standards in 40 CFR part 60, subpart JJJJ, for landfill/digester gas lean burn engines manufactured after July 1, 2010. Additional process information, emission estimates, and the source of the emission factors used to estimate emissions are provided on the following page. The information below assumes biogas is being combusted in the engine because biogas combustion results in higher emissions than does natural gas combustion. Because the engine is uncontrolled and will not be subject to any operational restrictions, the potential to emit (PTE) is equal to the maximum theoretical emissions (MTE) for all pollutants except sulfur dioxide. Because the permit requires the use of treated biogas as fuel, the potential emissions of SO₂ are calculated based on the sulfur content in the treated biogas. The maximum theoretical SO₂ emissions are calculated using the sulfur content in the untreated biogas of 2,000 ppm. Measurements of the sulfur content of the untreated biogas range from 24 ppm to 370 ppm; therefore, 2,000 ppm is a conservatively high assumption for the maximum sulfur content.

The SO₂ MTE is calculated as follows:

$$(10,456 \text{ scf/hr}) * (2,000 \text{ ppmv S}) * (28.32 \text{ L/scf}) * (1 \text{ mol}/24.47 \text{ L}) * (64.06 \text{ g/mol}) * (1 \text{ lb}/453.6 \text{ g}) = 3.42 \text{ lb/hr}$$

$$(3.42 \text{ lb/hr}) * (8760 \text{ hr/yr}) * (1 \text{ ton}/2,000 \text{ lb}) = 14.98 \text{ ton/yr}$$

Commented [DNR AM4]: The Emission Calculations section:

- lists which pollutants are expected to be emitted from the source
- explains how emissions are calculated
- summarizes the expected emission rate for each pollutant

This section is important because it is part of the department's finding that the source is able to meet all applicable emission limits.

Also, different requirements apply to a source depending on which pollutants they emit and how much of each pollutant they emit.

* The emissions units, operations and activities listed here are those identified in s. NR 407.05(4)(c)9., Wis. Adm. Code that are not otherwise included in Part I of this permit. These units, operations and activities are subject to all applicable requirements including those listed in Part II.

Digester Gas/Natural Gas Engine with NSPS Certified Emission Factors¹⁰

Biogas heat value =	650	BTU/cf HHV (average facility data)
Total Maximum Output =	676	kW
	906	HP (converted from kW ¹)
Fuel Consumption @ 100% Load ² =	7,500	BTU/bhp-hr
Capacity =	6,796,247	BTU/hr
	6.8	MMBtu/hour
Potential Fuel Flowrate =	10,456	scf/hr = (MMBtu/hr) / (BTU/scf) * (1,000,000)
CO ₂ Content of Digester Gas Fuel =	35%	
Potential CO ₂ flow rate =	3,660	scf/hr = fuel flow rate * % CO ₂
Sulfur Content =	150	ppm (post-digester gas treatment)

CAS	Pollutant	Emission Factor ³ (g/hp-hr)	Emission Factor ⁵ (lb/MMBtu)	Potential Hourly Emissions (lb/hr)	PTE (ton/yr)
Criteria Pollutants					
	NO _x	2.0		4.0	17.5
	CO	5.0		10.0	43.8
	PM (total) ⁶		9.99E-03	0.068	0.30
	SO ₂ ⁴			0.26	1.1
	VOC	1.0		2.0	8.8
CAS	Pollutant		Emission Factor ⁵ (lb/MMBtu)	Potential Hourly Emissions (lb/hr)	PTE (ton/yr)
Hazardous Air Pollutants					
50-00-0	Formaldehyde		5.28E-02	0.36	1.6
110-54-3	Hexane		1.11E-03	0.008	0.03
7783-06-4	Hydrogen Sulfide		4.01E-04	0.0027	0.012
	Pollutant	Global Warming Potential ⁷	Emission Factor ⁸ (lb/MMBtu)	Potential Hourly Emissions (lb/hr)	PTE (ton/yr)
Greenhouse Gases					
	Carbon Dioxide (CO ₂)	1	116.7	793	3,475
	Methane (CH ₄)	25	0.002	0.015	0.065
	Nitrous Oxide (N ₂ O)	298	0.0002	0.0015	0.0065
	Passthrough CO ₂ ⁹			411	1,798
CO ₂ Equivalent (CO ₂ e)			116.9	1,205	5,277

¹ HP to kW ratio of 0.746² Average brake-specific fuel consumption (BSFC) from Manufacturer Data of Like Engines.³ Emission Factors from NSPS Subpart JJJJ Table 1 of Landfill/Digester Gas Lean Burn post 7/1/2010 engines⁴ Emission factor for SO₂ based on assumed H₂S concentration of biogas. Calculation to find SO₂ emission is as follows: Max Flow Rate (scf/hr) x Sulfur conc. (ppmv) x 28.32 L/scf x mol/24.47 L x 64.06 g/mol x 1 lb/453.6 g = lb/hr⁵ Emission factors based on AP-42 Section 3.2 - Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines, Table 3.2-2.⁶ PM condensable + filterable PM10 is total PM₁₀⁷ Global Warming Potentials from 40 CFR 98 Table A-1.⁸ Emission Factors from 40 CFR 98 Tables C-1 and C-2, Natural Gas, converted to lb/MMBTU⁹ Mass of CO₂ calculated using Ideal Gas Law and assumed conditions, Temperature = 25°C and Pressure = 1 atmosphere. At these conditions, one mole of CO₂ will occupy 24.46 liters (note that 1 cubic foot = 28.3 liter and the molecular weight of CO₂ = 44.01 gram/mol):
1,000,000 cf CO₂ x 28.3 liter/cf = 28.3 million liter/mol x 44.01 gram/mol = 1,245,600 gram/lb = 2,750 lb/ton = 56.1 ton CO₂¹⁰ Emission calculations use the higher emission factor of the two fuel fired options for each pollutant.

6 APPLICABLE REQUIREMENTS AND COMPLIANCE DEMONSTRATION METHODS, MONITORING, AND RECORD KEEPING

This section describes the requirements that are applicable to the source. It includes emission unit and pollutant specific applicable requirements and associated compliance demonstration methods. Emission summary tables are included with references to supporting calculations and/or the source of emission information. As required by 40 CFR s. 70.5(c)(3)i., emission estimates sufficient to verify which requirements are applicable to the source are included in this analysis. Some pollutants subject to regulation under the Act do not currently have specific applicable emission limitations or standards, however they are considered when determining source status under programs, such as Part 70 and PSD, and when determining the applicability of requirements that are based on source status, such as CAM. One such pollutant is PM_{2.5}. Based on definitions in ss. NR 400.02(123m) and (124), Wis. Adm. Code, direct PM_{2.5} emissions cannot exceed PM₁₀ emissions. Since PM₁₀ and PM_{2.5} have the same major source thresholds, emission estimates of PM₁₀ are sufficient for determining Part 70 and PSD source status and CAM applicability with respect to both PM_{2.5} and PM₁₀. When determining Part 70 source status for particulate matter, a stationary facility is a Part 70 major source if it emits or has the potential to emit, 100 tpy or more of PM₁₀ per s. NR 407.02(4)(b), Wis. Adm. Code.

Operation permits are required to contain compliance testing, monitoring, reporting and recordkeeping requirements sufficient to assure compliance with the terms and conditions of the permit. Where an applicable requirement does not require periodic testing or instrumental or non-instrumental monitoring, periodic monitoring or testing sufficient to yield reliable data from the relevant time period that are representative of the source's compliance with the permit shall be included in the operation permit. Monitoring may consist of recordkeeping sufficient to meet this requirement.

Some standards such as NSPS and NESHAP include compliance demonstration, monitoring and recordkeeping requirements within the standard. The compliance demonstration, monitoring and recordkeeping requirements that are part of a standard are included in the draft operation permit, as applicable.

6.1 P01: Biogas Generator

Biogas generator P01 will be subject to requirements for particulate matter, visible emissions, sulfur dioxide, and federal requirements for stationary spark ignition reciprocating internal combustion engines.

Particulate Matter

S. NR 415.06, Wis. Adm. Code: Generator P01 will be a fuel burning installation which will be constructed or last modified after April 1, 1972, is an installation of less than 250 million Btu per hour, and does not burn wood. It is subject to the particulate matter emission limit of 0.15 pounds per million Btu heat input in s. NR 415.06(2)(a), Wis. Adm. Code. The allowable particulate matter emission rate corresponding to this limit is:

$$(6.8 \text{ MMBtu/hr}) \times (0.15 \text{ lb/MMBtu}) = 1.02 \text{ pounds per hour}$$

It is expected that the source will meet the allowable particulate matter emission limit, provided the permittee uses only treated biogas and/or natural gas as fuel, because the maximum theoretical emissions from the combustion of these fuels are less than the allowable emission rate. The draft permit requires the permittee to keep monthly records of the type of fuel combusted in the generator.

Visible Emissions

S. NR 431.05, Wis. Adm. Code: Generator P01 will be constructed or last modified after April 1, 1972. It is subject to a visible emission limitation of 20% opacity, pursuant to s. NR 431.05, Wis. Adm. Code. Generator P01 is expected to meet the visible emission limitation while firing gaseous fuels because they are considered clean burning fuels. The permittee is required to demonstrate compliance with the visible emissions limitation in the same manner as for the particulate matter emissions limitation.

Commented [DNR AM5]: The Applicable Requirements section lists which requirements apply to the source and why.

It is important because it is part of the department's finding that the source will meet all applicable requirements. This section also includes information about compliance demonstration methods, monitoring and recordkeeping that explains how the source is expected to demonstrate compliance with the applicable requirements and why that method of demonstrating compliance is sufficient.

This section of the Preliminary Determination document is the best place to go for more information about why certain requirements are or are not included in the draft permit.

Sulfur Dioxide

Ss. 285.63(1)(b) and 285.65(3), Wis. Stats.: The draft permit includes an hourly SO₂ emission limit for generator P01 of 0.3 pounds per hour. This limit is necessary to ensure the source will not cause or exacerbate a violation of the National Ambient Air Quality Standard for SO₂.

It is expected that the source will meet the allowable SO₂ emission limit, provided the permittee uses only treated biogas and/or natural gas as fuel, because the maximum theoretical emissions from the combustion of these fuels are equal to or less than the allowable emission rate. The draft permit requires the permittee to keep monthly records of the type of fuel combusted in the generator.

Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, 40 CFR Part 60, Subpart JJJJ

Generator P01 will be subject to the New Source Performance Standards (NSPS) for Stationary Spark Ignition Internal Combustion Engines in 40 CFR part 60, subpart JJJJ. The allowable emission rates corresponding to the emission standards in subpart JJJJ are included in the emission calculations in section 5.1 of this document. The applicability of specific requirements from subpart JJJJ is described in the table below.

Federal Standard Applicability	
NSPS for Stationary Spark Ignition Internal Combustion Engines [40 CFR Part 60, Subpart JJJJ, as last amended Dec. 4, 2020] (hereinafter subpart JJJJ)	
Affected Source(s): Stack S01, Process P01: Biogas and/or natural gas non-emergency engine generator (Siemens), 676 kW (906 hp), construction authorized 2021	
<i>This table explains the applicability of the above federal standard for the listed affected source(s), including any operational restrictions. The applicable requirements from the federal standard are included in the draft permit under the authority of s. 285.65(13), Wis. Stats.</i>	
NSPS Section/Requirement	Applicability Description
(60.4230) Applicability	The requirements of subpart JJJJ apply to P01 because it meets the criteria in paragraph (a)(4)(i) of this section: it has a maximum engine power greater than 500 hp and is manufactured after July 1, 2007.
(60.4231), (60.4232) Emission Standards for Manufacturers	The EXAMPLE facility is not an engine manufacturer; therefore, these sections do not apply.
(60.4233) Emission standards for owners or operators of a stationary SI internal combustion engine	Paragraph (a) does not apply because P01 has a maximum engine power greater than 25 hp. Paragraph (b) does not apply because P01 does not use gasoline as fuel. Paragraph (c) does not apply because P01 is not a rich burn engine that uses LPG as fuel. Paragraph (d) does not apply because P01 has a maximum engine power greater than 100 hp. Paragraph (e) does apply to P01 because it has a maximum engine power greater than 100 hp and is not a gasoline or rich burn engine that uses LPG. This paragraph requires the owner or operator to comply with the emission standards in Table 1 of subpart JJJJ. P01 is subject to the standards for landfill/digester gas engines with maximum engine power greater than or equal to 500 hp manufactured after July 1, 2010. Paragraph (f) does not apply because P01 is not a modified or reconstructed engine. Paragraph (g) does not apply because P01 is not a wellhead gas engine. Paragraph (h) does not apply because P01 is not required to meet standards that reference 40 CFR 1048.101.

Commented [DNR AM6]: Since this is just an example, some of the rows have been removed from this table to minimize the length of this document.

National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, 40 CFR Part 63, Subpart ZZZZ

Generator P01 will be subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Reciprocating Internal Combustion Engines in 40 CFR part 63, subpart ZZZZ. The EXAMPLE Facility is an area source of federal HAP emissions. According to 40 CFR 63.6590(a)(2)(iii), P01 will be a new stationary reciprocating internal combustion engine (RICE) because it is a RICE located at an area source of HAP emissions that commenced construction after June 12, 2006. According to 40 CFR 63.590(c)(1), P01 must meet the requirements of subpart ZZZZ by meeting the requirements of 40 CFR part 60, subpart JJJJ.

7 Hazardous Air Contaminants Regulated by Ch. NR 445, Wis. Adm. Code

The facility emits contaminants regulated by chapter NR 445, Wis. Adm. Code. Hazardous air contaminants regulated by Ch. NR 445, Wis. Adm. Code are emitted by the following processes:

P01: Biogas Generator

According to s. NR 445.01(b), Wis. Adm. Code, the emission limitations and control requirements in Ch. NR 445, Wis. Adm. Code, do not apply to hazardous air contaminants emitted by emissions units, operations or activities that are regulated by an emission standard promulgated under section 112 of the Clean Air Act. Biogas generator P01 is subject to the NESHAP for Stationary Reciprocating Internal Combustion Engines in 40 CFR part 63, subpart ZZZZ. The NESHAP is a standard promulgated under section 112 of the Clean Air Act. P01 demonstrates compliance with the NESHAP by meeting the emission standards in the NSPS for Stationary Spark Ignition Internal Combustion Engines in 40 CFR part 60, subpart JJJJ. Therefore, the hazardous air contaminants emitted from P01 are regulated by an emission standard promulgated under section 112 of the Clean Air Act and are not subject to the emission limitations and control requirements in Ch. NR 445, Wis. Adm. Code.

Note: The facility does not generate hazardous air contaminant emissions from the manufacture or treatment of pesticides, rodenticides, insecticides, herbicides, fungicides, or pharmaceuticals. Therefore, the thresholds in Table B and Table C and the requirements of s. NR 445.07(2) and (3), Wis. Adm. Code are not applicable.

8 COMPLIANCE ASSURANCE MONITORING (CAM)

Part 64 of 40 CFR requires that certain pollutant-specific emissions units at sources required to obtain a Part 70 permit, comply with Compliance Assurance Monitoring (CAM) requirements. Because the source is not a Part 70 major source the requirements of CAM do not apply.

9 AIR QUALITY REVIEW

Section 285.63(1)(b), Wis. Stats. allows the department to approve a permit application if it finds the source will not cause or exacerbate a violation of any ambient air quality standard or ambient air increment. See the Criteria for Permit Approval section for additional information and other criteria for permit approval. This section describes the department's finding under s. 285.63(1)(b), Wis. Stats.

Volatile Organic Compounds: The emissions units covered by this permit will be capable of emitting volatile organic compounds. Volatile organic compounds are precursors to ozone. Ozone is a regional pollutant which is formed in the atmosphere through complex chemical reactions. There is no approved dispersion model for predicting the impact VOC emissions from direct stationary sources will have on ozone concentrations. There are no ambient air quality standards specifically for VOCs. Therefore, dispersion modeling of VOC emissions from direct stationary sources is not performed.

PM_{2.5}: The emissions units covered by this permit emit will be capable of emitting PM_{2.5}. For the reasons described in Appendix B of the "Wisconsin Air Dispersion Modeling Guidelines", dated March 2018, the department has concluded that direct PM_{2.5} emissions from existing sources, minor new sources, and minor modifications of sources

Commented [DNR AM7]: The Air Quality Review section explains the department's finding that the source will not cause or exacerbate a violation of any ambient air quality standard or ambient air increment (in other words, the source will not worsen air quality). This section often includes the results of an air dispersion modeling analysis performed by the department to assess the source's impact on local air quality.

do not cause or exacerbate violation of the PM_{2.5} air quality standard or increment. This conclusion and the information contained in Appendix B of the “Wisconsin Air Dispersion Modeling Guidelines” serves as the department’s finding pursuant to s. 285.63(1)(b), Wis. Stats for the PM_{2.5} air quality standard and increment and sets forth the legal and factual basis for the draft permit conditions.

Nitrogen Oxides: The emissions units covered by this permit will be capable of emitting nitrogen oxides (NO_x). For the reasons described in Appendix C of the “Wisconsin Air Dispersion Modeling Guidelines”, dated March 2018, the department has concluded that direct NO_x emissions from stationary sources that are not large and comparatively steady sources of direct NO_x emissions, do not cause or exacerbate violation of the 1-hour NO₂ ambient air quality standard. This conclusion and the information contained in Appendix C of the “Wisconsin Air Dispersion Modeling Guidelines” serves as the department’s finding pursuant to s. 285.63(1)(b), Wis. Stats for the 1-hour NO₂ air quality standard and sets forth the legal and factual basis for the draft permit conditions. Large and comparatively steady sources of NO_x emissions include sources with one or more individual combustion units with a maximum heat input rating of 250 MMBtu/hr or more. The emissions units covered by this permit are not individual combustion units with a maximum heat input of 250 MMBtu/hr or more and the dispersion modeling analysis described below does not assess the impact of these emissions units on 1-hour NO₂ concentrations.

Dispersion modeling of annual NO_x emissions is an effective tool for predicting a source’s impact on ambient annual NO₂ concentrations as explained in Appendix C of the “Wisconsin Air Dispersion Modeling Guidelines”. The dispersion modeling analysis described below assesses the impact of the facility on annual NO₂ concentrations.

Dispersion Analysis: The emissions units covered by this permit emit(s) and/or will be capable of emitting PM₁₀, SO₂, NO_x, and CO. The department performed a dispersion modeling analysis as part of the review for this permit to predict the source’s potential impact on ambient concentrations of these pollutants. The results of the dispersion modeling are summarized in a memo dated June 7, 2021 and are shown below. The dispersion modeling predicts that the source impact will not cause or exacerbate a violation of the ambient air quality standards, taking into consideration background concentrations. The assumptions used in the dispersion modeling, including emission rates and stack parameters are summarized below.

A. INTRODUCTION

A dispersion modeling analysis was completed to assess the impact to ambient air of criteria pollutant emissions from EXAMPLE Facility. This analysis was in support of construction permit 21-ABC-123.

B. MODELING ANALYSIS

- EXAMPLE Facility supplied the emission rates and source parameters used in this analysis. Building dimensions were determined using BPIP-PRIME with measurements taken on plot plans provided with the application. Please refer to the source table for details.
- Five years (2011-2015) of preprocessed meteorological data was used in this analysis. The surface data was collected in La Crosse (EAU), and the upper air meteorological data originated in Minneapolis, MN.
- The AERMIC (AMS/EPA Regulatory Model Improvement Committee) Model (AERMOD) was also used in the analysis. The model used rural dispersion coefficients with the regulatory default options. These allow for calm wind and missing data correction, buoyancy induced dispersion, and building downwash including recirculation cavity effects.
- The receptors used in this analysis consisted of a rectangular grid of 1,027 points with 25-meter resolution extending 300+ meters from the facility. Points inside EXAMPLE Facility fences were not considered. Receptor elevations were derived from AERMAP using the National Elevation Dataset.
- Regional background concentrations included in the analysis can be found at the following link:
<https://dnr.wisconsin.gov/sites/default/files/topic/AirPermits/AQBackgroundConcentrationGuidance.pdf>

- The La Crosse County PSD baselines have NOT been set for PM₁₀, SO₂, or NO₂.

C. MODEL RESULTS

The results of the dispersion modeling analysis indicate that all air quality standards will be met assuming the emission rates and stack parameters listed in the source tables.

Modeling Analysis Results (All Concentrations in µg/m ³)			
	PM ₁₀ - 24 Hour	CO - 1 Hour	CO - 8 Hour
Impact of Increment consuming sources	-	-	-
PSD Increment	30	-	-
% Increment Consumed	-	-	-
Total Concentration (Modeled plus Background)	86	2184	1736
NAAQS	150	40000	10000
% NAAQS	57	6	17

Modeling Analysis Results (All Concentrations in µg/m ³)				
	SO ₂ - 1 Hour	SO ₂ - 3 Hour	SO ₂ - 24 Hour	SO ₂ - Annual
Impact of Increment consuming sources	-	-	-	-
PSD Increment	-	512	91	20
% Increment Consumed	-	-	-	-
Total Concentration (Modeled plus Background)	156	147	-	-
NAAQS	196	1300	-	-
% NAAQS	80	11	-	-

Modeling Analysis Results (All Concentrations in µg/m ³)	
	NO ₂ - Annual
Impact of Increment consuming sources	-
PSD Increment	25
% Increment Consumed	-
Total Concentration (Modeled plus Background)	64
NAAQS	100
% NAAQS	64

D. CONCLUSION

The results of the modeling analysis demonstrate that the applicable air quality standards will be satisfied assuming the emissions rates and stack parameters listed in the source tables.

Point Source Stack Parameters [†]					
Source ID	LOCATION (UTM83)	HEIGHT (M)	DIAMETER (M)	VELOCITY (M/S)	TEMP (K)
S01	640271.26, 4851049.37	7.62	0.305	12.94	533.15

[†] The source parameters in the table were used for modeling purposes, based on conversion from English units. Refer to the permit application forms or submittals in support of the application for the original English unit parameters.

Point Source Emission Rates (lbs/hr)				
Source ID	CO	SO ₂	NO _x	PM ₁₀
S01	10.0	0.3	4.0	0.1

10 EMISSIONS SUMMARY

A. Emissions from New Equipment or Modification – Criteria Pollutants.

Process		PM		PM ₁₀		PM _{2.5}		NO _x		CO		SO ₂		VOC		GHG
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	
PTE	P01	0.07	0.30	0.07	0.30	0.07	0.30	4.0	17.52	10.0	43.80	0.26	1.14	2.0	8.76	5,277
MTE	P01	0.07	0.30	0.07	0.30	0.07	0.30	4.0	17.52	10.0	43.80	3.42	14.98	2.0	8.76	5,277

B. Emissions from New Equipment or Modification – Hazardous Air Pollutants (HAPs).

Process		Stack No.	Stack Height ft	Formaldehyde (F, S) *			Hexane (F, S)			Hydrogen Sulfide (S)		
				lb/hr	lb/yr	TPY	lb/hr	lb/yr	TPY	lb/hr	lb/yr	TPY
PTE	P01	S01	25	0.36	3,154	1.58	0.008	70.0	0.04	0.003	23.6	0.01
MTE	P01	S01	25	0.36	3,154	1.58	0.008	70.0	0.04	1.82	15,937	7.97

* F = Federal HAP; S = State HAP (NR 445)

11 SOURCE CLASSIFICATION

The status of the facility is discussed in this section with respect to Prevention of Significant Deterioration (PSD), Non-Attainment Area (NAA), and Part 70 applicability. This discussion identifies whether the existing facility, the proposed project and the facility after the project are major or minor sources with respect to Part 70 and either PSD or NAA. For PSD, major stationary source has the meaning given in s. NR 405.02(22), Wis. Adm. Code. For Part 70, major source has the meaning given in s. NR 407.02(4), Wis. Adm. Code. For NAA, major source has the meaning given in s. NR 408.02(21), Wis. Adm. Code.

Facility Status After Issuance of Permit(s)

The facility is not located in an area designated as nonattainment for any pollutant.

The facility is a synthetic minor, non-Part 70 source because the draft permit limits emissions sulfur dioxide to below 80% of the Part 70 major source threshold of 100 tons per year. The emissions of each other criteria pollutant are naturally less than 100 tons per year.

The facility is an area (minor) source of hazardous air pollutants regulated by the Clean Air Act (federal HAPs) because the potential emissions of each single federal HAP are less than 10 tons per year and the potential emissions of all federal HAPs combined are less than 25 tons per year.

The facility is a minor source for Prevention of Significant Deterioration (PSD) purposes because the source is not one of the stationary source types listed in s. NR 405.02(22)(a), Wis. Adm. Code and the potential emissions of each air contaminant subject to regulation under the Act are less than 249 tons per year.

Project Status

The proposed project is a minor modification of a minor PSD source.

Source Status Summary

Program ^b	Facility Classification ^a				
	Existing Facility			After Permit Issuance	
	Major ^c	Synthetic Minor ^d	Minor	Major	Minor
PSD			X		X
NAA NSR	Not Applicable			Not Applicable	
Part 70 ^e			X	X	
Federal HAPs			X		X
EPA Class Code ^f			X	SM	

^a A facility can only have one overall classification for each program. If a facility has potential emissions of a single pollutant which exceed the major source thresholds for Part 70, including the major source thresholds for HAPs, the facility is a Part 70 source. The same applies for the EPA class code and the source status for PSD. A facility can be a Part 70 source for criteria pollutants and an area (i.e. minor) source of HAPs. If a facility is a major source of HAPs, it is a Part 70 source.

^b As required by 40 CFR s. 70.5(c)(3)i., emission estimates sufficient to verify which requirements are applicable to the source are included in this analysis. Based on the definitions in ss. NR 400.02(123m) and (124), Wis. Adm. Code, direct PM_{2.5} emissions cannot exceed PM₁₀ emissions. Since PM₁₀ and PM_{2.5} have the same major source thresholds, emission estimates of PM₁₀ are sufficient for determining Part 70 and PSD source status with respect to both PM_{2.5} and PM₁₀.

^c For PSD, major stationary source has the meaning given in s. NR 405.02(22), Wis. Adm. Code. For nonattainment areas (NAA), major stationary source has the meaning given in s. NR 408.02(21), Wis. Adm. Code. For Part 70, major source has the meaning given in s. NR 407.02(4), Wis. Adm. Code.

^d A source classified as synthetic minor is a stationary source that has maximum theoretical emissions greater than the major source threshold and has its potential to emit limited by practicably enforceable permit conditions so that it is not a major source. There are two categories of synthetic minor sources for EPA Class Code, SM80 and SM.

^e Part 70 source is defined in s. NR 407.02(6), Wis. Adm. Code. Note: When determining whether a stationary source is a major source for particulate matter, a stationary source is a Part 70 major source if it emits or has the potential to emit, 100 tpy or more of PM₁₀ per s. NR 407.02(4)(b), Wis. Adm. Code.

^f EPA Class Codes: "A" means the source's maximum theoretical emissions and potential to emit for one or more pollutants are greater than Part 70 major source thresholds. "SM80" means the source's maximum theoretical emissions of one or more pollutants are greater than Part 70 major source thresholds and potential to emit is at least 80% but less than 100% of Part 70 major source thresholds. "SM" means the source's maximum theoretical emissions of one or more pollutants are greater than Part 70 major source thresholds but potential to emit for all pollutants is less than 80% of Part 70 major source thresholds. "B" means the source's maximum theoretical emissions and potential to emit for all pollutants are less than major source thresholds.

Pollutant Specific EPA Class Code

Pollutant specific classifications are used for compliance purposes. A facility can only have one overall EPA class code. The facility's EPA class code is shown in the previous section.

Pollutant	Pollutant Specific EPA Class Code After Permit Issuance			
	A	SM80	SM	B
PM				X
PM ₁₀				X
PM _{2.5}				X
SO ₂			X	
NO _x				X
CO				X
VOC				X
Individual CAA HAPs				X
Total CAA HAPs				X

EPA Class Codes:

A means the source's maximum theoretical emissions and potential to emit for one or more pollutants are greater than Part 70 major source thresholds.

SM80 means the source's maximum theoretical emissions of one or more pollutants are greater than Part 70 major source thresholds and potential to emit is at least 80% but less than 100% of Part 70 major source thresholds.

SM means the source's maximum theoretical emissions of one or more pollutants are greater than Part 70 major source thresholds but potential to emit for all pollutants is less than 80% of Part 70 major source thresholds.

B means the source's maximum theoretical emissions and potential to emit for all pollutants are less than major source thresholds.

12 STATUS UNDER WISCONSIN ENVIRONMENTAL POLICY ACT (WEPA)

An air pollution control construction permit that does not require review under chs. NR 405 or 408, Wis. Adm. Code, is considered a minor action under s. NR 150.20(1m)(o), Wis. Adm. Code and as such, is compliant with WEPA and does not require a determination prior to permit issuance.

The issuance of an initial operation permit under ss. 285.60, and 285.62 Wis. Stats., is considered an integrated analysis action under s. NR 150.20(2)(a)4., Wis. Adm. Code. For further discussion on environmental impacts, please see the attached Environmental Analysis Questionnaire. Actions specified under s. NR 150.20(2), Wis. Adm. Code, require a WEPA compliance determination under s. NR 150.35, Wis. Adm. Code, but do not require any separate environmental analysis under ch. NR 150, Wis. Adm. Code. The department has determined that this type of proposal is not expected to have the potential to cause significant adverse environmental or secondary effects.

Notification of the determination required under s. NR 150.35, Wis. Adm. Code, is included in the public notice.

13 CRITERIA FOR CONSTRUCTION PERMIT APPROVAL

Section 285.63, Wis. Stats., sets forth the specific language for permit approval criteria. The department finds that:

1. The source will meet emission limitations.
2. The source will not cause nor exacerbate a violation of an air quality standard or ambient air increment.
3. The source is operating or seeks to operate under an emission reduction option. Not Applicable.
4. The source will not preclude the construction or operation of another source for which an air pollution control permit application has been received.

14 CRITERIA FOR OPERATION PERMIT APPROVAL

Since issuance of the construction permit also includes renewal of the facility's operation permit, the criteria for operation permit approval set forth in ss. 285.63 and 285.64, Wis. Stats. must be met. Changes in the renewed operation permit that require a construction permit shall meet the criteria for construction permit approval of s. 285.63, Wis. Stats., as outlined above. The department finds that:

1. The facility will meet applicable emission limits and other requirements.
2. The facility will not cause nor exacerbate a violation of an ambient air quality standard or ambient air increment.

15 PRELIMINARY DETERMINATIONS FOR 21-ABC-123 AND 12345678A-F01

The Wisconsin Department of Natural Resources has reviewed application and other materials submitted by EXAMPLE Facility for permit numbers 21-ABC-123 and 12345678A-F01 and hereby makes a preliminary determination that this project, when constructed and operated consistent with the application and subsequent information submitted, will be able to meet the emission limits and conditions included in the attached draft permit. Furthermore, the department hereby makes a preliminary determination that an operation permit may be issued with the applicable limits and conditions in the draft permit. A final decision regarding emission limits and conditions will be made after the department has reviewed and evaluated all comments received during the public comment period. The applicable limits and conditions in the draft permit may be changed as a result of public comments or further evaluation by the department.

COMMONLY USED ACRONYMS AND ABBREVIATIONS:

acfm	Actual cubic feet per minute	MTE	Maximum Theoretical Emissions
AP-42	Compilation of Air Pollutant Emission Factors	MW	Megawatts
BACT	Best Available Control Technology	n/a	Not Applicable
BTU or btu	British Thermal Unit	N ₂ O	Nitrous Oxide
°C	Degrees Celsius	NAA	Non-Attainment Area
CAA	Federal Clean Air Act	NAAQS	National Ambient Air Quality Standards
CAM	Compliance Assurance Monitoring	NESHAP	National Emission Standard for Hazardous Air Pollutants
CEM	Continuous Emission Monitoring	NMOC	Non-methane Organic Compounds
CFR	Code of Federal Regulations	NO ₂	Nitrogen Dioxide
CH ₄	Methane	NO _x	Oxides of Nitrogen
CI	Compression Ignition	NSCR	Non-Selective Catalytic Reduction
CO	Carbon Monoxide	NSPS	New Source Performance Standards
CO ₂	Carbon Dioxide	NSR	New Source Review
CO ₂ e	Carbon Dioxide Equivalents	Pb	Lead
COMS	Continuous Opacity Monitoring System	PHAP	Hazardous Air Pollutant Emitted as a Particulate
Department	Wisconsin Department of Natural Resources	PM	Particulate Matter
dscf	Dry standard cubic foot	PM ₁₀	Particulate Matter less than 10 microns in diameter
dscm	Dry standard cubic meter	PM _{2.5}	Particulate Matter less than 2.5 microns in diameter
EPA	United States Environmental Protection Agency	ppm	Parts per million
ESP	Electrostatic Precipitator	ppmdv	Parts per million dry volume
°F	Degrees Fahrenheit	ppmv	Parts per million by volume
FESOP	Federal Enforceable State Operating Permit	ppmw	Parts per million by weight
FID	Facility Identification Number	PSD	Prevention of Significant Deterioration
FOP	Federal Operating Permit	psia	Pounds per square inch absolute
ft	Feet	psig	Pounds per square inch gauge
g	Grams	PTE	Potential to Emit
GACT	Generally Available Control Technology	RACT	Reasonable Available Control Technology
GCP	General Construction Permit	RCP	Registration Construction Permit
GHG	Greenhouse Gas	RICE	Reciprocating Internal Combustion Engine
GOP	General Operation Permit	ROG	Reactive Organic Gases
gr	Grains	ROP	Registration Operating Permit
GWP	Global Warming Potential	s.	Section

COMMONLY USED ACRONYMS AND ABBREVIATIONS:

HAP	Hazardous Air Pollutant	scf	Standard cubic feet
Hg	Mercury	sec	Seconds
hr	Hour	SCR	Selective Catalytic Reduction
hp	Horsepower	SDS	Safety Data Sheet
H ₂ S	Hydrogen Sulfide	SI	Spark Ignition
HVLP	High Volume Low Pressure	SNCR	Selective Non-Catalytic Reduction
Kg	Kilogram	SO ₂	Sulfur Dioxide
kW	Kilowatt	SOP	State Operating Permit
LACT	Latest Available Control Techniques	Temp	Temperature
LAER	Lowest Achievable Emission Rate	THC	Total Hydrocarbons
lb	Pound	TPY	Tons per year
m	Meter	µg	Microgram
MACT	Maximum Achievable Control Technology	VE	Visible Emissions
MPAP	Malfunction, Prevention, and Abatement Plan	VHAP	Hazardous Pollutant Emitted as a Vapor
mg	Milligram	VOC	Volatile Organic Compounds
mm	Millimeter	Wis. Adm. Code	Wisconsin Administrative Code
MM	Million	Wis. Stats.	Wisconsin Statutes
MMBtu/hr	Million British Thermal Units Per Hour	yr	Year
MSDS	Material Safety Data Sheet	MTE	Maximum Theoretical Emissions

16 PERMIT FEE CALCULATION

BASIC FEES.

Construction or replacement of a PSD or NAA minor source or the PSD or NAA minor modification of a Part 70 minor source [\$3,000; s. NR 410.03(1)(a)1., Wis. Adm. Code] \$3,000.00

TOTAL BASIC FEES \$3,000.00

ADDITIONAL FEES.

The permit application is for a PSD or NAA minor source or minor modification to a major PSD or NAA source whose projected air quality impact requires a detailed air quality modeling analysis. [\$1,000] \$1,000.00

The application is for a source which requires specific permit conditions limiting the potential to emit to make the source a minor source or to make the modification a minor modification [\$3,500]. \$3,500.00

TOTAL ADDITIONAL FEES \$4,500.00

TOTAL FEES (Total Basic Fees + Total Additional Fees) \$8,000.00

CREDITS.

The initial fee submitted with the application [\$7,500] -\$7,500.00

TOTAL CREDITS -\$7,500.00

TOTAL AMOUNT DUE (Total Fee + Total Credit) \$500.00

Commented [DNR AM8]: This section is included only for construction permits.

Field Code Changed

ENVIRONMENTAL ANALYSIS QUESTIONNAIREWisconsin Department of Natural Resources
Air Management Program

Commented [DNR AM9]: This section is included only for original operation permits.

I. Applicant Information:Applicant: This questionnaire would be completed by the applicant

Address: _____

Contact Information: Tel: _____ E-mail: _____

Title of Proposal: _____

Location: County: _____ City/Town/Village: _____

Township Range Section(s): _____

☐ Attach any maps, plans and other descriptive material.**II. Brief overview of the proposal:**

III. Purpose and need (include history and background as appropriate):

IV. Authorities and approvals (list local, state and federal permits or approvals required):

Please list all other approvals required for this project. If additional approvals are required, you should also consider these under sections V. and VI. below.

V. Environmental analysis:**A. Analysis of affected environment and probable impacts (primary, secondary and cumulative)**

Have you researched to determine if there are any of the following on the affected property or that may be affected by actions resulting from the project? Briefly describe any existing features or resources that may be affected by the proposal and the probable impacts on those features. Provide any supporting information that demonstrates that you have done this.

- ☐ 1. Physical environment (land use, geologic, soils and topographic)

- ☐ 2. Physical environment (surface waters, groundwater resources and wetlands)

- ☐ 3. Biological environment - threatened/endangered resources (NHI)

- ☐ 4. Biological environment – Aquatic species and habitats

- ☐ 5. Biological environment – Terrestrial species and habitats

- ☐ 6. Social and economic – environmental justice and economic impacts including traffic, public safety, noise and visual change impacts on neighboring or other populations

- ☐ 7. Social and economic - archaeological/historical sites

- ☐ 8. Other special resources (e.g., State Natural Areas)

B. Analysis of alternatives

Briefly describe the impacts of no action and of alternatives to the project that would decrease or eliminate adverse environmental impacts

VI. Other considerations and assessing the need for an Environmental Impact Statement (EIS)**A. Does the Project meet any of the following criteria under s. NR 150.20(4)(b)? All of the following are considerations for whether an Environmental Impact Statement may be prepared. Check all that potentially apply.**

- ☐ 1. The project involves multiple Department actions.
- ☐ 2. The project may be in conflict with local, state or federal environmental policies [NR 150.20(4)(b)2. Wis. Adm. Code].
- ☐ 3. The project may set precedent for reducing or limiting environmental protection [NR 150.20(4)(b)3. Wis. Adm. Code].
- ☐ 4. The project may result in deleterious effects over large geographic areas [NR 150.20(4)(b)4. Wis. Adm. Code].
- ☐ 5. The project may result in long-term deleterious effects that are prohibitively difficult or expensive to reverse [NR 150.20(4)(b)5. Wis. Adm. Code].
- ☐ 6. The project may result in deleterious effects on especially important, critical, or sensitive environmental resources [NR 150.20(4)(b)6. Wis. Adm. Code].
- ☐ 7. The project involves broad public controversy [NR 150.20(4)(b)7. Wis. Adm. Code].
- ☐ 8. The project may result in substantial risk to human life, health, or safety [NR 150.20(4)(b)8. Wis. Adm. Code].

B. For all boxes checked in A. above, describe the criteria in more detail below.
